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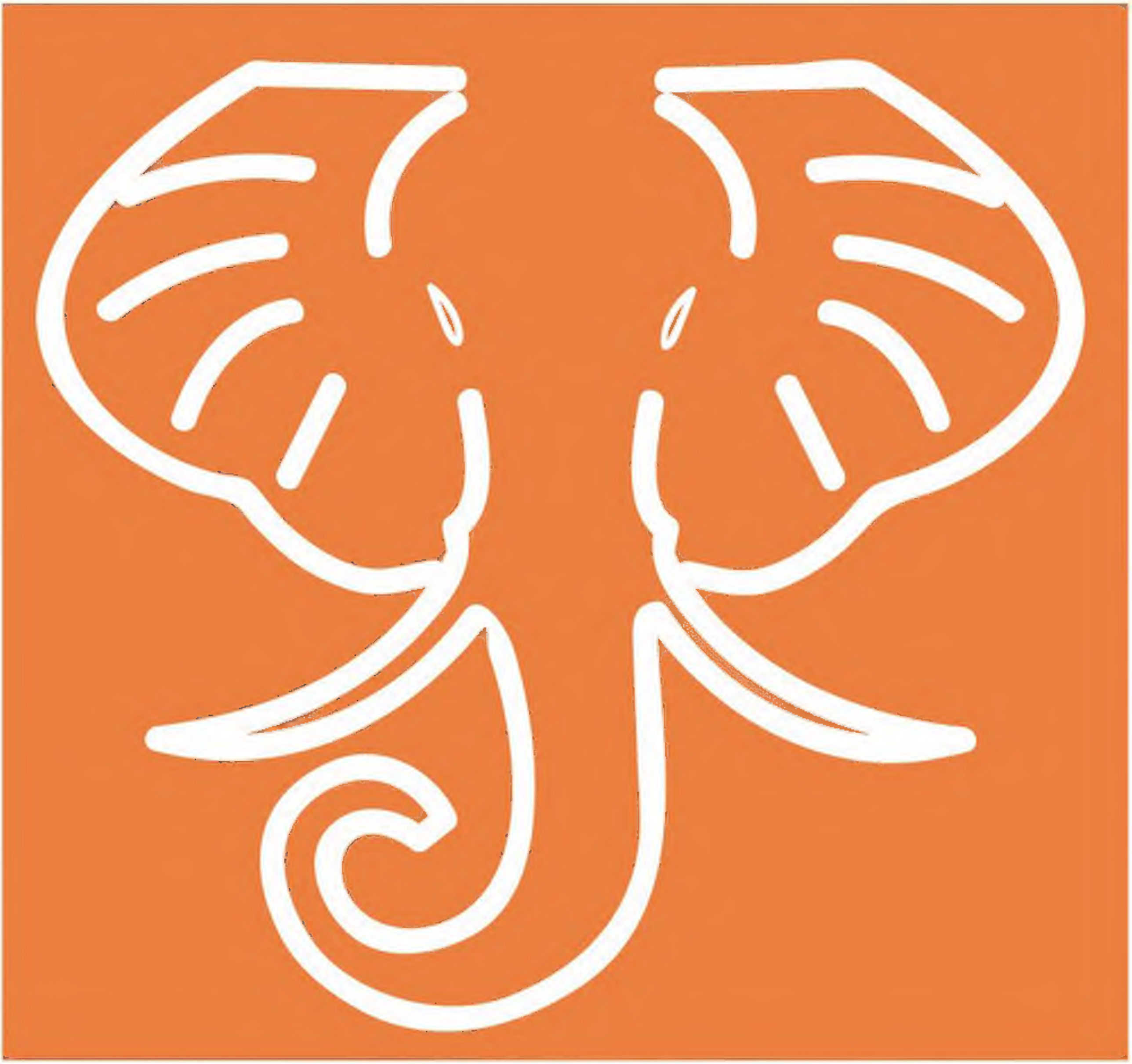

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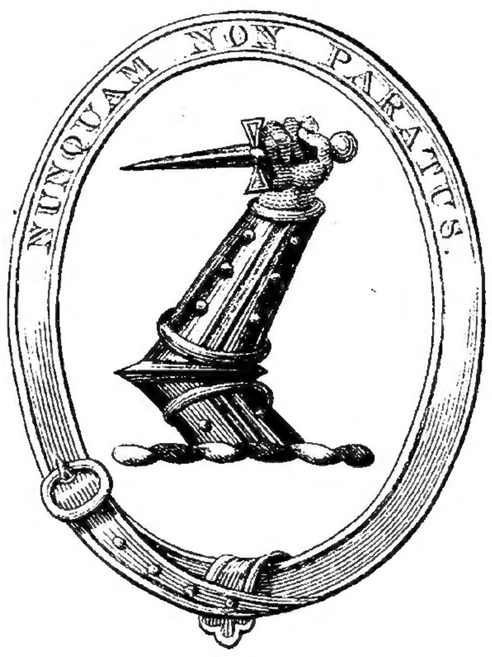

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THE

CYCLOPÆDIA;

OR,

Universal Dictionary

OF

ARTS, SCIENCES, AND LITERATURE.

VOL. XI.

Printed by A. Strahan,
New-Street-Square, London.

THE

CYCLOPÆDIA;

B 2313

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS,

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IN THIRTY-NINE VOLUMES.

VOL. XI.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, ORME, & BROWN, PATERNOSTER-ROW,

F.C. AND J. RIVINGTON, A. STRAHAN, PAYNE AND FOSS, SCATCHERD AND LETTERMAN, J. CUTHELL, CLARKE AND SONS, LACKINGTON HUGHES HARDING MAVOR AND JONES, J. AND A. ARCH, CADELL AND DAVIES, S. BAGSTER, J. MAWMAN, JAMES BLACK AND SON, BLACK KINGSBURY PARBURY AND ALLEN, R. SCHOLEY, J. BOOTH, J. BOOKER, SUTTABY EVANCE AND FOX, BALDWIN CRADOCK AND JOY, SHERWOOD NEELY AND JONES, R. SAUNDERS, HURST ROBINSON AND CO., J. DICKINSON, J. PATERSON, E. WHITESIDE, WILSON AND SONS, AND BRODIE AND DOWDING.

1819.

CYCLOPÆDIA:

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OF

ARTS and SCIENCES.

D

D, The fourth letter in the alphabet, and the third conſonant.

The letter D is the fourth in the Hebrew, Chaldee, Samaritan, Syriac, Greek, and Latin alphabets; in the five firſt of which languages it has the ſame name, though ſomewhat differently ſpoken, *e. gr.* in Hebrew, Samaritan, and Chaldee, *Daleth;* in Syriac, *Dolath;* and in Greek, *Delta.*

The Arabians have three D's in their language, the firſt called *Dal*, which is the eighth of the twenty-eight letters; the ſecond, called *Dhſal*, is only diſtinguiſhed from the former by having a point added over it; though its ſound is much the ſame with that of the Z: the third, which is their ſeventeenth letter, is called *Da*, and pronounced like our D, though in form it reſembles the Arabic *Ta*, the difference being a point added at the top. The form of our D is the ſame with that of the Latins; as appears from all the ancient medals and inſcriptions. And the Latin D is no other than the Greek Δ, rounded a little, by making it quicker, and at two ſtrokes. The Δ of the Greeks, again, is borrowed from the ancient character of the Hebrew *Daleth;* which form it ſtill retains on the Samaritan coins, as is ſhewn by the Jeſuit Souciet, in his Diſſertation on the Samaritan Medals. All the alteration the Greeks have made in it, is the making it ſtoop a little, and taking away a little line. Nor would it be difficult to ſhew, that the Syriac *Dolath*, and the Arabic *Dal*, are both borrowed from the ancient Hebrew, as well as the ד *Daleth* of the modern, or ChaldeeHebrew.

Some indeed will have it, that the Greek Δ, *Delta*, is borrowed from the Egyptians, who made their D of three ſtars diſpoſed in a triangle; which was a hieroglyphic that among them denoted God, the ſovereign Being, as if they had ſome notion of a Trinity: but this ſurmiſe is weakly ſupported.

Grammarians generally rank D among the lingual letters, as ſuppoſing the tongue to have the principal ſhare in the pronunciation thereof; though the abbot de Dangeau ſeems to have reaſon in making it a palatal letter. It has one uniform ſound, nearly approaching to that of T, but formed by a ſtronger appulſe of the tongue to the upper part of the mouth.

D is alſo a numeral letter ſignifying *five hundred*, which ariſes hence, that in the Gothic characters the D is half the M, or CIↃ, which ſignifies a thouſand. Hence the verſe:

"Litera D velut A Quingentos ſignificabit."

A daſh added at the top of the $\overline{D}$, denotes it to ſtand for *five thouſand.*

D uſed in abbreviation has various ſignifications; thus, D ſtands for doctor, and M.D. doctor of medicine, D.T. doctor of theology, D.D. doctor of divinity, or *dono dedit;* D.D.D. is uſed for *dat, dicat, dedicat;* and D.D.D.D. for *dignum deo donum dedit.*

Among Roman writers, D ſtands for *divus, decimus, devotus, diebus*, and *diutius.*

D.M. in the Roman epitaphs ſignifies *diis manibus*, but on other occaſions *deo magno*, or *diis magnis;* D.N. denoted *dominus noſter*, a title given by the Romans to their emperors.

D, on the French coins, is the mark of the city of Lyons. D, in the chemical alphabet, ſignifies vitriol.

D, in *Engliſh Muſic*, is the initial of *D-ſol-re*, the 5th above gammut, in the ſcale of Guido. It occupies the 3d line in the baſe, and the 4th in the treble. In all tenor clefs it is in the ſpace immediately above the line on which the clef is placed. In French muſic, D has the ſame ſignification as P in the Italian; that is to ſay, *doux, ſoft.* The Italians ſometimes uſe it for *dolce*, which is not only oppoſed to *forte, loud*, but to rough and coarſe, and in Italian and Spaniſh muſic for keyed-inſtruments, it is uſed for *deſtra, the right-hand.* D, in German muſic, implies diſcant, or treble, in thorough baſe. In French muſic, it likewiſe

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ſtands for *deſſus*, or *the treble part; d. m. dextra manu*, with the right-hand, is implied in leſſon-playing; and D. C. implies *Da Capo;* which ſee.

DA, is an Italian prepoſition, which implies *for:* as *da* cappella, for the chapel; ſonate *da* camera, chamber-ſonatas; ſonate *da* chieſa, ſonatas for the church. *Da* capo, repeat the firſt part from the beginning; *da* ſuonare, to be played in a ſong where the initial and incidental ſymphonies, or ritornelli, are interted in the ſame line as the voice part.

DAÆ, in *Ancient Geography*. See DAHÆ.

DAALDER, in *Commerce*. See DOLLAR and COIN.

DAALHAUSEN, in *Geography*, a town of Germany, in the circle of Weſtphalia, and biſhopric of Paderborn; 9 miles N.N.E. of Warburg.

DAB, in *Ichthyology*, a name given by the Engliſh to a ſmall fiſh of the pleuronectes kind, called by authors the *paſſer aſper* and *limanda*. See PLEURONECTES *limanda*.

DABAIBA, in *Mythology*, an idol of the inhabitants of Panama. This goddeſs, having been a female of diſtinguiſhed virtue, was deified after her death, and called by her votaries "the mother of God." To her anger they aſcribe thunder and lightning. In honour of her they burnt ſlaves as ſacrifices; and they worſhip her by faſting three or four days together, and by trivial acts of devotion, ſuch as ſighs, groans, extacies, and the like.

DABARITA, or DARABITA, in *Ancient Geography*, a village of Paleſtine, according to Joſephus, ſituated at the extremity of Galilee and Samaria.

DABASÆ, a people of India, on the other ſide of the Ganges.

DABASCHET, DABBASCHET, or *Dabbaſeth*, the frontier town of the tribe of Zabulon, in Paleſtine.

DABBER, in *Agriculture*, a term applied in ſome diſtricts to the tool uſed in dibbling, or ſetting different ſorts of crops, as thoſe of wheat, potatoes, and others. It is more frequently called a dibble or ſetting ſtick. See DIBBLE.

DABBERETH, in *Ancient Geography*, a town of Judæa, in the diviſion of the tribe of Iſſachar, according to the book of Joſhua; allotted to the Levites of the family of Gerſhon; and probably that called by Jerome *Dabira*, which he places towards mount Thabor, in the canton of Diocæſarea.

DABBING, in *Agriculture*, is a word ſometimes uſed to ſignify the operation of dibbling. See DIBBLING.

DABBUDA, in *Muſic*, a kind of Turkiſh dulcimer.

DAB-CHICK, in *Rural Economy*, a term which is ſometimes made uſe of to ſignify a chick which has been juſt hatched.

DABER, in *Geography*, formerly called *Dober*, a ſmall town of Pruſſia, in Pomerania, in the ancient duchy of Caſſuben, or Caſſubia.

DABER, or *Debir*, called *Kirjath-Sepher*, a town of Paleſtine, in the tribe of Judah, not far from Hebron. It was given to the Levites; after Joſhua had taken it and put its king to death.

DABHAUSEN, a ſmall town of Germany, in the circle of the Upper Rhine, with ſome thriving manufactures which were eſtabliſhed after the revocation of the edict of Nantes by induſtrious French Proteſtant refugees. It belongs to the counts of Solms, who at preſent hold their fiefs under the ſupremacy of the king of Weſtphalia.

DABIA, in *Ancient Geography*, a town of Africa, in Mauritania Tingitania, near mount Cirna.

DABIA, or *Dabai*, in *Geography*, a town of Egypt; 21 miles S. of Cairo.

DABIS, in *Mythology*, a deity of Japan, in repreſentation of which a large brazen Coloſſus, or image, is placed on the road from Oſacia to Sorungo. To this deity is offered annually a ſpotleſs virgin, who, being inſtructed to aſk the god ſome particular queſtions, receives an anſwer from a bonze, or prieſt, encloſed within the hollow of this idol.

DABLIS, in *Ancient Geography*, a town of Aſia Minor, in Bithynia; 24 miles from Cœnos Gallicanos, according to the Itinerary of Antonine.

DABO. See DACHSPERG.

DABRA-SHIN, in *Geography*, a town of Egypt; 12 miles S. of Cairo.

DABUH, in *Zoology*, a name given by the Arabs to the hyæna.

DABUL, in *Geography*, a town of India, on the coaſt of Concan, taken and ſacked by the Portugueſe, under the conduct of Almeyda, in 1509; but re-taken by the natives. The principal articles of its commerce are pepper and ſalt; 75 miles S. of Bombay. N. lat. 17° 52′. E. long. 72° 53′.

DA CAPO, Ital. muſical terms, implying, after an air or movement ſeems finiſhed, a return to the firſt part or ſtrain, which is to be repeated from the beginning, to the corona, 𝄐, or final mark; in the early periods of the opera, and of cantatas, when recitatives for the dialogue and narrative parts of a poem began to be terminated by ſhort airs, which often ſerved for ſeveral different ſtanzas, like thoſe of modern ballads. Before the terms da capo were in uſe, the air was written over again, as often as it was wanted, ſometimes in exactly the ſame notes, but more frequently, with little changes and embelliſhments, to the ſame baſe, and to different ſtanzas.

In the opera of Orontea, by Ceſti, performed at Venice, 1666, there are frequent returns to particular portions of the airs, more, indeed, in the manner of a refrein, or burden, than da capo, or rondo; but in the opera of Enea, performed at Genoa, 1676; in that of Aurora, ſet by Zanetti, and performed in the ſame city, 1678, there is a conſtant da capo, or return to the firſt part of each ſong. The practice ſeems to have begun about the year 1660. And in 1661, we find it ſometimes uſed in the opera of Clearco, ſet by Tenaglia, and performed at Rome. In the motets, *à voce ſola*, di Monferrato, printed 1673, da capos occur; about which time they became frequent; and before 1680, they appear to have been in conſtant uſe.

Among new muſical technica in the Arioſe Cantate of Sebaſtian Enno, publiſhed at Venice, 1655, we find da capo ſe piace, if you pleaſe. But the firſt intereſting air in a ſerious opera, that was performed in England, without a da capo, we believe, was, Se cerca ſe dice, in 1742, as ſet with ſuch dramatic propriety and effect by Pergoleſi, and ſung by Monticelli. The next was Rende mi il figlio mio, ſung by the Mattei in Cocchi's Ciro riconoſciuto, 1759. But it was in the operas of J. Chr. Bach, that da capos firſt totally diſappeared, and which, about this time, began to be generally diſcontinued: the ſecond part being incorporated with the firſt, to which, after modulating into the 5th of the key, the ſinger generally returns.

DACCA, in *Geography*, a town of Hindooſtan, ſituated in the eaſtern quarter of Bengal, and beyond the principal ſtream of the Ganges, though a very conſiderable branch of the ſame river runs through it. It is very favourably ſtationed for an inland emporium of trade, as the Dacca river communicates directly and not circuitouſly with all the other inland navigations. Dacca ſucceeded Sonergorg, as the provincial capital of this quarter; and it is the third city of Bengal, with reſpect to extent and population. It has a vaſt trade in muſlins, which are among the moſt delicate that are ſought after in Europe; and the cotton is produced within the province. Within the laſt century Dacca

was

was the capital of Bengal. It has ſtill the remains of a ſtrong fortreſs; and within a few years it had in its vicinity a cannon of extraordinary weight and dimenſions, which has ſince, together with the bank on which it reſted, fallen into the river. Major Rennell has given the dimenſions of this curious piece of artillery from his own meaſurement. His account of it is as follows; "It was made of hammered iron; it being an immenſe tube formed of 14 bars, with rings of 2 or 3 inches wide driven over them, and hammered down into a ſmooth ſurface; ſo that its appearance was equal to that of the beſt executed piece of braſs ordnance; although its proportions were faulty.

Whole length -	22 feet	10½ inches.
Diameter at the breech	3	3
——————4 feet from the muzzle	2	10
——————of the muzzle -	2	2½
——————of the bore -	1	3⅕

The gun contained 234,413 cubic inches of wrought iron; and conſequently weighed 64,814 pounds avoirdupoiſe, or [illegible]t the weight of eleven 32 pounders. Weight of an iron ſhot for the gun 465 pounds.

Dacca is ſituated about 100 miles above the mouth of the Ganges, and 180 by the road from Calcutta. The country round it lying low, and being always covered with verdure during the dry months, it is not ſubject to ſuch violent heats as Moorſhedabad, Patna, and other places. Its ſituation is 601 miles S. E. from Benares, 790 in the ſame direction from Lucknow, 120 E.S.E. from Moorſhedabad, and 177 N. E. from Calcutta. N. lat. 23° 43'. E. long. 90° 30'.

DACE, in *Ichthyology*, the Engliſh name for the fiſh, called by authors the *leuciſcus*. See CYPRINUS *leuciſcus*.

The dace is very common in our rivers, and is a remarkably lively fiſh. They ſpawn in February, and the males at that time are ſpotted and ſcabby, as in the rudd, &c. and are in higheſt ſeaſon for the table in April and May; but they are never a very well-taſted fiſh, or much eſteemed.

This fiſh gives the expert angler great diverſion. The dace will bite at any fly; but he is more than ordinarily fond of the ſtone-caddis, or May-fly, which is plentiful in the latter end of April, and the whole month of May. In warm weather this fiſh very ſeldom refuſes a fly at the top of the water; but at other times he muſt have the bait ſunk to within about three inches of the bottom. The winter fiſhing for dace requires a very different bait: this is a white maggot with a reddiſh head, which is the produce of the eggs of the beetle, and is turned up with the plough in great abundance. A parcel of theſe put in any veſſel, with the earth they were taken in, will keep many months, and ſupply an excellent bait.

Small dace may be put into a glaſs jar with freſh water, and there preſerved alive for a long time, if the water be properly changed. They have been obſerved to eat nothing but the animalcula in the water. They will grow very tame by degrees. Phil. Tranſ. N° 487. p. 23. ſeq.

DACHARENI, in *Ancient Geography*, a people of Arabia Felix. Ptolemy.

DACHAU, in *Geography*, a town of Bavaria, ſeated on an eminence on the river Ammer, in the diſtrict of Munich in Upper Bavaria, remarkable for an ancient caſtle. There is a communication between this place and Schleiſheim, a country palace of the kings of Bavaria, by means of a canal.

DACHETZ, or DACZICE, a ſmall town of Auſtria, in the margraviate of Moravia, in the diſtrict of Iglau, on the river Teya, with a convent of Franciſcan friars.

DACHINABADES, in *Ancient Geography*, a very populous country of India, S. of Barygaza, according to Arrian, in the Periplus of the Erythrean ſea.

DACHSBACH, in *Geography*, a town of Germany, in the circle of Franconia, and principality of Culmbach; 22 miles S. of Bamberg.

DACHSPERG, DAGSBOURG, or *Dabo*, a ſmall town of France, in the department of the Lower Rhine, in the diſtrict of Saverne, ſituated among the mountains called the Voſges, near the ſource of the river Sarre; 9 miles S. of Saverne.

DACHSTEIN, a ſmall town of France, in the department of the Lower Rhine, in the diſtrict of Straſbourg; 3 miles N. E. of Molſheim.

DACHSTUL, a town of Germany, in the circle of the Upper Rhine, and principal place of a lordſhip, which gives the poſſeſſor a ſeat and vote at the diets of the circle, but not of the empire; 22 miles S. E. of Treves.

DACI, in *Ancient Geography*, the people of Dacia, who inhabited the country N. of the Danube, from the plains occupied by the Sarmatian Jazyges, to the mouths of this river and the coaſt of the Euxine ſea. They had the ſame language with the Getæ. Strabo ſays, that they inhabited the upper part of this country, as it reſpects the courſe of the river, from the territory of the Suevi to that of the Tyrigetæ; and he aſſigns to the Getæ the lower part. Pliny, Steph. Byz., and Dion Caſſius ſay, that theſe people were called Getæ by the Greeks, and Dacians by the Romans. Herodotus calls them Scythians, and he gives them the epithet of immortals, becauſe they thought that, after death, they went to Zamolxis, who was a diſciple of Pythagoras. He had left them ſome inſtructions, which laid the foundation of their religion. They were a brave people. Alexander made war againſt them and burnt their city. The ſucceſſors of this prince attempted to ſubdue them, but one of their chiefs, having taken Lyſimachus, convinced them that they had done wrong in attacking a people as poor as they were brave. However, after the death of their king Berebiſtus, they quarrelled among themſelves, and unable to collect more then 20,000 men againſt Auguſtus, he vanquiſhed them without difficulty. They afterwards cauſed ſome diſturbance under Domitian; but Trajan effectually ſubdued them, and reduced their country into the ſtate of a Roman province. Florus ſays, that the Dacians croſſed the Danube, and advanced as far as Thrace, Macedonia, and Illyrium. Suetonius relates that Cæſar deſigned to reſtrain their progreſs; but this deſign was accompliſhed by Auguſtus. The emperor Aurelian, according to Vopiſcus, deſpairing of preſerving Dacia on the other ſide of the Danube, formed a new province of Dacia between the two territories denominated Mœſia.

It appears, however, that the Dacians inhabited the whole extent of country that lies between the Pruth, the Danube, the Tibiſcus, and the Carpathian mountains; and this was called "Dacia vera," or the province of Trajan. Under the reign of Trajan, Decebalus, king of the Dacians, revolted: upon which their prince, A.D. 106, carried his arms into Dacia, twice defeated theſe people, and formed their country into a Roman province, which was for a long time diſtinguiſhed by the name of "Provincia Trajani." See DACIA.

DACIA, the ancient name of two countries of Europe; the one on this ſide of the Danube called "Dacia Aureliani;" the other, called "Dacia Trajani," on the other ſide of the river. The latter comprehended Tranſylvania, Moldavia, Wallachia, and the bannat of Temeſwar, or

that country of Europe between the Danube and the Carpathian mountains, which, after an obſtinate ſtruggle of five years, was ſubdued by the Romans, annexed to the Roman empire in the reign of Trajan and joined to Mœſia, or modern Bulgaria, by an admirable bridge, the ruins of which are ſtill ſeen near Tſchernetz.

The river Tyras, Danaſter, or Nieſter, which runs from the north-weſt to the ſouth-eaſt, ſerved with the Alpes Baſtarnicæ, or Carpathian mountains, to form the boundary of this province to the north and north-eaſt. On the eaſt was the Euxine ſea, and on the weſt it was defended by an intrenchment. According to M. D'Anville, it was about 13 hundred miles in circumference. In the centre of the country was mount "Concajou," which was deemed ſacred by the Getæ. The principal rivers were the Danube, the Tibiſcus, Ternes, or Teyſs, the Aluta, the Ordeſſus, the Ararus, the Porata or Pretus, ſuppoſed to be the Hieraſſus of Ptolemy, and the Tyras or Danaſter. The chief towns of Dacia were, towards the north-weſt, Napoca, Prætoria Auguſta, Apulum, Tibiſcus, and Zarmigethuſa, called Ulpia Trajana; along the Danube from weſt to eaſt, Lederata oppoſite to Vominacium, which belonged to Mœſia, and Ternes, near the bridge of Trajan. The ancient hiſtorians ſcarcely make mention of the country, known under the name of Dacia, before the time when Darius carried his arms againſt the Daci in the year 508, B. C. After having traverſed the Thracian Boſphorus, he was in danger of loſing his whole army in the country of the Getæ, between the Iſter and the Aluta. Lyſimachus, to whom Thrace was allotted in the general diſtribution after the death of Alexander, made an unſucceſsful attack upon the Dacians, and was taken priſoner. In the times of Cæſar and Auguſtus, they took up arms againſt the Romans. However, Auguſtus and his firſt ſucceſſors reſtrained, both the Daci and Getæ, within the country on the other ſide of the Danube. Nevertheleſs, when the river was frozen and became paſſable, they made occaſional incurſions into the territory of the empire for the ſake of pillage. Auguſtus, in order to keep them within their own boundaries, entered into ſeveral treaties with them, the general character of which was moderation. Under the ſucceeding emperors the Dacians frequently recurred to arms; and under Domitian, Decebalus, their king, entered Mœſia and defeated Oppius Sabinus; but this emperor concluded with them a diſgraceful peace, and entered Rome in triumph.

Trajan obtained a degreee of ſucceſs, correſponding to his valour and military virtues; and advancing into the country humbled Decebalus and conſtrained him to ſue for peace, which the emperor granted him, though he proved treacherous, and attempted by his emiſſaries, to aſſaſſinate Trajan. The Roman forces afterwards penetrated into the country, and Decebalus, deſpairing of being able to reſiſt them, put an end to his own life. Trajan, as we have already ſaid, reduced Dacia into a Roman province and conſtructed a bridge over the Danube. Zarmigethuſa, the capital, aſſumed the name of the conqueror, and was from this time called Ulpia Trajana. Under the reigns of Adrian and Antonine the Dacians remained quiet; but neither they nor the emperors in ſubſequent periods adhered to the terms of the treaties and conventions that had been eſtabliſhed between them: at a ſubſequent period the Goths, among other inhabitants of the northern regions, invaded the Roman provinces; and they were particularly allured by the rich harveſts which covered the fields of Dacia. This new and unſettled province was neither ſtrong enough to reſiſt, nor rich enough to ſatiate the rapaciouſneſs of the barbarians. As long as the remote banks of the Nieſter were conſidered as the boundary of the Roman power, the fortifications of the Lower Danube were more careleſsly guarded, and the inhabitants of Mœſia lived in ſupine ſecurity, fondly conceiving themſelves at an inacceſſible diſtance from any barbarian invaders. The irruptions of the Goths, however, under the reign of Philip, fatally convinced them of their miſtake. Cniva, the king, or leader of that fierce nation, traverſed with contempt the province of Dacia, and paſſed both the Nieſter and the Danube without encountering any oppoſition capable of retarding his progreſs. At length the emperor Aurelian terminated the Gothic war, which had for 20 years occaſioned great calamities both to the Goths and the Romans, by a laſting and beneficial treaty. As a conſequence of this treaty, the emperor, in the year 274, relinquiſhed the ſovereignty of theſe Trans-Danubian provinces, and withdrew the Roman troops and coloniſts to the Cis-Danubian provinces of ancient Mœſia and Illyricum, or modern Bulgaria, Servia, and Boſnia, which were called Hither Dacia. Such of the Roman coloniſts as choſe to remain beyond the Danube were incorporated with the Goths, and ſerved as a medium of intercourſe between the Romans on the ſouth ſide of the Danube and the new ſettlers. The policy of Aurelian was juſtified by the event. The extenſive province of ancient Dacia, or Ulterior Dacia, which the Romans had been unable to defend, oppoſed, after it was become independent, a firm barrier againſt the incurſions of the ſavages of the north, until the declining ſtate of the Roman empire induced the inhabitants, after they had admitted ſucceſſive hordes of barbarians into their country, to iſſue out occaſionally from their woody retreats. They croſſed the Danube in their light boats, and marked their inroads into the Roman provinces with blood and ruin, even to the ſuburbs of Conſtantinople.

The treaty of peace which Attila, king of the Huns, dictated to Theodoſius and the eaſtern empire, A. D. 446, gave him the ſovereignty of ancient Dacia; and he ſtipulated, that, for the convenience of his Dacian ſubjects, a ſafe and plentiful market ſhould be eſtabliſhed on the ſouthern bank of the Danube.

After the death of Attila, and the extinction of his empire, Dacia became the ſeat of a new but tranſitory power, under Ardaric, king of the Gepidæ.

The countries of which ancient Dacia was compoſed were afterwards governed by petty princes, under the protection of the kings of Hungary. Theſe princes, having formed alliances with the kings of Poland, aſſumed independency, but were at laſt forced to ſurrender their countries as fiefs to Auſtria and the Ottoman Porte. Temeſwar and Tranſylvania are now conſidered as parts of the Auſtrian dominions; and Moldavia and Wallachia are tributary to the Ottoman Porte, but are at preſent invaded by the Ruſſians, and likely to be ſevered from the Turkiſh empire. See MOLDAVIA, WALLACHIA, TEMESWAR, TRANSYLVANIA.

DACIER, ANDREW, in *Biography*, was born at Caſtres in 1651; here alſo he received the early parts of his education, and would probably have completed his ſtudies in the ſame college, had not the management of it fallen entirely into the hands of the Jeſuits, a circumſtance that induced him to remove to Saumur, where he received inſtructions from Tannegui le Fevre, a man of great celebrity, whoſe daughter Dacier afterwards married. Within two years of their marriage, they both renounced the Proteſtant religion and conformed to the Roman Catholic faith. Dacier was firſt publicly known as an editor of ſeveral of the Greek and Roman claſſics, in which he was aſſiſted by his learned wife.

wife. He tranſlated the works of Horace into French proſe; the meditations of Marcus Antoninus; the Poetics of Ariſtotle; ſome of the Tragedies of Sophocles; the Manual of Epictetus, and the lives of Plutarch. As a tranſlator he was an enthuſiaſtic admirer of the original authors. He engaged in a controverſy with Perrault concerning the merit of the ancients and moderns, but was not conſidered as an able defender of the cauſe in which he engaged as an advocate. He was admitted a member of the academy of Inſcriptions, and afterwards was elected perpetual ſecretary to the French academy. He was likewiſe keeper of the cabinet of Louvre; theſe facts prove better than a thouſand eulogia, that he was a man of great worth, and unſullied integrity. He died in 1722. He took a part in the Medallic Hiſtory of Lewis XIV., for which he received a penſion. Moreri.

Dacier, Anne Le Fevre, wife of the preceding, and, as we have already obſerved, daughter of Tannegui le Fevre. She was born at Saumur, in the ſame year with her huſband; and was educated with the greateſt care by her father. At an early age ſhe became known as editor and commentator of ſome of the ancient claſſics in both languages. One of her firſt productions ſhe dedicated to the king, which he refuſed to receive from the hands of a proteſtant; the duke de Montauſier, who had introduced her to his ſovereign, was ſeverely reprimanded for encouraging the proſcribed ſect; jealous, however, of his maſter's honour, he took the liberty of expoſtulating with him, proving that he ought to be the patron of merit and talent, wherever, and among whomſoever found; and he added, that he would ſend Mademoiſelle Le Fevre a hundred piſtoles in his majeſty's name, which he might repay or not, as he ſhould judge proper. This circumſtance probably had ſome effect upon the change of ſentiments which M. Dacier and her huſband openly avowed ſoon after their marriage. She was a tranſlator as well as editor. Ariſtophanes, Anacreon, and Homer, were all rendered into French by this lady, ſome of which have been frequently reprinted and diſplay much merit. Notwithwithſtanding the high reputation to which ſhe attained in the literary world, ſhe was far from laying claim to any ſuperiority on that account: ſhe was modeſt and unaffected, but jealous of the honour of thoſe ancient writers whoſe merits ſhe wiſhed her countrymen to feel and acknowledge. She performed the duties of a wife and mother with exemplary affection, and exhibited in the loſs of a ſon of great promiſe, and of a darling daughter, the fortitude of a hero, and the reſignation of a true Chriſtian. She died in 1720, much eſteemed and regretted by all who knew her.

DACIO, in *Geography*, the laſt village in the kingdom of Italy, on the borders of Switzerland, and more particularly of the canton of the Griſons near the lake of Chiavenna.

DACIRA, in *Ancient Geography*, a town of Meſopotamia; called by ſome *Diacira*.

DACKENEM, or Dacquenem, in *Geography*, a town of Flanders, eight miles north-eaſt of Ghent.

DACOLITHUS, in *Ichthyology*, a ſpecies of *Cobitis*. See Cobitis *Tænia*.

DACRYDIUM, in *Botany*, (from δακρυ, a *tear*, or gummy diſtillation from a tree.) Solander in Forſter's Pl. Eſculent. 80, and Fl. Inſ. Auſtr. Prod. 92. Lambert Pin. 93. t. 41. Claſs and order, *diœcia monadelphia*. Nat. Ord. *Coniferæ*, Juſſ.

Gen. Ch. Male flowers forming an ovate terminal catkin. *Cal.* the ſcales of the catkin heart-ſhaped, pointed, bearing the anthers. *Cor.* none. *Stam.* Filaments none; anthers two to each ſcale, tranſverſe, orbicular, of two valves. Female flowers on a diſtinct plant, ſolitary, terminal. *Cal. Cor.* and *Style* unknown. *Nut* ovate, encompaſſed at the baſe by a dilated, firm, cup-ſhaped receptacle, and containing one ſeed.

Eſſ. Ch. Male. Calyx the ſcale of a catkin, bearing two ſeſſile anthers. Female. Nut ovate, ſeated in a cup-ſhaped receptacle.

Dacrydium cupreſſinum is figured in captain Cook's ſecond voyage, tab. 51, under the name of the Spruce Fir of New Zealand. It is ſaid to form large foreſts in the ſouth-weſt part of that country, to yield valuable timber, and to afford a kind of ſpruce beer. The leaves are ever-green, ſmall, crowded like thoſe of a *Lycopodium*; the branches elegantly pendent. Its height is from 50 to 100 feet. *D. taxifolium*, another New Zealand ſpecies, is mentioned by Hawkſworth in Cook's firſt voyage, v. iii. 441, as reſembling the Pitch Pine, and likely to make the fineſt maſts in the world, if the trees could be lightened by tapping.

DACRYODES, in *Surgery*, a term applied to ulcers, which are continually yielding a putrid matter.

The word is formed from δακρυ, *tear*, and ειδος, *form*; denoting the ulcers to weep, or ſhed ſomewhat like tears.

DACRYON. See Tears.

DACTYL, Dactylus, a foot in the Latin and Greek poetry, conſiſting of a long ſyllable, followed by two ſhort ones: as *cārmĭnĕ*; and *tenderly*, *haſtily*, in the Engliſh language.

Some ſay it is derived from δακτυλος, a *finger*, becauſe it is divided into three joints, the firſt of which is longer than the other two.

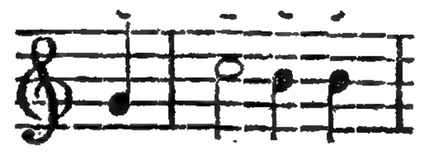
The dactyl is ſaid to have been the invention of Dionyſius or Bacchus, who delivered oracles in this meaſure at Delphos, before Apollo. The Greeks call it πολιτικος. The dactyl and ſpondee are the moſt conſiderable of the poetical feet; as being the meaſures uſed in heroic verſe, by Homer, Virgil, &c. Theſe two are of equal time, but not equal motion. The ſpondee has an even, ſtrong, and ſteady pace, like a trot: the dactyl reſembles the nimbler ſtrokes of a gallop. Paſſages in which the dactyl abounds afford a ſound, which is evidently and intentionally an echo to the ſenſe. Thus Homer (Odyſſ. l. xi.), after he has deſcribed in labouring ſpondees the ſlow and painful manner in which Siſyphus rolled the ſtone up hill, makes uſe of nimble dactyls in deſcribing its ſwift deſcent: thus,

"Αὖθις ἔπειτ' ἄπεδόνδε κυλίνδετο λᾶας ἀναιδὴς."

And Virgil (Æn. viii. v. 595, 596.) deſcribes in pure dactyls the galloping of the horſe: thus,

"——— It clāmŏr, ĕt āgmĭnĕ fāctō
Quādrŭpĕdāntĕ pŭtrēm Sŏnĭtū quătĭt ūngŭlă cāmpūm."

This term, in verſification, as much belongs to muſic as poetry, words frequently occurring in our language, (chiefly adverbs,) conſiſting of one long and two ſhort ſyllables; ſo that muſical movements in common time, when bars compoſed of one long and two ſhort notes frequently occur, it may be called *Dactylic muſic*, ſuch as Shenſtone's paſtorals generally require.



"My bānks thĕy wĕre fūrnĭſhed wĭth bēēs,
Whŏſe mūrmŭrs ĭnvīte mĕ tŏ ſlēēp."

Arne has ſet theſe words admirably in Siciliana time.

See

See the 2d ſtanza of this paſtoral ballad.

"Nŏt ă pīne ĭn thĕ grōve ĭs thĕre ſeēn," &c.

Shenſtone, vol. i.

DACTYLETHRA, or DACTYLITHRA, *Digitale*, among the *Ancient Phyſicians*, a medicine uſed to provoke vomiting. It was a ſort of topical application, and is deſcribed at large by Oribaſius.

DACTYLI, in *Antiquity*, a name attributed to the firſt prieſts of the goddeſs Cybele; who were particularly called *Dactyli Idæi*, on account of the goddeſs herſelf, who was ſtyled *Cybele Idæa*, becauſe principally honoured on mount Ida in Phrygia. The name *Dactyli* is ſuppoſed to have been given them on this occaſion: that to prevent Saturn from hearing the cries of Jupiter, whom Cybele had committed to their cuſtody, they uſed to ſing verſes of their own invention, which by their unequal meaſures ſeemed to reſemble the foot called *dactylus*.—This is the account of the grammarian Diomedes.

One Sophocles, quoted by Strabo, lib. x. ſpeaks differently. According to him they were called *Dactyli*, from the Greek word δακτυλος, *finger*, becauſe their number was at firſt equal to the fingers of the hand, *viz.* ten; five of them boys, and as many girls. He adds, that it is to them we owe the invention of iron, and the manner of working it, with divers other uſeful things, and for their uſeful diſcoveries, they are ſaid to have been worſhipped, after their death, as gods. Others make their number more, and others leſs than ten. Some, again, make them natives of Phrygia, near the foot of mount Ida; and others bring them from other places. According to Diodorus Siculus, they were the firſt inhabitants of Crete, who originally inhabited mount Ida, and paſſed from thence into Europe with king Minos. They ſettled firſt in Samothrace, where they taught the inhabitants ſacred rites, inſtituted ſacrifices, and introduced a ſet form of religious worſhip. Orpheus, who was naturally inclined to muſic and poetry, is thought to have been their diſciple, and the firſt who eſtabliſhed ſacred rites and ceremonies in Greece. However, all the authors Strabo had ſeen, he ſays, agreed, that they were the firſt who wrought in iron; that they had been miniſters of the mother of the gods, or Cybele; and that they dwelt at the foot of mount Ida: and they probably derived their knowledge of forging metals from the fuſion of minerals at the burning of mount Ida.

It is alſo conjectured by ſome authors, not that the Curetes and Corybantes were the ſame with the Dactyli Idæi, but that the Curetes and Corybantes were their poſterity; that a hundred men, born in Crete, were firſt called Dactyli Idæi; and that each of theſe had nine children, who were the Curetes; and that each of the Curetes had ten children, who were alſo called Dactyli Idæi. They were Cyclopians.

Strabo only gives us the names of four of the Dactyli Idæi, which are Salaminus, Damnanæus, Hercules, and Acmon. The learned Bryant, (Ancient Mythol. vol. i.) ſuppoſes that they were the ſame as the Curetes, Corybantes, Telchines, and Cabiri; which ſee reſpectively.

DACTYLIC, ſomething that has a relation to *dactyls*.

Anciently, there were dactylic, as well as ſpondaic flutes, *tibiæ dactylicæ*. The dactylic flutes conſiſted of unequal intervals; as the dactylic foot does of unequal meaſures.

DACTYLIC *verſes*, are hexameter verſes, ending in a dactyl, inſtead of a ſpondee; as ſpondaic verſes are thoſe which have a ſpondee in the fifth foot inſtead of a dactyl.

An inſtance of a dactylic verſe we have in Virg. Æn. lib. vi. 33.

"Bis patriæ cecidere manus: quin protinus omnia
Perlegerit oculis.——"

DACTYLIOMANCY, DACTYLIOMANTIA, a ſort of divination performed by means of a ring.

The word is compoſed of the Greek δακτυλος, *ring*, of δακτυλος, *finger*; and μαντεια, *divination*.

Dactyliomancy conſiſted principally in holding a ring, ſuſpended by a fine thread, over a round table, on the edge whereof were made divers marks with the twenty-four letters of the alphabet. The ring, in ſhaking or vibrating over the table, ſtopped over certain of the letters, which being joined together, compoſed the anſwer required.

But the operation was preceded and accompanied by ſeveral ſuperſtitious ceremonies; for firſt the ring was to be conſecrated with a great deal of myſtery: the perſon who held it was to be clad in linen garments, to the very ſhoes; his head was to be ſhaved all round; and in his hand he was to hold vervain. And before he proceeded on any thing, the gods were firſt to be appeaſed by a formulary of prayers, &c. Ammianus Marcellinus gives the proceſs at large in his twenty-ninth book.

DACTYLIS, in *Agriculture*, is a term ſometimes applied to a ſpecies of cultivated graſs, the rough cock's-foot graſs (*Dactylis glomerata.*) It is a coarſe hardy rough graſs, but which has been found highly uſeful on moiſt loamy ſoils, where the bottom is of the retentive clay-marl kind; and where other finer graſſes are apt to be overpowered by the natural herbage. It requires to be kept cloſely fed down; under which circumſtances it conſtitutes an excellent early ſheep feed. See GRASS, and GRASS *Land*.

DACTYLIS, in *Botany*, (from δακτυλος, a *finger*, in alluſion to the ſhape of its ſpikes.) Linn. Gen. 35. Schreb. 50. Willd. Sp. Pl. v. i. 407. Juſſ. 31. Claſs and order, *triandria digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume of two valves, containing one or more florets, forming an oblong compreſſed ſpikelet; its valves unequal, pointed, keeled, convex, and broader on one ſide. *Cor.* Glume of two valves, the lowermoſt largeſt, concave, acute, pointed or awned; the other cloven, lanceolate. *Nectary* a pair of lanceolate, pointed ſcales, tumid at their baſe. *Stam.* Filaments three, capillary, longer than the corolla; anthers oblong, cloven at each end. *Piſt.* Germen ovate; ſtyles two, ſpreading; ſtigmas feathery. *Seeds* ſolitary, oblong, naked, with a furrow on one ſide, clothed for a while by the permanent corolla.

Eſſ. Ch. Calyx of two linear-oblong, compreſſed, keeled, unequal valves.

This genus of graſſes is not one of the beſt defined. It ought to have but a ſingle floret in each calyx, as in *D. ſtricta*, Engl. Bot. t. 380; *D. cynoſuroides*, Linn; and *D. patens*, Ait. H. Kew; which are genuine examples of it; but *D. glomerata*, Engl. Bot. t. 335, has three or four florets, and has thence been judged, by ſeveral botaniſts, not a good *Dactylis*. No one, however, has ſucceſsfully referred it to any other genus, nor is it adviſable to form a new one of this ſpecies alone, the ſtructure of its fructification being by no means ſufficiently diſtinct from the above-mentioned ſpecies. The *D. glomerata* thrives under the ſhade of trees. We have in the above article mentioned its agricultural properties; but we have no authority to recommend it for any agricultural purpoſe. If uſed for fodder, it muſt be cut while young and tender.

DACTYLONOMY, DACTYLONOMIA, from δακτυλος, *finger*, and νομος, *law*, the art of accounting, or numbering, by the fingers,

The rule is this; the left thumb is reckoned 1, the index

2,

2, and ſo on to the right thumb, which is the tenth, and of conſequence is denoted by the cypher o.

DACTYLS, in *Botany*, denotes the fruit of the palm-tree, more uſually called *dates*.

DACTYLUS, in *Antiquity*, a ſort of dance among the Greeks, chiefly performed, as Heſychius obſerves, by the athletæ.

Dactylus, in *Zoology*, a ſpecies of Pholas, in the claſs of *Vermes Teſtacea*. See Pholas.—Alſo, a ſpecies of *Voluta*, in the ſame claſs. See Voluta.

Dactylus *Idæus*, in *Natural Hiſtory*, a name given by many authors to the belemnites; ſuppoſed erroneouſly by many to be the *lyncurius* of the ancients.

DADACARDIM, in *Geography*, a town of Aſiatic Turkey, in the province of Diarbekir; 60 miles S. of Diarbek.

DADAI, a town of Aſiatic Turkey, in the province of Natolia, 40 miles E. S. E. of Amaſieh.

DADARI, a town of Hindooſtan, in the country of Delhi; 52 miles W. of Delhi.

DADASTANA, in *Ancient Geography*, a town of Aſia Minor, in Bithynia, at nearly an equal diſtance between Ancyra and Nice; where, according to Zoſimus, the emperor Jovian died Feb. 17, A. D. 364. It ſeparates Bithynia from Galatia, according to Arminianus Marcellinus.

DADDALA, a place of Aſia Minor, in Lycia. Ptol.

DADDI, Bernardo, in *Biography*, a painter, native of Arezzo, who was the ſcholar of Spinello, and became a member of the company of painters at Florence, in 1355. He painted the chapels of S. Lorenzo and S. Stefano dé Pulci, together with other works in the church of Santa Croce in that city. Little elſe is known of him except that he died in 1380. Baldinucci.

Daddi, Cosimo, a Florentine painter of the 16th and 17th centuries, who was a diſciple of Batiſta Naldini, and was employed in many conſiderable works by the court of Tuſcany. Amongſt others he painted in the *Coriile* of the Villa of Petraja, the heroic actions of Goffredo Buglione at the taking of Jeruſalem. The churches of Florence likewiſe poſſeſs ſeveral altar-pieces of conſiderable merit by his hand, and he was much eſteemed for his portraits, which generally proved ſtriking likeneſſes. He died at an advanced age, in 1630, having had the honour to inſtruct Baldaſſare Franceſchini, called Il Volterrano, in the firſt rudiments of his art. Baldinucci.

DADELER, in *Geography*, a town of Aſiatic Turkey, in the province of Caramania; 12 miles N. of Cogni.

DADEN, a town of Germany, in the circle of Weſtphalia, and county of Sayn, near which are ſome mines of copper; 8 miles S. of Siegen.

DADES Promontorium, in *Ancient Geography*, a promontory in the ſouthern part of the iſle of Cyprus, between the promontory Curias to the weſt, and that of Pedalium to the eaſt. Ptol.

DADICÆ, a people who, according to Herodotus (l. viii. 66.) lived in the vicinity of Sogdiana; and who were armed like the Bactrians.

DADIVAN, in *Geography*, a plain of Perſia, about 4 or 5 leagues in circumference, between Schiras and Lar, covered with trees of oranges, citrons, and pomegranates, to which the Engliſh and Dutch merchants of Ormus generally retire in the ſummer.

DADLEWALLET, a town in Africa, in the kingdom of Kontu.

DADO, in *Architecture*, the middle of a pedeſtal, or that part comprehended between the baſe and the cornice. In the pedeſtals of the orders this part has nearly a cubical form, whence it derives its name *dado*, Italian, for die.

Dado, in *Biography*, a fictitious artiſt, to whom ſeveral excellent prints of the 16th century, marked with a die, have been attributed. Many connoiſſeurs, however, conſider theſe plates to have been the work of Niccolo Beatricetto. Heinecken.

DADOU, in *Geography*, a ſmall river of France, in the department of the Tarn. It has its ſource near Saint Salvy, and runs into the river Agout below Lavaur.

DADUBRA, Dadibra, or *Dadybras*, in *Ancient Geography*, an epiſcopal town of Aſia Minor, in Paphlagonia.

DADUCHI, in *Antiquity*, prieſts of Ceres. See Ceres.

That goddeſs, having loſt her daughter Proſerpine, ſay mythologiſts, began to make ſearch for her at the beginning of the night. In order to do this in the dark, ſhe lighted a torch, and thus ſet forth on her travels throughout the world: for which reaſon it is, that ſhe is always ſeen repreſented with a lighted torch in her hand.

On this account, and in commemoration of this pretended exploit, it became a cuſtom for the prieſts, at the feaſts and ſacrifices of this goddeſs, to run about in the temple, with torches, after this manner: one of them took a lighted torch from off the altar, and holding it with his hand, ran with it to a certain part of the temple, where he gave it to another, ſaying to him, *Tibi trado;* this ſecond ran after the like manner, to another part of the temple, and gave it to the third, and ſo of the reſt.

From this ceremony the prieſts became denominated *daduchi*, δαδουχοι, q. d. *torch bearers;* from δας, an unctuous and reſinous wood, as pine, fir, &c. whereof the ancients made torches; and εχω, *I have, I hold.*

The Athenians alſo gave the name daduchus to the high-prieſt of Hercules.

DÆARA, in *Ancient Geography*, a place of Aſia, near to Apamea and almoſt E. of it, and S.W. of Anthemuſias.

DÆDALA, in *Antiquity*, two feſtivals in Bœotia, one of which was obſerved annually by the Platæans at Alalcomenus, where was the largeſt grove in all Bœotia. Here they aſſembled, and expoſing to the open air pieces of ſodden fleſh, carefully obſerved whither the crows that came to feed upon them took their flight, and then hewed down all thoſe trees on which any of them alighted, and formed them into ſtatues, which by the ancient Greeks were called *dædala*, δαιδαλα.

The other ſolemnity was by far the greateſt and moſt remarkable of the two, being celebrated only once in ſixty years, in commemoration of the exile of the Platæans, which laſted that number of years. For the ceremonies obſerved in it, ſee Pauſan. p. 302. in Bœot. and Pott. Archæol. Græc. lib. ii. cap. 20.

Dædala, in *Ancient Geography*, a country of India, the inhabitants of which abandoned it, and fled for ſhelter to the mountains, on the approach of Alexander the Great. The ſituation of this country, and alſo that of Acedera, which was deſerted in the ſame manner, are not preciſely aſcertained. Ptolemy places a town of this name on this ſide of the Ganges, in the country of the Caſpirians; lat. 30° 30′. —Alſo, a town of the iſland of Crete. Steph. Byz.—Alſo, a mountain of Lycia.—Alſo, a caſtle, according to Livy and Mela, or, as Pliny ſays, a town, of Aſia Minor, in Caria, ſituated in the northern part of the gulf of Glaucus, N. of Cape Cria, about lat. 36° 50′ or 55′. Stephanus Byzantius ſays, that Dædalus, being ſtung by a reptile, died

of the wound, and that this town, which was built in the place of his burial, took his name.

DÆDALEON Insulæ, two iſlands of Aſia, at the northern extremity of the gulf of Glaucus, on the coaſt of Caria.

DÆDALIA, a town of Italy, founded by Dædalus, according to Steph. Byz., who ſays that in his time it was called *Julia*.

DÆDALIUM, a place of Sicily on the ſouthern coaſt, S.E. of Agrigentum, and very near mount Ecnomus.

DÆDALUS, in *Fabulous Hiſtory*, the great grand-ſon of Erectheus, king of Athens, and grand-ſon of Eumolpus, or Eupalamus, or, as Ovid ſays, the ſon of Eupalamus, was eminently diſtinguiſhed as the moſt ingenious artiſt produced either in Athens or Greece. To him is aſcribed the invention of the axe, the ſaw, the plummet, the augre, and glue, and alſo of maſts and yards for ſhips. He alſo carved ſtatues with ſuch ſkill, that they ſeemed to be alive, and would move or fly from one place to another, unleſs they were chained. Having liberally educated Talus, called alſo Perdix, the ſon of his ſiſter, the ingenuity of his nephew, who is ſaid to have invented the turning-wheel, and other mechanical inſtruments, excited the jealouſy of Dædalus, and induced him to put Talus ſecretly to death. The murder being diſcovered, the Areopagus of Athens condemned Dædalus capitally, or, as Servius ſays, ſentenced him to perpetual exile. But whatever was the nature of his ſentence, he withdrew from Athens in diſguiſe, and retired with his ſon Icarus to Crete, where he was favourably received by king Minos. During his retreat in this iſland, he is ſaid to have conſtructed the famous labyrinth at Gnoſſus; and as he aſſiſted Paſiphae, the wife of Minos, in her licentious amours, he and his ſon were confined in this labyrinth; and finding no way of eſcape, he made wings for himſelf and Icarus with wax and the feathers of birds, and faſtening theſe wings to their ſhoulders, Dædalus flew out of Crete into Sicily, but Icarus, diſregarding his father's advice, and indulging the pride and wantonneſs of youth, ſoared too high, ſo that the ſun melted the wax that faſtened his wings, and he fell into the ſea, which, according to Ovid (Triſt. 1.), has from this circumſtance been called the Icarian ſea. From his plaſtic powers Lucretius deduces an epithet, which he applies to the earth, in order to deſcribe its vernal vegetation:

"—— Tibi ſuaves, *Dædala* tellus
Summittit flores."

DÆDIS, among the Greeks, a ſolemn feſtival that laſted three days, during all which time δαδες, or *torches*, were kept burning, which gave occaſion to the name.. The firſt was in commemoration of the pains of Latona, when ſhe was delivered of Apollo; the ſecond was in honour of the birth of Glycon, and the gods; and the third in memory of the marriage of Podelirius and the mother of Alexander.

DAELIKER, Johan Rudolph, in *Biography*, a portrait-painter of ſome eminence, who was born at Berlin in 1694. He afterwards ſettled in Switzerland, and died at Schaffhauſen in 1769. J. J. Hard has engraved from this artiſt a portrait of Johan Geſner, M.D.; and another of Johan Caſper Landoff, conſul of Zurich. Heineçken.

DÆMON, Δαιμων, a name the ancients gave to certain ſpirits, or genii, which they ſay appeared to men, either to do them ſervice, or to hurt them.

The Greek word, δαιμων, is derived (according to Plato, in his Cratylus, p. 398. ed. Serrani, vol. i.) from δαημων, *knowing*, or *intelligent*; but according to others from δαιομαι, *to diſtribute*. See the Scholiaſt on Homer, Il. i. ver. 222. Euſebius (Præp. Evang. l. iv. c. 5.) deduces dæmons from δειμαινειν, *to fill men with terror*; and as in the Greek language ε is often changed into α, we have thus the origin of δαιμων, *dæmon*, denoting any inviſible being that is an object of fear. Either of theſe derivations agrees with the office aſcribed to dæmons by the ancient heathens, as the ſpirits entruſted with the inſpection and government of mankind. For, according to the philoſophers, dæmons held a middle rank between the celeſtial gods and men on earth, and carried on all intercourſe between them; conveying the addreſſes of men to the gods, and the divine benefits to men. Plutarch de Defect. Orac. p. 415, *et ſeq.* Platon. Sympoſ. p. 202. tom. iii. ed. Serrani. Apuleius de Deo. Socrat. p. 674. 677. ed Delph. Iamblichus de Myſter. Auguſt. de Civ. Dei.

It was the opinion of many, that the celeſtial divinities did not themſelves interpoſe in human affairs, but committed the entire adminiſtration of the government of this lower world to theſe ſubaltern deities. "Neque enim pro majeſtate deum cœleſtium fuerit, hæ curare." Apuleius de Deo Socratis, p. 677. "Cuncta cœleſtium voluntate, numine & authoritate, ſed dæmonum obſequio, & operâ, & miniſterio fieri arbitrandum eſt." Id. p. 675. Hence they became the objects of divine worſhip. "If idols are nothing," ſays Celſus (apud Origen. cont. Celſ. lib. viii. p. 393.), "what harm can there be to join in the public feſtivals? If they are dæmons, then it is certain that they are gods, in whom we are to confide, and to whom we ſhould offer ſacrifices and prayers, to render them propitious."

Several of the heathen philoſophers held, that there were ſeveral kinds of dæmons; that ſome of them were ſpiritual ſubſtances of a more noble origin than the human race, and that others had once been men. Apuleius de Deo Socratis, p. 684. 690. Ammonius apud Plutarch. de Defect. Orac. p. 431. tom. ii. ed. 1624. Plato in Timæo, p. 41, 42. 69. 71. 75.

Thoſe who maintain the former of the above-mentioned opinions, allege that the primary gods, whoſe exiſtence was conſidered as prior to the creation of man, and whoſe original is always connected with the formation of the earth, the elements, and the heavenly bodies, are frequently ſtyled dæmons by the ancient Greek writers, and more eſpecially by Homer (Il. i. v. 222.); who, as Plutarch (de Orac.) obſerves, indifferently uſes theſe two words, ſometimes calling the gods dæmons, and the dæmons gods; and indeed he applies both terms in the ſame ſentence to one deity. (Il. xvii. v. 98.) The proſe writers alſo uſe the term dæmon in the ſame ſenſe. Thus, Xenophon (Memorab. l. i. c. 4. l. iv. c. 3.) calls him the dæmon, who is able to diſcern and regulate all things, both at hand and at the greateſt diſtance, in the ſame moment, and with the utmoſt care; and who ſhews himſelf to be unwearied, perfect, incorruptible, adminiſtering quicker than thought, and without error. The advocates of this opinion further obſerve, that the ſupreme deity of the Pagans is called the greateſt dæmon; to which argument it has been replied, that notwithſtanding the magnificent titles by which the Heathens deſcribe their ſupreme deity, they yet repreſent him as having a father and mother, a grand-father and grand-mother, and being of the ſame kindred with the other gods of whom he was chief. See Homer's deſcription of Jupiter in Iliad. i. v. 398. and Lucian. Deor. Dialog. apud Oper. vol. i. The other Heathen writers, and Heſiod in particular in his Theogony, give a

ſimilar

ſimilar repreſentation of Jupiter; aſcribing to him the prerogatives, titles, and epithets of their ſupreme natural divinity; and at the ſame time clothing him with the weakneſſes, vices, and all the properties of a human being: ſo that he ſuſtained the two characters of a natural and of a hero-god. According to the Pagan ſyſtem of theology, deified human ſpirits appear to have been aſſociated with and to have repreſented the natural gods, and they were both called by the ſame names. The ſun, æther, or air, or whatever other part of nature was eſteemed the ſupreme deity of Pagans, was called in Egypt Oſiris, in Chaldæa and Phœnicia, Bel or Baal; and in many other countries, Jupiter: and it is univerſally known, that Jupiter, Bel, and Oſiris, had once been mortal men, who were ſuppoſed to be advanced after death to a deified ſtate. For the ſame reaſons, therefore, for which the chief Heathen numen was called Oſiris, or Bel, or Jupiter, he might be called a dæmon; ſuppoſing the word to denote a deified human ſpirit; and it is ſaid, that under this laſt character he was principally regarded by the common people. It has been ſaid, however, that no deciſive evidence can be produced in order to prove, that religious honours were ever paid to any deceaſed man, under the names of Bel, the ſupreme deity of the Chaldæans, or Oſiris, the numen of the Egyptians, or that ſuch worſhip was ever paid to a human ſpirit, under the name of Jupiter: and, indeed, it is certain that the Heathens worſhipped many gods that had never been men. The Heathens, it is ſaid, never conſidered any part of nature as their ſupreme deity; the Egyptians worſhipped the ſun and moon under the names of Oſiris and Iſis, and never paid any religious honours to hero-gods; and under the name Bel, who is ſaid by Beroſus to have formed the ſtars and the ſun, the Chaldæans worſhipped what had never been a man; as did alſo the Greeks, under the appellation of Jupiter.

It is farther urged by thoſe who maintain the ſuperior rank and nature of dæmons, that they are deſcribed as beings placed between the gods and men. But, on the other hand, it is argued, that this deſcription reſpects not their nature but their office, as mediators between men and the celeſtial gods, and therefore agrees with ſuch human ſpirits as were thought to be advanced to the office of dæmons. Jamblichus (apud Stob. Eclog. Phyſic. lib. i.) ſays, that good men were recompenſed at death by being converted into angels and angelical ſouls, meaning the ſame as dæmons; and it is allowed by the learned, that Jamblichus, Hierocles, Simplicius, and others, uſe the word dæmons and angels indiſcriminately. Hierocles ſays expreſsly (In Carm. Pythag.), that the middle kinds of beings were called indifferently angels, or dæmons, or heroes; and as the latter were human ſpirits, it is preſumed that the former belonged to the ſame claſs. Philo ſays (De Gigantibus), that ſouls, dæmons, and angels, are only different names, but imply one and the ſame ſubſtance; and in another place (De Somn.) he affirms, that Moſes called thoſe *angels*, whom the other philoſophers ſtyled *dæmons*. It is farther argued, on the one ſide, that dæmons are expreſsly diſtinguiſhed from heroes, who were the departed ſouls of men; and on the other, that dæmons were advanced to a rank and ſtation ſuperior to that of heroes, and that this difference occaſioned the diſtinction. Accordingly thoſe who adopt this opinion contend, that thoſe dæmons who were the more immediate objects of the eſtabliſhed worſhip amongſt the ancient nations were human ſpirits, ſuch as were believed to become dæmons or deities after their departure from their bodies. Plutarch teaches (Vit. Romul.), "that according to a divine nature and juſtice, the ſouls of virtuous men are advanced to the rank of dæmons; and that from dæmons, if they are properly purified, they are exalted into gods, not by any political inſtitution, but according to right reaſon." In his book (De Defect. Orac.) he ſpeaks of human ſouls as commencing firſt heroes, then dæmons, and afterwards advanced to a more ſublime degree. He adds (De Iſ. et Oſir.), "that Iſis and Oſiris were, for their virtue, changed from good dæmons into gods, as were Hercules and Bacchus afterwards, receiving the united honours of both gods and dæmons." Theſe ſentiments of Plutarch are confirmed by other writers, as Diodorus Siculus, and Pauſanias in Corinthiac. l. ii. c. 10. Heſiod, and other poets, who have recorded the ancient hiſtory or traditions, on which the public faith and worſhip were founded, aſſert that the men of the golden age, who were ſuppoſed to be very good, became dæmons after death, and diſpenſers of good things to mankind.

This account of dæmons is fully confirmed by the other writings of the ancient heathens; and many paſſages have been cited from theſe wri ings by ſeveral learned men, particularly by Mr. Joſ. Mede, and Dr. Sykes, in which dæmons muſt have the ſame meaning as in Heſiod. It is not pretended, that the heathens did not acknowledge and worſhip celeſtial or natural gods; for the deſcription of dæmons as the more *immediate* objects of worſhip of itſelf implies, that there were *ultimate* objects of it, who could be no other than thoſe celeſtial gods, whoſe agents and miniſters the former were ſuppoſed to be. Moreover, it is ſuppoſed that ſome dæmons, or ſubaltern deities, either celeſtial or terreſtrial, were acknowledged and worſhipped in the nations to which the inquiry extends, and particularly among thoſe that were in the moſt civilized and poliſhed ſtate, and even in moſt of thoſe nations that were reckoned barbarous. Among the nations poliſhed by learning we may reckon the Chaldæans, Babylonians, Syrians, Phœnicians, Egyptians, Greeks, Romans, and alſo ſuch Arabians as bordered upon India and Egypt. That in theſe nations divine honours were paid to dead men and women is ſtrenuouſly maintained by Mr. Farmer, whoſe reſearches on this ſubject have been very ample and various. Philo of Byblus, who tranſlated the hiſtory of Sanchoniathon from the Phœnician language into Greek, has given in his preface to it, the following extract from his author "The moſt ancient of the barbarians, eſpecially the Phœnicians and Egyptians, from whom other people derived this cuſtom, accounted thoſe the GREATEST GODS, who had found out things moſt neceſſary and uſeful in life, and had been benefactors to mankind. Theſe they worſhipped as gods; and, applying their temples to this uſe, they conſecrated to their names pillars and ſtatues of wood, which the Phœnicians held in high veneration, and inſtituted the moſt ſolemn feſtivals in their honour. More eſpecially did they give the names of their kings to the mundane elements, and to other things to which they attributed divinity. For phyſical beings alone, ſuch as the ſun, moon, planets, and elements, and things of the ſame kind, did they acknowledge to be ſtrictly and properly gods. So that ſome of their gods were MORTAL, and others IMMORTAL." Hence it is deduced, that the Phœnicians and other ancient nations, worſhipped ſuch men as had been benefactors to the human race. Moreover, Euſebius, who has preſerved part of Philo's tranſlation in his Præp. Evang. l. i., teſtifies, that, even to his time, deified men and women were the gods worſhipped by all people, and in all cities and countries. It is farther maintained by the learned writer now cited, that heroes and gods of earthly origin were worſhipped by the Egyptians. Hermes Triſmegiſtus (*vid.* Auguſt. Civ. Dei,

l. xxviii. c. 26.), acknowledged, that the gods of Egypt were dead men; that the art of making gods was invented in this country; and that human ſouls were worſhipped as dæmons in every city. Herodotus, who had viſited Egypt, and who had taken pains in informing himſelf concerning the religion of that country, records ſeveral inſtances of the worſhip of human ſpirits in that country; though they ſeem to have been overlooked by Dr. Blackwell, (Letters on Mythology, p. 209.) and Jablonſki, (Pantheon Egypt. tom. 2. Prolegom. p. 37.) who affirmed, upon the ſuppoſed authority of this hiſtorian, that the Egyptians paid no religious honours to any gods of earthly extract. Herodotus has alſo recorded ſeveral facts, which ſerve to ſhew, that ſome at leaſt of all the different orders of Egyptian gods were no other than men and women deified. From Diodorus Siculus we learn, that the Egyptians, beſides the ſun and moon, whom they called the *firſt* and *eternal gods*, acknowledged ſuch as *were taken from the earth*; ſeveral of whom, he ſays, *had been kings of Egypt*, and *bore the ſame names with the celeſtial gods*, (p. 14. 17. Ed. Weſſel.) He particularly ſpecifies the eight great gods of Egypt, *Sol*, *Saturn*, *Rhea*, *Jupiter*, (called alſo *Ammon Juno*, *Vulcan*, *Veſta*, and *Mercury*). Iſis and Oſiris, the two principal divinities in Egypt, were, according to Diodorus, king and queen of Egypt; and he informs us, that Oſiris conquered the moſt diſtant nations; that he deified his parents; and that he was himſelf deified in his turn, and had a third part of the lands appropriated to maintain his worſhip; and that after his death he received equal honour with that paid to the celeſtial gods. (p. 24.) From Plutarch (Iſ. et Oſir.) we learn, that the prieſts affirmed, that the bodies of their gods, except ſuch as were incorruptible and immortal, lay buried with them; and he gives us at large the hiſtory of the parentage of Iſis and Oſiris, their birth, their kindred, their exploits, and their death. Mr. Farmer has appealed to ſeveral other authorities, ſuch as thoſe of Plato, Lucian, Maximus Tyrius, Varro, Apuleius, and Lucan, in proof of the fact, that the worſhip of human ſpirits prevailed in Egypt. Upon the whole he concludes, that the Phœnicians and Egyptians, though they acknowledged elementary and ſidereal deities, and aſſerted more eſpecially the divinity of the ſun and moon, did alſo worſhip human ſpirits; and that the Egyptians worſhipped them under the diſtinct characters of heroes, dæmons, and gods. It farther appears, ſays this ingenious writer, that both the Phœnicians and Egyptians accounted their princes and eminent benefactors as *the greateſt gods*. The twelve great gods of Egypt, in particular, as well as the Cabiri of Phœnicia and the eaſtern nations, were dead men deified. He infers from the teſtimonies which he has adduced, that deified men were the *immediate* objects of the public eſtabliſhed worſhip in Egypt, as they alſo were in Phœnicia. He proceeds to ſhew, that the cuſtom of deifying human ſpirits prevailed among the Aſſyrians, Chaldæans, and Babylonians. As the religion of Aſſyria and Babylon was derived from Egypt, which was probably the caſe, the former muſt have been in a great meaſure the ſame with that of the latter, which conſiſted, in part, in the worſhip of human ſpirits. The Chaldæan idolatry, called alſo the *Sabian*, conſiſted very much, at leaſt originally, in the worſhip of the ſun, moon, and ſtars, which were conceived to be ſeverally animated by a ſoul, as the human body is; and, probably, they were alſo thought to be inhabited by the ſpirits of illuſtrious men. The chief god of the Babylonians was *Bel*, called by the Greeks *Belus*, anſwering to the Hebrew *Baal*, and to the Syrian *Beel*, and ſignifying *lord*. This term might therefore be applied to the true God; but it is commonly given in Scripture to thoſe fictitious deities, who were falſely ſuppoſed to have dominion over mankind. Some have ſuppoſed that Bel, who was worſhipped at Babylon, was the creator of heaven and earth, as the true God; but as the Babylonians had been for many ages before the time of Alexander, when Beroſus, who has particularly mentioned Bel as having framed the world, &c., was the prieſt of Belus, were groſs idolaters, they were not likely to worſhip the creator of heaven and earth; and ſome circumſtances are related concerning this Belus, which are altogether inconſiſtent with this high denomination and character. Bel, indeed, was a name or title given to ſeveral princes; and more eſpecially to the founder of the Babylonian empire. If he be, as ſome have ſuppoſed, the Nimrod of the Bible, he was ranked amongſt the gods by the Perſians, who ſucceeded to his empire; whence we may infer, that he was firſt worſhipped at Babylon; and Euſebius informs us, that Belus, the firſt king of the Aſſyrians, was deified after his death. It is not to be inferred from the account given of Belus, that the term *Bel* was never explained phyſically, and applied to the ſun, by learned men, as Oſiris alſo ſometimes was; for the ancients gave the names of their deified kings to the heavenly bodies. But the temple of Babylon was erected in honour of a man who founded the Babylonian empire, agreeably to the cuſtom of the Heathens in the like caſes. And this Belus was the god whom the Babylonians principally worſhipped. (See Baal, Baalim, and Babylon.) The Aſſyrians and Babylonians had ſeveral other gods of mortal origin, and it appears upon the whole, that dead men and women were the more immediate objects of the public devotion at Babylon, and were indeed honoured as their greateſt gods. From the teſtimony of Lucian (De Dea Syr.) it appears, that the gods of Syria were of two ſorts; the one viſible, particularly the ſun and moon; the other inviſible, that is, human ſpirits, or ſuch deities as correſponded to the idea which the Greeks had formed concerning thoſe objects of worſhip that belonged to the human race, and were repreſented by ſtatues; and we have ſufficient reaſon for believing, that the Syrians deified dead men and women.

Mr. Farmer has traced at large the mythology of the barbarous nations, and cited a great number of teſtimonies and facts in order to ſhew that the worſhip of human ſpirits prevailed among the Scythians, the Maſſagetes, the Getes, the Goths, the Germans, the Perſians, the Arabians, and the inhabitants of Meroe. This is alſo the caſe with regard to ſeveral barbarian nations in Africa, the Celtes both of Aſia and Europe, and ſeveral nations of Aſia. But for particulars we muſt refer to the author himſelf.

It is well known, and univerſally allowed, that the natural gods, the ſun and moon in particular, were adored by the Greeks, as well as by the barbarians. It muſt alſo be admitted, that the Greeks worſhipped the firſt founders of ſtates and cities; thoſe who died in defence of their country; and ſuch as were greatly diſtinguiſhed by their talents and exploits. But it is altogether unneceſſary, in ſo plain a caſe, to produce the various proofs of the deification of men in Greece, which occurs continually in Herodotus, Pauſanias, Plutarch, and other Greek writers. The law ordained, that the gods, the dæmons, and the heroes, ſhould be worſhipped according to their reſpective ranks. Mr. Farmer is of opinion, that the twelve great gods of Greece, or as they are ſometimes called, the gods of the greater nations, were of human extraction. In proof of this opinion, he alleges the following arguments. 1. The Greeks derived their religion from Phœnicia and Egypt; eſpecially from the latter. 2. The teſtimony of Herodotus, who was,

without

without doubt, well acquainted with the Grecian objects of worſhip. This hiſtorian informs us (l. i. c. 131.) that the reaſon why the Perſians did not erect temples, altars, and images, to the gods (which the Greeks were known to do) "was, in his opinion, their not believing, as the Greeks did, that the gods are of the race of men." The ſtatues of the gods, in human form, ſays our author, were a proof of their having been men. The Greeks acknowledged the ſame natural gods as the Perſians did; but in Perſia they worſhipped the natural gods themſelves, directly and immediately; whereas, in Greece, the more immediate objects of the public worſhip were deified human ſpirits, to whom the adminiſtration of the government of this lower world was thought to be committed. And as theſe preſidents over nature did, as it were, intercept and engroſs the public devotion, Herodotus might juſtly ſay, in general terms, that the Greeks believed their gods were of human origin. And as Herodotus is here ſpeaking of the principal objects of Grecian worſhip, or of thoſe to whom the title of gods eminently belonged, who had temples, chapels, images, and altars, erected in their honour: he muſt therefore include the 12 great gods of Greece, and conſequently affirm, that they were dead men and women deified. 3. That the gods of the greater nations were deified mortals is a point partly eſtabliſhed by the "Sacred Hiſtory of Euhemerus of Meſſina." Euhemerus relates, that in one of his voyages, undertaken by order of Caſſander, king of Macedonia, he came to an iſland called Panchaia, and there found, in the temple of the Triphilian Jupiter, an authentic regiſter of the births and deaths of the gods, ſeveral of which are ſpecified by name, and mentioned by Diodorus Siculus. in a fragment preſerved by Euſebius. (Diod. Sic. Fragm. ad Weſſel. Euſeb. Præp. Evang. l. ii. c. 2. Cicero de Nat. Deor. l. i. c. 42.) The deſign of this "Sacred Hiſtory" was to ſhew, that the gods were to be regarded as mortal men. This hiſtory has been ſanctioned by the moſt reſpectable writers of antiquity: it was tranſlated into Latin, and approved by Ennius, Cicero, Diodorous Siculus, Euſebius, St. Auſtin, Lactantius, Minucius Felix, and Arnobius. But Euhemerus, it has been ſaid, was branded as an atheiſt: and this circumſtance has been urged to diſcredit the truth of his doctrine concerning the humanity of the gods. To this objection it has been replied, that no man was deemed an atheiſt by the heathens, if he worſhipped any gods who intereſted themſelves in the affairs of mankind, though they were only ſuch as had been men. So far, indeed, was the deification of men from implying atheiſm, that it rather preſuppoſed the exiſtence of the natural gods, with whom the deified men were aſſociated, and from whom they derived their power and authority. Hence it has been inferred that Euhemerus was not ranked among the atheiſts merely for aſſerting, that thoſe worſhipped by the people as gods had once been men. The charge againſt Euhemerus was his believing, that there were no gods, or none who take care of mankind. (Ælian. Var. Hiſt. l. ii. c. 31. Plut. de Placit. Phil. l. i. c. 7.) This charge, however, might be founded on his rejection of the received notion of the popular gods, juſt as Socrates, for a ſimilar reaſon, was deemed an atheiſt; and accordingly Sextus Empiricus informs us (Adv. Phyſicos, l. ix. c. 2. § 17.) that he repreſented their pretended deification as the mere effect of the pride and policy of princes and great men, in order to procure a higher veneration for their perſons, and a more ready ſubmiſſion to their authority. Moreover, Plutarch grounds the charge of atheiſm againſt him, not upon his aſſerting that the gods had been men, but upon his maintaining that they were nothing more than men long ſince dead. To this purpoſe Clemens Alexandrinus (Cohort. ad Gentes, tom. 1.) ſays, that Euhemerus and others were called atheiſts, "becauſe they had the ſagacity to diſcover the error of other men concerning the gods;" that is, they clearly ſaw they were not real divinities. The only plauſible objection, it is ſaid, againſt the hiſtory of Euhemerus, is that which Plutarch has urged, *viz.* that no one beſides this hiſtorian had ever ſeen the iſland of Panchaia. The exiſtence of this iſland, however, has been acknowledged by others, as Pomponius Mela, Diodorus Siculus, and Ptolemy Euergetes. Upon the whole it may be obſerved, that if the doctrine of Euhemerus, charged by Plutarch with ſpreading atheiſm through the world, and impugning the exiſtence of all the received gods without diſtinction, whom he deſcribed merely as ancient generals, admirals, and kings, be true, then even the great gods of Greece were men and women, who were, without any reaſon, ſuppoſed to become gods after death. Beſides, from a particular enumeration of the ſeveral Grecian deities, and an examination of their reſpective hiſtory, and of the character and attributes aſcribed to them, it is inferred that the origin of each of them was human. This was the caſe with reſpect to Jupiter, and of courſe as to the other gods and goddeſſes, who were of the ſame family, and of whom he was chief. In regard to the Greeks, it is concluded, that however they might acknowledge the natural gods, yet the dead men and women, whom they deified, were the more immediate and principal objects of their public worſhip. As the Romans derived their religion from Greece, Ægypt, and the Eaſt, it is natural to imagine that there ſhould be a conformity between their objects of worſhip, and thoſe of the other nations, in which dead men and women were deified. Accordingly we find that Æneas, from whom the Romans claimed deſcent, brought from Troy into Italy his houſehold gods, who were the ſouls of his departed anceſtors, and the great gods, who probably were the Samothracian deities, ſtyled "Cabiri," or great and powerful divinities, natives of Phœnicia. Hence it has been inferred, that, both in the country he had left, and among his own deſcendants in Italy, gods of human origin were worſhipped, and repreſented by ſacred images. Among other laws reſpecting religion, Numa ordained the following: "Let all honour the ancient gods of heaven, and thoſe whoſe merits have carried them thither: ſuch as Hercules, Bacchus, Æſculapius, Caſtor, Pollux, and Quirinus. (Cicero de Legibus, l. ii. c. 8.) To theſe ſix more may be added in later times, who are univerſally allowed to have been men, but who were eminently diſtinguiſhed from many other heroes, by being admitted into the community of the celeſtial or olympian gods. Numa required both theſe orders of deities to be worſhipped by the people: and hence it appears that the Romans acknowledged mortal gods. The law of Numa became a law of the 12 Tables, and remained in force in all ſucceeding times; whence it follows, that human ſpirits were, in every age, worſhipped at Rome, and even were the principal objects of the eſtabliſhed worſhip in that city; for the ancient gods of heaven, ſpoken of in the laws of the 12 Tables, were no other than the following 12 ſuperior gods of the Romans:

Juno, Veſta, Minerva, Ceres, Diana, Venus, Mars,
Mercurius, Jovis, Neptunus, Vulcanus, Apollo.

And theſe were the ſame with the 12 ſuperior gods of the Greeks, who were no other than deified men and women. Varro, the moſt learned of all the Romans, aſſerted, as St. Auguſtine informs us, that one would be at a loſs to find, in

the writings of the ancients, *gods* who had not been men. Cicero contends, (Tuſc. Quæſt. l. 1. c. 12.) "that the whole heaven was almoſt entirely filled with the human race; that even gods of the ſuperior order, or gods of the greater nations, were originally natives of this lower world, &c." (See alſo Cicero De Nat. Deor. l. i. c. 42.) Cicero's teſtimony is confirmed by St. Auſtin (Civ. Dei, l. viii. c. 26. c. 5.), who ſays, "You cannot find, or can hardly find, in all the writings of the Heathens, any gods but ſuch as had been men; nevertheleſs, to all of them they pay divine honours, as if they had never belonged to the human race." It was upon the principles of the ancient theology that the Roman people deified their emperors; nor was this cuſtom of deifying great princes an innovation of the Romans, but it was an old ſuperſtition, which prevailed to ſuch a degree, that even the Chriſtian emperors permitted themſelves to be addreſſed, "as gods adored by the nations, to whom the world preferred their public and private vows." It has been farther argued, that the worſhip of human ſpirits prevailed among the heathens, from various teſtimonies of the ancients, and from certain uncontroverted facts. The heathen poets, whatever are the titles with which they dignify the objects of their eſtabliſhed worſhip, do nevertheleſs record their birth, parentage, and kindred, and aſcribe to them thoſe paſſions, external forms, and various properties, which belong to human nature, and which ſubſiſt among mankind. (See Cicer. de Natur. Deor. l. i. c. 16. l. ii. c. 28. Tuſcul. Diſput. l. i. c. 26.) The worſhip appointed by the laws was conformable to the poetic theology, and founded upon it. Moreover, the painters and ſculptors convey to us the ſame ideas of the heathen deities as the poets, for they repreſent them under human figures, both male and female.

If an appeal be made to the opinions of the philoſophers, concerning the gods, they will be found to have been infinitely various. Nevertheleſs, we may deduce from their teſtimony what were the objects of national worſhip, and this affords ſufficient evidence of the general worſhip of human ſpirits. Indeed, all the different ſects of the philoſophers eſtabliſh this fact. The heathen hiſtorians not only bear teſtimony to the worſhip of human ſpirits in particular countries, but furniſh general proofs of the prevalence of this worſhip among the ancient heathens. (See Diod. Sic. Fragm. tom. ii. p. 633. ed. Weſſel. Polyb. Hiſt. l. vii. p. 512. ed. Caſaub.) The learned Bryant (ſee Anal. Anc. Mythol. vol. i. p. 454, &c.), whilſt he allows, that the Pagan gods were not only ſuppoſed by Chriſtian writers to have been deified mortals, who were worſhipped in the countries where they died, but that this was the opinion of the heathens themſelves, the very people by whom theſe gods were honoured; yet contends that this was a miſtake; and that moſt of the deified perſonages, mentioned by the Greek writers, never exiſted, but were mere titles of the deity, the ſun. This hypotheſis reſts principally upon two grounds; one of them being etymological deduction, which is, in various caſes, precarious and unſatisfactory; and the other, the writings of the Greeks, whoſe teſtimony he himſelf has taken pains to diſparage.

If we examine the opinion of the Jews concerning the Heathen Gods, we ſhall find that the writers of the Old Teſtament, in particular, though they knew that the Pagans believed in ſidereal and elemental deities, yet properly deſcribe their gods as *dead* perſons, becauſe it was to ſuch that the public worſhip was more immediately directed. In deſcribing the Heathen gods as dead perſons, they conſider them as what they *really were*, not what they were *conceived to be* by their worſhippers, for theſe regarded them as men advanced to divine power and dominion. (See Deut. xxvi. 14. Pſ. cvi. 28, compared with Numb. xxv. 1, 2, 3. Iſ. viii. 19.) In contradiſtinction from theſe, the ancient prophets called Jehovah the only *living* God. (See Deut. v. 26. Joſh. iii. 10. 1 Sam xvii. 26. 2 Kings, xix. 4. Jerem. x. 10. Dan. vi. 26, &c. &c.) The Jews, who were the authors of the Septuagint verſion, ſtyle the Heathen gods dæmons. (Deut. xxxii. 17. Pſ. xcv. 6. Pſ. cvi. 37.) The Chriſtian fathers are very generally agreed in maintaining that all the Heathen deities had been men and women; ſo that it is needleſs to multiply citations from their writings to this purpoſe This, as Mr. Bryant allows, was the opinion of Clemens, Euſebius, Cyril, Tertullian, Athenagoras, Epiphanius, Lactantius, Arnobius, Julius Firmicus, and others; among whom we may reckon Cyprian, Minucius Felix, and St. Auſtin.

The opinion and teſtimony of the fathers ſeem to be of great weight in the determination of this queſtion. They were bred up in the heathen religion, or lived in the times when it flouriſhed; and therefore were as competent judges as the Heathens themſelves could be. After critical examination they confidently pronounced the objects of national worſhip to be human ſpirits. They ſupported this opinon by arguments more than by the authority or conceſſions of the Heathens. And ſo clear and cogent were their reaſonings, that idolaters deſerted the worſhip of their falſe gods, and adored only the Creator of heaven and earth.

The teſtimonies already adduced, in order to prove that all the Heathen gods (except the deified parts and powers of nature) had been men, are confirmed by indiſputable facts, and particularly by the nature of the worſhip paid to the heathen deities. If no argument can be drawn from the ſacrifices which were offered them; yet their images, columns, ſhrines, reliques, altars, or grave-ſtones; and temples (which were their ſepulchres) afford ſufficient proofs, that the objects of public worſhip were ſuch dead men and women as ſuperſtition deified. Even funeral rites were performed in their honour. As a juſt idea of the heathen gods is a matter of no ſmall importance in its reference to conſiſtent views of religion, and a ſatisfactory defence of the Scripture, we have extended this article beyond the uſual limits aſſigned to ſubjects of this nature. By the account above given of the pagan gods, we are enabled to vindicate the cenſure paſſed upon them in the ſacred writings. As to the parts and powers of nature which the heathen world deified, they are repreſented in ſcripture as the creatures of God's power, and the paſſive inſtruments of his decrees: nor can we forbear obſerving, that, at a time when the world was univerſally regarded as animated and divine, and the elements and the heavenly bodies were thought to poſſeſs an internal power to exert themſelves in all their admirable effects, Moſes diſcovered, publiſhed, and, by ſuitable miracles, confirmed the oppoſite doctrine. This doctrine, ſo perfectly agreeable to the principles of modern philoſophy, and ſo remote from the ſentiments and philoſophy of his age, affords a ſtrong preſumption of his having received it by immediate revelation. As to the other gods of paganiſm, whether they were ſuch human ſouls as became dæmons, or created ſpirits of a ſuperior order, as ſome apprehend; the ſcripture (we conceive) gives us ſuch a view of them as is inconſiſtent with their inſpiring prophecies or working miracles. The ſacred writers ſeem conſtantly to repreſent theſe gods as utterly impotent and inſignificant; either as having no real exiſtence, or no more power than if they did not exiſt. They call them "vanities," or things of no value or efficacy, and this degrading repreſentation is extended to all of them without exception. (See Deut.

xxxii. 21. 1 Kings, xvi. 13, 26. Jerem. viii. 19, x. 8. xiv. 22. xviii. 15. 1 Sam. xii. 21. Pſ. xxxi. 6. xcvi. 5. Job, xiii. 4. Iſaiah, xli. See alſo Levit. xix. 4. 1 Chron. xvi. 26. Ezek. xxx. 13, and compare 1 Kings, xviii. 27. Iſ. xlv. 5.) The apoſtles of Chriſt uſe the ſame language concerning them with that of the ancient prophets. (1 Cor. viii. 4. x. 19.) The heathens, indeed, aſcribed oracles, prophecies, and prodigies to their dæmons; and on their favour the good or evil ſtate of men's lives was thought to depend: and this perſuaſion was the ground of their worſhip. Hence it appears, that the proper point in diſpute between idolaters and the prophets of the true God was, whether that perſuaſion was ſupported by facts. The meſſengers of God challenge idolaters to juſtify their worſhip of idols, and the idol gods themſelves to give proof of their divinity by a diſplay of knowledge, or by ſome exertion of power, ſuch as was either hurtful or beneficial to mankind; and even admit that, by ſuch a diſplay of their power or knowledge, the heathen deities would have eſtabliſhed their claim to divinity, and their title to the homage of mankind. (See Iſaiah, xli. 21, 24.) Their utter impotence appears to be the only reaſon of the Scripture's remonſtrating againſt paying them homage. Theſe circumſtances are frequently repeated and juſtified by facts. (See Jerem. x. 3, 5, 15. Iſ. xliii. 8. xliv. 7. xlv. 16, 20. xlvi. 5. xlviii. 3. 1 Cor. viii. 4. x. 19. xii. 2. 1 Theſſ. i. 9. Dan. iv. 7. v. 7. 1 Kings, xviii.)

It has been aſſerted, and ſtrenuouſly maintained by ſome writers of approved talents and learning, that the ſyſtem of pagan idolatry was ſupported by miracles and prophecies, performed and delivered, not by the fictitious deities of the heathens, but by "devils," or, wicked dæmons of a higher order than mankind, who perſonated the gods, lurked within their conſecrated images and ſtatues, inſpired the vates, animated the fibres of the entrails of victims, governed the flight of birds, guided the lots, framed the oracles, and exerted themſelves to the utmoſt in promoting idolatry, in order to involve men in the guilt of it, to draw all adoration to themſelves, to ſecure proper food and nouriſhment from the evil ſteams and blood of the victims which were offered to them, and hereby to ſtrengthen themſelves for the enjoyment of their luſtful pleaſures with boys and women. Theſe wicked ſpirits, it has been aſſerted, were, properly ſpeaking, the gods of the heathens, rather than thoſe imaginary beings whom they ſeemed to themſelves to worſhip. In ſupport of theſe aſſertions an appeal has been made to the writings of the fathers, and the authority of ſcripture; and it muſt be allowed that extravagant opinions of this kind are clearly contained in the writings of the fathers. (Juſt. Mart. Apol. p. 113. ed Thirlbii. Tertullian de Anima, c. lvii. Minucius Felix, c. xxvii. Cyprian. de Idolor. Van. p. 206. Arnob. cont. Gent. l. i. 26. Lactant. de Orig. Error. l. ii. c. 16. de verâ Sapient. l. viii. c. 16. Euſeb. Præp. Evang. l. v. c. 4. Auguſt. de Civ. Dei. l. viii. c. 16. See alſo Middleton's Free Enquiry, p. 66, 70, 77, and Mede's Works, p. 680, 681.) The Fathers, however, though they ſometimes taught or allowed, that pagan idolatry was ſupported by oracles and miracles, do nevertheleſs on other occaſions confeſs, or clearly intimate, that paganiſm had no other ſupport than human craft and impoſture. (Origen cont. Celſum. Euſeb. Præp. Evang. l. iv. c. 1, 2, 3. Clem. Alexand. Strom. Arnob. l. vi. Lactant. l. ii. See Fontenelle's Hiſt. of Oracles, c. ix. and Clerici Hiſt. Eccles. prolegom.) We have already ſuggeſted the improbability that the Scriptures ſhould aſſert or allow that idolatry was ſupported by the miraculous interpoſition of any wicked ſpirits; whether they did or did not counterfeit the ſouls of men deceaſed: and the ſubject, as it is peculiarly intereſting to the biblical critic, will be again reſumed for farther diſcuſſion.

Dæmon is often uſed, in a general ſenſe, as equivalent to a *deity*; and is accordingly applied to *fate* or *fortune*, or whatever elſe was regarded as a god; yet thoſe dæmons, who were the more immediate objects of divine worſhip amongſt the heathens, as Mr. Farmer maintains, and as we have already ſtated his ſentiments and reaſoning, were human ſpirits.

The word dæmon is uſed indifferently in a good and in a bad ſenſe. In the former ſenſe it was very commonly uſed amongſt the ancient heathens, "We muſt not," ſays Menander, "think any dæmon to be evil, hurtful to good life, but every god to be good." Plato (Cratyl. tom. 1. p. 398. ed. Serrani) commends Heſiod and the other poets, who affirmed, that whenever any good man died "he became a dæmon." He elſewhere (de Republ. tom. ii. l. v. p. 468.) ſpeaks to the ſame purpoſe. "All thoſe who die valiantly in war are of Heſiod's golden generation, and become dæmons; and we ought for ever to worſhip and adore their ſepulchres, as the ſepulchres of dæmons" He affirms the ſame concerning all who were judged excellently good in life, in whatever manner they die. The common or conſtant uſe of dæmon in the earlieſt ages, in a good ſenſe, unleſs when κακος, or ſome ſimilar epithet, is joined with it, is owing, ſays Mr. Farmer, to its being applied at firſt to the deified ſouls of good men; and if the firſt dæmons were all good, as Dr. Sykes aſſerts, it is becauſe the firſt men (whoſe ſouls they were), the men of the golden age, were all good: becauſe the heathens thought that the ſeparated ſpirits of good and bad men became reſpectively good and bad dæmons. Nevertheleſs, thoſe are certainly miſtaken who affirm, that dæmon never ſignifies an evil being till after the times of Chriſt. Pythagoras held dæmons who ſent diſeaſes to men and cattle. (Diogen. Laert. Vit. Pythagor. p. 514. ed Amſtel.) Zaleucus in his preface to his laws (apud Stobæum. Serm. 42.) ſuppoſes that an evil dæmon might be preſent with a man, "to influence him to injuſtice." The dæmons of Empedocles were evil ſpirits, and exiles from heaven. (Plutarch Περι του μη δειν δανειζεσθαι.) And in his life of Dion (p. 958.) he ſays, "It was the opinion of the ancients, that evil and miſchievous dæmons, out of envy and hatred to good men, oppoſe whatever they do. Scarcely did any opinion more generally prevail in ancient times than this, *viz.* that as the departed ſouls of good men became good dæmons, ſo the departed ſouls of bad men became evil dæmons. See Chalcid. in Platon. Tim. cap. 135. p. 330.

Accordingly δαιμονιος frequently occurs in ancient writers as a term of reproach as well as of praiſe; whatever may be the opinion we adopt with regard to the nature and rank of dæmons. It has been very generally ſuppoſed, that dæmons, and particularly the bad dæmons, were ſpirits of a celeſtial origin; and this application of the term frequently occurs both among the heathens and in the ſcriptures; and more eſpecially in the writings of the Chriſtian fathers. When no bad quality is aſcribed to the dæmon, or dæmons that are mentioned, and nothing is affirmed concerning them which implies it, the acceptation of the term in Pagan writers is generally favourable. The Jews, and as ſome ſay, the ſacred writers, and alſo the Chriſtian fathers, commonly uſed the term in a bad ſenſe. But Mr. Farmer maintains, that, whether the term dæmon be uſed in a good or bad ſenſe, there is no ſufficient reaſon for reſtricting it to ſpirits of a higher order than mankind. As the ſouls of many good men,

men, he ſays, were thought to become good dæmons after death, ſo it was a prevailing opinion that the departed ſouls of many bad men became bad dæmons. Thales, Pythagoras, Plato, and the Stoics, as we learn from Plutarch (De Placit. Philoſ. l. i. c. 8.) repreſented "heroes as ſouls ſeparated from their bodies, and as being good or bad according to their reſpective characters." No notion, he adds, was more prevalent in the Heathen world, from the earlieſt ages, than that of the power of ghoſts to haunt and torment mankind, particularly the ghoſts of thoſe who died a violent death; and hence he inclines to believe that the doctrine of the philoſophers concerning evil men's becoming evil dæmons after death was the creed of the vulgar. From the Heathens the ſame or ſimilar opinions paſſed to the Jews, whoſe doctors taught "that the ſouls of the damned are for ſome time changed into devils, in order to be employed in tormenting mankind." (See Calmet's Dictionary, Art. *Dæmon*; Theophylact cited by Grotius in Matt. viii. 28.) Joſephus ſays expreſsly (De Bell. Jud. l. vii. c. vi. § 3.) "that dæmons were the ſpirits of wicked men." Aſmodeus (who is often deſcribed as the prince of evil ſpirits, and reckoned the very ſame as Sammael and Beelzebub) is repreſented by the Jews as having for his mother Nahemah, the ſiſter of Tubal-Cain. Some of them taught that dæmons were the offspring of Sammael (the prince of dæmons), and Eve, before Adam knew her. (See Calmet, *ubi ſupra.* Vandale de Idolat. Buxtorf's Lexic. Chald. Talmud. Baſnage's Hiſt. of the Jews, b. iv. c. 11.)

It is not eaſy to aſcertain, whether dæmon is uſed in a good or bad ſenſe in the LXX. If we could determine this point, we might infer how the term ſhould be underſtood in the New Teſtament, the writers of which have adopted the ſtyle and diction of the LXX. That it was uſed, at leaſt generally, in a bad ſenſe, ſeems to be probable for the following reaſons. Some of the Heathens themſelves inferred from the actions aſcribed to their gods, and the rites by which they were appeaſed, that they were not gods, but evil dæmons. (Plut. de Iſ. Oſir. De Defect. Orac. Compare Porphyr. de Abſtin. l. ii. § 36, 37. 42.) The Jews who wrote in the Greek language uſe dæmon in a bad ſenſe, particularly Joſephus and the tranſlator of Tobit, ch. iii. 8. vi. 17. Grotius (in Matth. iv. 14.) thought that the Helleniſts uſed δαιμων in an ill ſenſe, as the Hebrews did Baal; though both originally indifferent in their ſignification. Moreover the New Teſtament does certainly, on ſome occaſions, by dæmons mean evil ſpirits (Matth. x. 34. James, ii. 19.); and therefore the word may have the ſame meaning when it is applied to the heathen gods. Whatever notion we entertain concerning dæmons, in their reference to poſſeſſion, whether we ſuppoſe them to be ghoſts of wicked men deceaſed, or lapſed angels, it is plain they were conceived to be malignant ſpirits. They are exhibited as the cauſes of the moſt dreadful calamities to the unhappy perſons whom they poſſeſs, dumbneſs, deafneſs, palſy, madneſs, epilepſy, and ſimilar diſorders. They are frequently called πνευματα ακαθαρτα, unclean ſpirits, ſometimes πνευματα πονηρα, malign ſpirits. They are repreſented as conſcious that they are doomed to miſery and torments, though their puniſhment be for a while ſuſpended. It has been generally thought that by *dæmons* we are to underſtand *devils*, in the Septuagint verſion of the Old Teſtament. Accordingly the Iſraelites are charged by Moſes (Deut. xxxii. 17.) with the aggravated idolatry of ſacrificing unto *devils* (ſchedim), whom he calls "new gods that came newly up, whom they knew not, and their fathers feared not;" and the pſalmiſt (Pſ. cvi. 37.) reproaches them in ſimilar terms; "Yea, they ſacrificed their ſons and daughters unto devils" (ſchedim); and in another place (Pſ. xcvi. 5.) it is ſaid "all the gods of the nations are idols." In theſe three paſſages the term uſed by the Septuagint is δαιμονια. If all the pagan gods were devils, ſays Mr. Farmer, why are the *Schedim* diſtinguiſhed from their other gods? Why are they called new to the Iſraelites, who had of old worſhipped the pagan deities? (Gen. xxxv. 2, 4. Joſh. xxiv. 2.) Why is the worſhip of theſe *Schedim* mentioned as matter of peculiar reproach? And if theſe *Schedim* were devils, who have a real and extenſive power over mankind, why are they called *vanities* and *idols?* (Deut. xxxii. 2. Pſ. xcvi. 5. cvi. 36.) The word *ſchedim*, as this author ſays, is derived from a verb, which ſignifies to lay waſte, to deſtroy, and ought to have been rendered *the deſtroyers*. It expreſſes the ſuppoſed cruel nature and character of theſe falſe gods, who were thought to delight in, and who were accordingly worſhipped by, the deſtruction of the human ſpecies, and who required as appears from the context (Pſ. cvi. 38.) even "the blood of their ſons and daughters." Who the gods were that were worſhipped by human ſacrifices all hiſtory informs us; and ſo has the plaſmiſt in the moſt expreſs terms, "they ate the ſacrifices of the dead:" they were the great warriors who in their mortal ſtate delighted in the ſlaughter of the human race. This worſhip was new to the Iſraelites, as they had never practiſed it in Egypt or before they went into that country; but what they afterwards learned of the Canaanites. Accordingly the *ſchedim* are expreſsly called by the pſalmiſt (Pſ. cvi. 38.) "the idols of Canaan." What one circumſtance is there, adds our author, that can lead us to ſuppoſe that either Moſes or the Pſalmiſt, in the forecited paſſages, is ſpeaking of *devils*, in the common acceptation of that word? On the other hand, it is alleged that *ſchedim* is derived from a verb, which ſignifies to pour forth, to ſhed, to ſcatter abroad, and ought to be rendered *diſtributors*. Theſe were the idol gods of Canaan, *viz.* Baal, the ſun, moon, planets, and all the hoſts of heaven, as the ſcriptures repeatedly aſſure us; nor doth Moſes mention any other idol gods: whence, it is ſaid, it muſt be obvious to unprejudiced perſons, that the terms *ſchedim* in the Old Teſtament, and dæmons in the New, are applied to thoſe gods which had never been men, and cannot denote deified human ſpirits. (Fell's Dæmoniacs, p. 71.)

There is another paſſage in the Old Teſtament (Levit. xvii. 7.) in which our Engliſh tranſlators have introduced the word *devils*, "they ſhall no more offer their ſacrifices unto devils," לשעירם, to *ſeirim* or *ſchirim*, a word which ſignifies hairy beings, or goats. The learned Bochart has ſhewn, that the ſacred animals of Egypt were hairy, and that the goat in particular was worſhipped; ſo that, as the *ſchedim* were the idols of Canaan, the *ſeirim* were the idols of Egypt. That this was the caſe appears from another paſſage in which the ſame word occurs, *viz.* 2 Chron. xi. 15. But the word *ſeirim* (goats) no more ſignifies *devils* than any other word throughout the Bible. This prohibition of Moſes to the Iſraelites, after they had left Egypt implies, that they had, during their ſtay there, defiled themſelves with the particular ſpecies of idolatry here condemned. And the other paſſage, in which it is ſaid that Jeroboam "obtained him prieſts for the high places, and for the devils, and for the calves he had made," obviouſly denotes, that Jeroboam lately returned from Egypt, eſtabliſhed the worſhip of the deities of that country, which was eminently that of goats and calves, or at leaſt ſet up the images of theſe animals as ſymbols of the divinity. It could not refer to *devils*, in the ſenſe now given to the word, becauſe the Iſraelites are never charged by their prophets with ſo deteſtable a ſpecies of idolatry as the worſhip of devils; nor did the Egyptians, whoſe example Jeroboam copied, ever repreſent devils under the figure of goats and calves.

calves. Upon the whole Mr. Farmer concludes, that the authors of the Septuagint verſion muſt have known that the Heathen gods, which were the immediate objects of worſhip, and which are repeatedly called dæmons, and not devils, were deified men; and what he has offered on this head is much confirmed by what occurs in ſir Iſaac Newton's Chronology, p. 160, 161.

In the New Teſtament alſo the Heathen deities are called dæmons; though the Engliſh tranſlation tends to miſlead the reader by the uſe of the word devils inſtead of dæmons, which the original imports; and hence, as well as from ſome other collateral conſiderations, it has been inferred, that the Heathen deities were ſpirits of an order ſuperior to that of the human race, and alſo that they belonged to the claſs of wicked ſpirits. Thus we read in 1 Cor. x. 20, 21. "that the things which the Gentiles ſacrifice, they ſacrifice to *devils*, and not to God; and I would not that ye ſhould have fellowſhip with *devils*;—ye cannot drink the cup of the Lord, and the cup of *devils*; ye cannot be partakers of the Lord's table and the table of *devils*." The word here rendered *devils* is δαιμονια, or *dæmons*; but allowing this to be the caſe, it has been maintained that the word dæmon being uſed in an ill ſenſe, the dæmons here referred to were apoſtate angels. On the other hand, Mr. Mede and others are of opinion, that dæmons might have been taken in a good ſenſe; and it has been ſuppoſed that the apoſtle is deſcribing, in this paſſage, the objects of popular worſhip, and ſpeaking of the notion which the Heathens in general had of them; thus "they ſacrifice to dæmons," that is, to ſpirits whom they regard as real deities. But it has been ſaid, that if theſe dæmons were evil ſpirits, they might nevertheleſs have denoted deified men and women. How immoral were the characters, and how licentious was the worſhip, of thoſe gods that were certainly of human extract, ſuch as Jupiter, Venus, Bacchus, and many others? Oſiris or Serapis was the chief of evil dæmons (Plutarch, tom. ii. p. 362.) To theſe, it is ſaid, there may be a reference in 2 Cor. vi. 14—16; particularly in the expreſſion, "what concord hath Chriſt with Belial?" The Heathen dæmons might be called Belial, either becauſe they were of no uſe (deducing it from בלי, *nihil*, and יעל, which in Hiphil denotes *prodeſſe*, or becauſe ſo much wickedneſs entered into the idea which the pagans entertained of them. St. Paul, it is alleged, was not unacquainted with the Greek learning, and it may be preſumed that he could not be ignorant of the ordinary ſignification of dæmons amongſt the Greeks. Nay, it is farther affirmed by Mr. Farmer, that he did know, that the Greeks by this word expreſſed gods taken from among men. After preaching to the Athenians concerning the reſurrection and glory of Jeſus Chriſt, they repreſented him as "a ſetter forth of ſtrange dæmons or gods;" (Acts, xvii. 18, 22.) which, as our tranſlators have intimated, could not mean *devils*, in the ordinary acceptation of the term, but muſt denote *deified men*; the Athenians imagining that St. Paul was recommending a new deity, who had once been a man. It cannot be ſuppoſed that in his addreſs to the Athenians, whom he wiſhed to conciliate, and not to irritate, when he calls them δεισιδαιμονεστερους, or very devout towards dæmons or the gods, he ſhould brand them as worſhippers of devils; an affirmation of that kind not being true, nor likely to be underſtood by the Athenians in that ſenſe. In another paſſage (1 Tim. xiv. 1.) St. Paul, foretelling the apoſtacy of ſome profeſſing Chriſtians from the purity of the original faith, ſpecifies, among ſeveral other inſtances, this very remarkable one, "their giving heed to doctrines" (not of *devils* but) "concerning dæmons." Here the apoſtle evidently refers to the worſhip of *Saints* practiſed by idolatrous Chriſtians; as biſhop Warburton allows (Serm. vol. iii. p. 302.) though not in perfect conſiſtency with another declaration (Serm. vol. ii. p. 70.) "that the ſacred writers never uſe the word *dæmons*, but they always mean Satan and his angels." The meaning of the apoſtle may be inferred from this paſſage, which ſhews that by the word *dæmons* he did not mean *devils*, but beatified or deified human ſpirits.

The apoſtle James ſays (ch. ii. 19.), "The devils" (in the original, the dæmons) "believe and tremble." Here, ſays Dr. Campbell, the apoſtle means the ſpirits of wicked men deceaſed; and he further obſerves, that in this epiſtle, the epithet δαιμονιωδης is accordingly uſed in a bad ſenſe, (ch. iii. 15.), where that wiſdom which produceth envy and contention is ſtyled earthly, ſenſual, deviliſh or dæmonian. Mr Farmer ſuggeſts, that this paſſage of St. James is taken from one in the book of Job (xxvi. 5.), the words of which he tranſlates, "the giants tremble under the waters (or in *the abyſs*), *together with their* hoſt or fellow-inhabitants." The word רְפָאִים, he ſays, ſometimes ſignifies the ghoſts of the dead in general. (Pſ. lxxxviii. 10. Iſ. xxvi. 14.) In other paſſages it ſeems to denote the ghoſts of wicked men in particular, who are in a ſtate of perdition; and more eſpecially, perhaps, thoſe of the giants who periſhed by the flood, and thoſe who, like them, filled the earth with violence and terror. (Prov. ii. 18. ix. 18. xxi. 16. Iſ. xiv. 9.). Rephaim properly ſignifies giants in Gen. xiv. 5. Deut. ii. 11. 20. iii. 11. Joſh. xv. 8. xvii. 15. 2 Sam. xxi. 16. 18. 20. 22. 1 Chron. xx. 4. 6. 8. In the paſſage cited from Job, it is explained concerning giants, that is, their ghoſts in the Chaldee Paraphraſe, the Septuagint, the Latin Vulgate, and many modern verſions. In the phraſe "under the waters," Mr. Peters (Diſſ. on Job, p. 359.) and others, ſuppoſe that it refers to the waters with which the giants were overwhelmed at the flood. (See Mede Diſc. on this text, Works, p. 31.). This expreſſion, "under the waters," anſwers to the loweſt hell, or ſheol, in Deut. xxxii. 22. or that part of ſheol which is allotted to wicked ſouls. (See Peters on Job, ſect. 8. Windet, de Vitæ Functorum ſtatu, p. 204. 243.) Accordingly, Mr. Farmer apprehends, that the dæmons of St. James anſwer to thoſe departed ſouls in Job, whether you underſtand thereby the ghoſts of the wicked in general, or thoſe of the antediluvian giants in particular. From this paſſage he infers, that by dæmons in the New Teſtament we are ſometimes to underſtand the ghoſts of dead men. In another paſſage (Rev. ix. 20.), he ſuppoſes it can bear no other meaning; where St. John refers to the idolatries practiſed in the Romiſh church, which conſiſt in the worſhip of departed ſaints and ſenſeleſs idols, not of *devils*, as this word is now underſtood. In the ſequel of the revelation of St. John, he had a prophetic viſion of "the ſpirits of dæmons working miracles," which is referred by ſome to the miracles pretended to be wrought by departed ſaints, and in ſupport of their worſhip, and underſtood by others as a ſymbol or figurative repreſentation of the deceit and fraud practiſed by men of the temper and ſpirit of dæmons, in ſupporting their claims to a miraculous power. Another paſſage occurs in the book of Revelations (ch. xviii. 2.), in which the utter deſolation of Babylon is deſcribed: "It is become the habitation of dæmons;" *i.e.* a deſert; dæmons or evil ſpirits being ſuppoſed to frequent deſolate places, (compare the LXX. verſion of Iſ. xiii. 21; and ſee Vitringa on Rev. xviii. 2.)

Such as we have enumerated are the occaſions on which dæmons, not directly referring to poſſeſſions, occur in the

New Teſtament; from a diſtinct examination and illuſtration of which, Mr. Farmer concludes, that the term dæmons never means in them the devil and his angels; but that dæmons denoted the ghoſts of dead men; and that the word was uſed, as the ancients uſed it, ſometimes in a good, and at other times in a bad ſenſe. For the cuſtomary uſe of the term in its connection with poſſeſſions, ſee the article DÆMONIAC.

As to the meaning of the word dæmon in the fathers of the Chriſtian church, it is uſed by them in the ſame manner it was by the heathen philoſophers, eſpecially the latter Platoniſts; that is, ſometimes for departed human ſpirits, and at other times for ſuch ſpirits as had never inhabited human bodies. In the fathers, indeed, the word is more commonly taken in an evil ſenſe than in the ancient philoſophers; and it has been a very general opinion, that by dæmons they meant fallen angels, as well as the ſouls of dead men, both being objects of worſhip among the heathens. To this purpoſe, Lactantius ſays *(ubi infra)*, "Triſmegiſtus calls dæmons evil angels; ſo well was he acquainted with this, that they had been celeſtial beings, but were depraved, and ſo were become terreſtrial." He alſo affirms "that there are two ſorts of dæmons, the one celeſtial, the other terreſtrial; that the latter are the authors of the ill things that are done, whoſe prince is the devil, whom Triſmegiſtus calls the dæmonarch," (prince of dæmons.) Chryſoſtom (in Pſ. xli. tom. v. p. 137.) reckons it among the favours of Providence, that when the air is full of dæmons and adverſe powers we do not diſcern them; for the ſight of them might frighten us out of our wits, if not to death. Euſebius of Cæſarea (Præp. Evang. l. vii. c. 16.) ſuppoſed theſe ſpirits to be fallen angels; and he ſays, that when they had ſinned, and for their tranſgreſſion were expelled the heavenly abodes, many of them were thruſt into hell, called the abyſs, and confined there; others of them were ſuffered to dwell near the moon, and in the region of the air, &c.

Mr. Farmer, whilſt he allows that the heathens believed in the exiſtence of dæmons of a purely celeſtial nature, ſome of whom were evil ſpirits, denies that the heathens worſhipped any ſuch beings as we call fallen angels; and as to the opinion of the fathers, he obſerves, that they conſtantly maintain that Saturn, Jupiter, Serapis, Æſculapius, and all the heathen gods, had been mortal men; and that, therefore, they contradicted themſelves, when they aſſerted that they were a different order of beings. If they admitted that they had all been men, with what truth or conſiſtency could they call them fallen angels? Mr. Farmer conceives that the fathers borrowed this language from the Pagan philoſophers: and both urge, in ſupport of their aſſertion, that thoſe beings whom the heathen world worſhipped as gods were evil dæmons, the ſame arguments; ſuch as the actions aſcribed to the heathen gods, the rites appointed to placate them, and their oppoſition to the cauſe of true piety. Both taught that evil dæmons were ſpirits of a celeſtial origin, and that they were inſpirers and authors of prophecies and miracles. As the fathers had been educated in the ſchools of pagan philoſophy, they would naturally adopt the ſentiments and language of the philoſophers, and retain them after they embraced Chriſtianity. Nevertheleſs, attached as they were, by early education or habit, to the pagan ſyſtem of dæmonology, ſome of them maintained, and Juſtin Martyr in particular, that dæmons were the ſouls of dead men. This was alſo the caſe with regard to Athenagoras, Tatian, Tertullian, and others.

Beſides the two forementioned kinds of dæmons, the fathers, as well as the ancient philoſophers, held a third, *viz.* ſuch as ſprang from the congreſs of ſuperior beings with the daughters of men. In the theology of the ancients, theſe were the worſt kind of dæmons. (Tertullian's Apology, cap. 22. Lactantius, Div. Inſtitut. lib. ii. cap. 14. 15.) Tertullian here refers to "the ſons of God," in the hiſtory of Moſes (Gen. vi. 2.), who mixed with the daughters of men, and who were believed to be angels by Juſtin Martyr (Apolog. ii. p. 112.), Tertullian, and by almoſt all the fathers of the four firſt centuries, upon the authority of Joſephus (Antiq. i. 4.), Philo (vol. i. p. 263.), and the ancient editions of the Septuagint, which had ſubſtituted "the angels of God," inſtead of "the ſons of God."

Different orders of dæmons had different ſtations and employments aſſigned them by the ancients. Good dæmons were conſidered as the authors of good to mankind; evil dæmons brought innumerable evils both upon men and beaſts. Amongſt evil dæmons there was a great diſtinction with reſpect to the office aſſigned them; ſome compelled men to wickedneſs, others ſtimulated them to madneſs. On the ſubject of this article, ſee, beſides the original writers already cited, Banier's Mythology, vol. i. b. v. Blackwell's Letters on Mythology. Mede's Works. Farmer's Diſſert. on Miracles. Eſſay on Dæmoniacs. Worſhip of Human Spirits. Lardner's Works, vol. i. Bp. Newton's Works, vol. iv. diſſ. xv. See DÆMONIAC.

DÆMON, or *Genius of Socrates*, a ſort of preceptor or monitor, whoſe counſel and aſſiſtance he is ſaid to have experienced in the chief concerns and actions of his life. This genius ſuggeſted to him what courſe it was proper for him and others to avoid, and diverted him, and thoſe who regarded his advice, from the proſecution of enterpriſes which would have proved prejudicial, without ever prompting him to any particular action. Cicero (De Divin. l. i.) deſcribes this dæmon as "Divinum quoddam, quod dæmonum appellat, cui ſemper ipſe paruerit, nunquam impellenti, ſæpe revocanti." Plutarch and Apuleius have compoſed ſeparate treatiſes on this genius or dæmon of Socrates, in which they ſtate the ſentiments of the ancients concerning its exiſtence and nature. As the deity alone has a clear and unerring knowledge of futurity, thoſe who are the moſt ſagacious in diſcerning the courſe and iſſue of events, and their effect in contributing to the ſucceſs or miſcarriage of any enterpriſe, approach the moſt nearly to divinity, and ſeem, according to human judgment, to participate, in ſome degree, the counſels and deſigns, the foreſight and preſcience of the deity himſelf; although their knowledge of futurity is conjectural and precarious, whilſt his is certain and infallible. Socrates poſſeſſed a very conſiderable portion of this ſagacity, in the exerciſe of which he blended a juſt and penetrating judgment with the moſt conſummate prudence. Accordingly he might denominate this kind of ſagacity δαιμονιον, ſomething divine, adopting a ſort of equivocal expreſſion, and modeſtly declining to arrogate to himſelf the merit of his wiſdom in conjectures concerning futurity. The abbé Fraguier, in a diſſertation on this ſubject, printed in the fourth volume of the "Memoirs of the Academy of Belles Lettres," aſcribes the whole of what has been ſaid concerning the dæmon of Socrates, to the wiſdom and prudence of that philoſopher, which enabled him to foreſee many things which a perſon of inferior diſcernment would never have thought of; for prudence, ſays Cicero, is a kind of divination. If Socrates had not intended to decline aſſuming to himſelf the merit of an unerring judgment, by attributing it to a kind of inſtinct; and if he had pretended to any extraordinary gift ſuperior

a foreſt conſecrated to the Eumenides. Sophocles, according to Suidas, was born in this place.

COLONUS, an huſbandman, or villager, who was bound to pay yearly a certain tribute, or at certain times of the year, to plow ſome part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch *boor*.

COLONY, Colonia, is properly a number of perſons of all ſexes and conditions, tranſported into a remote province, with a view of remaining there, and for the purpoſe of cultivating and inhabiting it; but among commercial nations, the term is uſed in a larger but leſs proper ſenſe, and applied to the temporary reſidence of merchants and agents in another country. The word colony originally ſignified no more than a *farm*, i. e. the habitation of a peaſant, *colonus*, with the quantity of land ſufficient for the ſupport of his family; "quantum colonus unus arare poterat." It is derived from the Latin word *colo*, I till or cultivate; hence *colonus*, a huſbandman, and *colonia*, a body of farmers, ſent to cultivate the ground in a diſtant country, and, by metonymy, the place itſelf. From the Latin the word has paſſed, with ſcarcely any alteration, into the modern languages of the weſt of Europe.

We may diſtinguiſh, generally, four kinds of colonies; *viz.* 1. Thoſe that ſerve to eaſe or diſcharge the inhabitants of a country, where the people are become too numerous, ſo that they cannot any longer conveniently ſubſiſt together. 2. Thoſe eſtabliſhed by victorious princes and people, in the middle of vanquiſhed nations, to keep them in awe and obedience. 3. Thoſe that are formed by emigrants, driven from their native country by oppreſſion and perſecution to ſeek a foreign ſettlement, and to ſubſiſt firſt by agriculture, and afterwards by commerce. 4. Thoſe that may be called "colonies of commerce;" becauſe trade is the ſole occaſion and object of them.

To the *firſt* claſs we may refer the colonization which took place in the earlier ages of the world, and which ſerved to diſſeminate the human race, firſt through the various regions of the eaſt, and afterwards through other more remote parts of the globe. At this early period colonization was of courſe more frequent than it is at preſent. The increaſe of a tribe beyond the limits of a comfortable ſubſiſtence upon the lands which were occupied, would be a ſufficient motive for inducing the younger members of the ſociety to remove from the proſpect or actual preſſure of want, to ſome unoccupied territory. Some authors, however, are of opinion that ſoon after the deluge, when the deſcendants of Noah became numerous, a diviſion of the ancient continent and its adjacent iſlands was made, probably by lot, among the heads of the ſeveral families. This opinion ſeems to be in ſome meaſure ſupported by the authority of Moſes, who ſays, (Gen. x.) on mentioning the children of Eber, that the name of one of them was "Peleg" (diviſion), for in his days was the earth divided." (See Dispersion.) However this be, the gradual extenſion of the habitations of mankind muſt have correſponded with their increaſe; and it ſeems to have been unreſtrained by claims made upon the uncultivated ſpots. But this unlimited right of diſperſion has long ſince ceaſed in moſt parts of the world; and hence it has become neceſſary for coloniſts, who ſeek new ſcenes for their labours, either to unite with the natives as friends, or to ſubdue them by conqueſt, if the colony is founded upon hoſtile principles. At a ſubſequent period, the different ſtates of ancient Greece, ſuch were Athens, Sparta, Corinth, and Argos, poſſeſſed territories of very limited extent; and the increaſe of population gave riſe to various emigrations from all thoſe ſtates. The colonies of the Dorians reſorted chiefly to Italy and Sicily, which, in the times preceding the foundation of Rome, were inhabited by barbarous and uncivilized nations; thoſe of the Ionians and Eolians, the two other great tribes of the Greeks, to Aſia Minor and the iſlands of the Ægean ſea, the inhabitants of which ſeem at that time to have been pretty much in the ſame ſtate as thoſe of Sicily and Italy. The emigrations now mentioned, and ſome others of a ſimilar nature, were undertaken by private individuals, with no authority from the government; and as they were generally directed towards diſtant and tranſmarine ſettlements, they retained but a ſlight connection with their original countries. The parent ſtate, indeed, conſidered the colony as a child, at all times entitled to great favour and aſſiſtance, and owing in return much gratitude and reſpect; but, moreover, conſidered it as an emancipated child over whom no direct authority or juriſdiction was claimed. The colony ſettled its own form of government, enacted its own laws, elected its own magiſtrates, and made peace or war with its neighbours as an independent ſtate, which had no occaſion to wait for the approbation or conſent of the parent city. The coloniſts, indeed, remembered the land of their fathers with filial affection and reſpect; they honoured its gods, by offerings of firſt-fruits to their temples; they retained a predilection for its cuſtoms and laws, as well as its religion and language; they yielded to its citizens the place of diſtinction at public games, and to its prieſts the holy honour of firſt inſpecting the entrails of ſacrifices. In war they generally followed the fortunes of the metropolis, as allies upon equal terms; but as they were perfectly independent, received no protection from her, and often equalled her in reſources, they always refuſed to come forward as auxiliaries, when unfair terms were propoſed. Thus, the Sicilian colonies refuſed to admit an Athenian army into their territories, for the purpoſe of reſting, on an expedition; and, in the Perſian war, the republic of Syracuſe, when intreated by the Lacedæmonians to aid the common cauſe, refuſed to ſend any aſſiſtance, unleſs their chief magiſtrate, Gelon, were allowed to command the united forces. Sometimes the parent country, conſcious of her ſuperiority and ſtrength, attempted to exact from the colonies, as matter of right, the uſual marks of filial attachment. Thus, Corinth was deſpiſed by her colony at Corcyra, for her inferiority of wealth and trade; and ſhe endeavoured to obtain by force, the uſual tokens of remembrance. The coloniſts appealed to Athens, who took their part, and retained them as uſeful allies, eſpecially during the Peloponneſian war. Potidæa, another Corinthian ſettlement, took the part of Athens, until her impolitic tyranny urged it to throw off the yoke, and appeal to Sparta and Corinth. After a long and ſevere ſtruggle, the Athenians were ſucceſsful; ſent new colonies to occupy the confiſcated and vacant lands; continued their oppreſſive government; and retained their dominion over Potidæa, until the invaſion of Philip. When the progreſs of Cyrus expoſed the Aſiatic colonies of Grecce to extreme danger, they in vain applied to Sparta for aſſiſtance; and, being ſoon conquered by the Perſian monarch, they remained in ſubjection, until the victories of Plateæ and Mycale reſtored them to freedom; but deſpairing of long maintaining their independence, they formed a ſtrict alliance with Athens, who availed herſelf of the opportunity of a general alarm, to propoſe an univerſal contribution from all her colonies and allies, for the great purpoſe of reſiſting the Perſian power. We might cite many other inſtances to exemplify the independence of the Grecian colonies on the ſtates from which they originated. Nevertheleſs, the benefits in point of civilization reſulting to barbarous countries from colonies of private adventurers, migrating

proof of the contrary doctrine, and the opinion of the Jews, however, reference has been made to the language of the Phariſees, when they objected to Chriſt's cure of dæmoniacs: "He caſteth out dæmons by Beelzebub (Gr. Beelzebul) the prince of dæmons." For the ſtatement and examination of this objection, ſee the article BEELZEBUB.

It has been ſaid, however, that the term dæmon bears a different meaning in the ſacred writings, from that which belonged to it in the profane; or, that our Saviour and his apoſtles uſed it in a ſenſe peculiar to themſelves. To this argument it has been replied, that as the ſacred writers have not particularly explained the ſenſe in which they uſe the word dæmon, we may naturally infer, that they uſe it in its common and ordinary ſignification; and that if they had aſſigned to it a new and peculiar meaning, we might have expected that they would have apprized us of it for the prevention of miſtakes. For the general ſenſe of theſe ages, concerning the ſubject under our preſent conſideration, we cannot refer to a more reſpectable authority than that of Juſtin Martyr, who was bred a heathen, and inſtructed in the principles of the heathen philoſophy; and who afterwards became a Chriſtian, and flouriſhed near the times of the apoſtles, or about the middle of the ſecond century. This learned writer affirms (Apol. l. i. al. 2. p. 65. Par. 1620), "That thoſe perſons who are ſeized and thrown down by the ſouls of the deceaſed, are ſuch as all men agree in calling dæmoniacs and mad." From the caſe of the poſſeſſed this father infers the permanency of the human ſoul after death; and yet he ſeems to have believed in dæmons of a different order from thoſe who were of the human ſpecies. Accordingly he calls the devil a dæmon (Cohort. ad Græc. p. 87. ed. Oxon.), and ſpeaks of the devil's deceiving our firſt parents. With regard to the language of the New Teſtament on this ſubject, it has been aſſerted that the evangeliſt John ſeems to intimate (ch. xiii. 2.) that the *devil* took poſſeſſion of Judas; whence it has been inferred that as this was the language of the vulgar, it ſhews that, in their eſtimation, Satan and his angels did occaſionally enter the bodies of men. In another place, (Acts, x. 38.) we read of perſons that were healed, "who were oppreſſed of the *devil*," or held in ſubjection to the devil: whence it has been concluded, that to be poſſeſſed of dæmons, for to perſons in this ſtate the apoſtle ſeems to refer, and to be held in ſubjection to Satan, were expreſſions of the ſame import in the eſtimation of the Jews. With reſpect to the teſtimony of Juſtin Martyr, an ingenious writer obſerves, that he is pleading the cauſe of Chriſtianity againſt the worſhippers of dæmons, and that he ſeems to be deſirous of placing the objects of their worſhip in the moſt humiliating and contemptible point of view: and therefore in the diſcuſſion of this queſtion, we ought to regard him as an advocate, and not as exerciſing the authority of a judge. Joſephus, ſays the ſame writer, was a Jew, who held the pagan ſyſtem in the ſame contempt with which it was regarded by the Chriſtians; and whilſt he availed himſelf of an opportunity for degrading the objects of pagan worſhip, his words may be ſuppoſed to intimate, not that the ſpirits of deceaſed perſons only entered the bodies of men, but that all thoſe ſpirits which, under the name of dæmons, were adored by the heathens, were merely the ſpirits of deceaſed perſons deified by ſuperſtition. Joſephus and Juſtin Martyr, as we have elſewhere obſerved, (ſee DÆMON) ſeem to favour the opinion that fallen angels ſometimes occupied the bodies of men; for, they mean by angels (Antiq. i. 4. Apolog. ii. 112.) the fallen angels, or thoſe who, in the New Teſtament, are called the devil and his angels. Hence it has been concluded, that the indwelling dæmons of the New Teſtament were fallen angels: and that Beelzebub and the dæmons comprehend the devil and his angels, as well as the ſpirits of wicked men deceaſed. It muſt be allowed, whatever may be the ſentiments which we may adopt on this ſubject, whether we ſuppoſe the devil and his angels to be real or fictitious beings; and however we may extend or limit, admit or deny, the reality of their power and agency, that poſſeſſions were actually aſcribed by many of the fathers, after the time of Juſtin Martyr, to fallen angels. For their conduct in this reſpect, Mr. Farmer endeavours to account by the following conſiderations. Several philoſophers taught that the heathen dæmons were evil ſpirits of a rank ſuperior to mankind; and that theſe dæmons perſonated the ſouls of the dead, gods, and genii, and procured themſelves to be worſhipped under their names. In this opinion many of the fathers had been educated, and others adopted it from an attachment to the principles of ſome of the learned Gentiles. Motives of policy might likewiſe lead them to repreſent poſſeſſing dæmons as ſpirits of a higher order than mankind. Thus, whilſt St. Chryſoſtom (De Lazaro Conc. 2. tom. i. p. 728.) admits, that dæmons in poſſeſſed perſons pretended, that they were the ſouls of ſuch and ſuch a monk, he aſſerts that the devil perſonated the ghoſts of thoſe who had ſuffered a violent death, and thus cauſed men to think, that they became dæmons, that he might deſtroy the honour of the martyrs. By ſuch repreſentations they not only preſerved the credit of the Chriſtian martyrs, but contributed to diſgrace paganiſm, whilſt they repreſented its gods as devils, who perſonated theſe gods, and paſſed under their names. This view of the pagan gods ſerved alſo to diſparage the prophecies and miracles aſcribed to them by their worſhippers, and the reality of which was too haſtily allowed by the fathers. Mr. Farmer cites a number of paſſages, from which he infers that the fathers doubted or diſbelieved the reality of poſſeſſions, though they aſſerted it in their popular diſcourſes.

In the tranſlation of the New Teſtament in vulgar uſe, we frequently read of perſons *having* or *being poſſeſſed by a devil* or *devils*, and of Chriſt's *caſting out devils*. But the Scripture never deſcribes more than one evil ſpirit by the word devil; and never, (ſays Mr. Farmer), repreſents, any perſons as poſſeſſed by the *devil*, or by *devils*, not even in a ſingle inſtance, notwithſtanding the great frequency with which the evangeliſts ſpeak on the ſubject of poſſeſſions. In all the inſtances in which the term devil occurs in the Engliſh tranſlation of the New Teſtament, the original word is *dæmons* (δαιμονες, δαιμονια, δαιμονιζομενοι) and not that from whence comes the Engliſh word *devil* (διαβολος.)

In deſcribing perſons poſſeſſed the word δαιμων occurs only three times in the New Teſtament; once in each of the three goſpels, Matthew, Mark, and Luke; and in theſe three places it refers to the ſame poſſeſſion, *viz.* that of the furious man in the country of the Gadarenes, who haunted the ſepulchres. There does not, however, ſeem to be any material difference in this appellation from that of the diminutive δαιμονιον, which is alſo uſed by Luke in relation to the ſame dæmoniac. This term δαιμονιον occurs above fifty times, in reference to poſſeſſions real or ſuppoſed, and δαιμονιζομαι thirteen times. Whereas, it has been ſaid, the word διαβολος, *devil*, is never applied to poſſeſſion. The paſſage in the Acts in which thoſe "oppreſſed by the devil" are mentioned, and which we have already cited, ought to have been excepted.

It has, indeed, been generally apprehended, that dæmons and their prince are the ſame ſpirits with the devil and his angels. To which purpoſe it has been alleged, that Satan and Beelzebub are names for the ſame perſon; for when Chriſt was reproached with caſting out dæmons by

the aſſiſtance of the prince of dæmons, he replied, "How can Satan caſt out Satan?" (Matth. xii. 26. Mark, iii. 26. Luke xi. 18.) If Satan, it is ſaid, who is conſidered as the ſame perſon with the devil, (Rev. ix. 12. compare Matt. iv. 1. with Mark, i. 12.) was the prince of thoſe dæmons who were caſt out by Chriſt, then dæmons are the ſame ſpirits as the devil's angels. On this ſuppoſition there can be no other difference between dæmons and the devil, than that which ſubſiſts between a prince and his ſubjects, who both partake of one common nature, though the prince, as preſiding over the reſt, hath a peculiar name of his own. To this objection Dr. Sykes, who maintained that dæmons and their prince were a different order of ſpirits from the devil and his angels, never replied: and Dr. Lardner ſeems to admit its force; for he ſays, (Caſe of the Dæmoniacs, &c. Works, vol. i. p. 448.) "The devil is often called Satan and Beelzebub." For an abſtract of Mr. Farmer's reaſoning on this ſubject, ſee the article BEELZEBUB. See alſo DEVIL and SATAN.

Whether there ever were any real dæmoniacs, is a queſtion that will be conſidered under the article DÆMONIACAL *Poſſeſſion*.

In the Romiſh church, there is a particular office for the exorciſm of dæmoniacs.

DÆMONIACS are alſo a party or branch of the Anabaptiſts, whoſe diſtinguiſhing tenet it is, that the devils ſhall be ſaved at the end of the world.

DÆMONIACAL POSSESSION. Whether we allow that reputed dæmoniacs were really poſſeſſed by dæmons or not, it muſt be acknowledged that they are ranked in the New Teſtament amongſt thoſe who ſuffered the moſt grievous diſtempers. (See Matt. iv. 24. viii. 16, 17.) Hence it may be inferred, that poſſeſſions are comprehended under infirmities and ſickneſſes; and if they had not been included under diſeaſes, the mention of them would not have been omitted in Matt. xi. 5; conſequently, poſſeſſions imply ſome diſorder or diſtemper in the human frame, from whatever cauſe it might proceed. It muſt alſo be admitted, that the miracle, wrought upon the demoniacs, of the reality of which there can be no doubt, is often deſcribed in the ſame terms as that wrought upon the diſeaſed; and theſe terms are ſuch as neceſſarily imply their having previouſly laboured under a real diſtemper, (ſee Matt. iv. 24. viii. 16, 17. xv. 28. xvii. 16, 18. Luke, vi. 18. vii. 21. viii. 2. ix. 42. Acts, v. 16.) Whenever a miracle wrought upon a dæmoniac is deſcribed, the evangeliſt ſays indifferently, Chriſt expelled the dæmon, or that he healed the dæmoniac; ſo that a real diſorder was cured, whenever Chriſt is repreſented as ejecting a dæmon. Amongſt the Greeks and Romans alſo, as well as amongſt the Jews, thoſe perſons who were thought to be poſſeſſed, ſuffered grievous diſtempers. Hence we may infer, that dæmoniacs were afflicted with certain diſtempers, whether the poſſeſſion of dæmons was the real or reputed cauſe of them. Moreover, an opinion ſeems to have very generally prevailed, both amongſt the Heathens and the Jews, that evil ſpirits or dæmons, (whether fallen angels or ſouls of bad men) were the inſtruments or authors of many afflictions and calamities to mankind. Madneſs, or diſtraction, is one evil often aſcribed to them. Forms of ſpeech to this purpoſe were very common. The nations bordering upon Judæa, as well as others, join inſanity and poſſeſſion together. In the plays of Æſchylus, of Sophocles, of Euripides, and of Plautus, from which we may judge what opinions prevailed in common life, thoſe who are ſpoken of as poſſeſſed are all either madmen, or perſonate ſuch. Beſides madneſs, the ancients alſo aſcribed epilepſy to poſſeſſion; eſteeming this diſorder ſacred on account of the entrance of dæmons into the bodies of thoſe who ſuffered under it. Mr. Farmer is of opinion that all the dæmoniacs ſpoken of in the New Teſtament were either madmen or epileptics. Poſſeſſion, he ſays, referring to John, x. 20, 21, may be conſidered as the cauſe, and madneſs as the ſuppoſed effect; or madneſs was the evidence of poſſeſſion.

The language of this paſſage is obviouſly grounded on the connection ſuppoſed to ſubſiſt between poſſeſſion and inſanity. (See alſo John viii. 48, 49. 51, 52. vii. 20.) Melancholy, as well as raving madneſs, was aſcribed by the Jews to dæmons. (See Matt. xviii. 11. Luke vii. 33. See alſo the account of the Gadarene dæmoniacs in Matt. viii. 28. Mark v. 2. Luke viii. 27.) With regard to epileptics, it is obſerved by the ſame writer, that if their diſtemper was by the ancients aſcribed to poſſeſſion, it was becauſe it was attended with a deprivation of the underſtanding, or loſs of ſenſe, and with the ſigns of phrenſy. (See Matt. xvii. 25. Mark ix. 18. Luke ix. 33.) On the other hand, Dr. Lardner contends, "that all thoſe ſaid to have evil ſpirits were not diſcompoſed in their minds," in proof of which he refers to the caſe of the epileptic youth above-mentioned, that recorded in Mark i. 23. 26. Luke iv. 33., and the two inſtances mentioned by St. Matthew (ix. 32.) and Matt. xii. 22. Luke xi. 14. In ſupport of his hypotheſis he alſo appeals to paralytic caſes; whereas Mr. Farmer maintains that paralytics are never ſpoken of in the goſpel as dæmoniacs; and that the goſpel expreſsly diſtinguiſhes palſies from poſſeſſions. (Matt. iv. 24.) With regard to two other paſſages, cited by Dr. Lardner, in one of which a woman is ſpoken of whom "Satan bound" (Luke xiii. 11. 16.), and in the other all diſeaſed perſons are deſcribed as "oppreſſed by the devil" (Acts x. 38), Mr. F. obſerves, that a diſtinction ſhould be made between diſorders which the Jews conſidered as *inflicted* by evil ſpirits, and ſuch as they aſcribed to evil ſpirits *poſſeſſing* mankind. Epileptics, it is ſaid, were by the Greeks and Latins called lunatics; but the evangeliſts, as well as the ancients, diſtinguiſhed between dæmoniacs and lunatics, the former being maniacs, and the latter epileptics, the fits of whoſe diſeaſes were ſuppoſed conſtantly to return with every new and full moon. Accordingly Galen ſays, "the moon governs the periods of epileptic caſes." However, many reputed the ſame perſon to be both a dæmoniac and a lunatic; a dæmoniac, becauſe they referred the epilepſy to the poſſeſſion of dæmons, and a lunatic, becauſe the fits of this diſorder were thought to keep lunar periods. While ſome aſſerted the natural influence of the moon upon this diſorder; others taught, that the patients were more ſubject to the incurſions of dæmons at the changes of this planet than at any other time. Such, perhaps, was the caſe of the youth deſcribed in the goſpel; for his father repreſents him both as lunatic and ſore vexed with a dæmon; or he might have been what ſome modern phyſicians call "epileptic mad." (Mead, p. 46, 47.) The ancient Chriſtian writers are ſaid to deſcribe dæmoniacs as perſons diſordered in their mind; and conſidered them as mad, melancholy, or epileptic perſons. (See Mr. Joſ. Mede, p. 30. Wetſtein, vol. i. p. 283.)

Some writers have aſſerted, that there were no dæmoniacs, whether poſſeſſions be ſuppoſed to be real or imaginary, or not ſo many amongſt any other people as the Jews; nor amongſt them, but about our Saviour's time. Hence unbelievers have taken occaſion to triumph; and have conceived unfounded prejudices againſt the goſpel, repreſenting it as ſomewhat extraordinary, that the devil ſhould exert his power at the appearance of his judge and avenger, rather than at any other time, when he might do it with greater hopes of impunity; and contumelioufly aſking, whether or not we can regard

Chriſt as the Saviour of mankind, if he gave the devil new powers to deſtroy them? In accounting for this ſuppoſed fact, they have ſuggeſted a variety of arguments. A greater liberty and power, ſay ſome of them, might be allowed the evil ſpirits, in the age of Chriſt than in any other, on account of "the intimate relation that dæmoniacal poſſeſſions have to the doctrine of redemption." (Warburton's Serm. vol. iii. p. 229.) The biſhop alſo (p. 217.) concurs with Dr. Macknight, (Truth of the Goſpel Hiſtory, p. 169.) Stillingfleet (Orig. Sacr. p. 166.), in alleging other weighty reaſons for this fact, ſuch as the glory that accrued to God, and the teſtimony that was borne to Jeſus, when Satan was caſt out by a divine power. The learned Stillingfleet, indeed, is at a loſs to determine, whether frequent poſſeſſions, at and after the time of Chriſt, were owing to the malice of the devil, in order to *diſparage* the miracles of our Saviour, or to the providence of God, in order to *augment* his glory. Dr. Jortin thought that Providence ſuffered evil ſpirits to exert their malignant powers ſo much at that time to give a check to Sadduceiſm among the Jews, and to Epicurean atheiſm among the Gentiles. (Rem. on Eccl. Hiſt. vol. i. p. 14.) In another place (vol. ii. p. 17, 18.) he ſays, that Chriſt cured poſſeſſed perſons, in order to ſhew that he came to deſtroy the empire of Satan, and to remove all ſuſpicion of a confederacy with evil ſpirits. Theſe ſpirits, ſays biſhop Newton (Works, vol. iv. p. 302.), had at the time of our Saviour's appearance a particular reaſon for exerting their power and malice, in oppoſition to the firſt erection and eſtabliſhment of the kingdom of God; and they might be permitted to exert them to the utmoſt, in order more effectually to diſplay the ſuperior power and goodneſs of him whom God had ſent into the world, to render their defeat more conſpicuous, and to gain the greater credit to him and his diſciples. But it has been ſaid, that this reaſoning accounts for a fact, *viz.* God's permitting or forcing the devil to take poſſeſſion of men's bodies at the time of Chriſt, and at no other, which has no foundation to ſupport it. It ſhould be conſidered, however, that, many ages before the birth of Chriſt, and in other countries beſides Judæa, men aſcribed their diſeaſes in general to ſpirits. The account of dæmoniacs occurs, as we have already ſhewn, in the writings of more ancient and later dramatic poets, of hiſtorians, of phyſicians, and of philoſophers. The eſtabliſhed theology of the heathen world, from its firſt riſe to its final overthrow, reſted upon the baſis of dæmoniſm. With regard to the Jews, Joſephus informs us (Antiq. l. viii. c. 2. § 5.), that the method of exorciſm preſcribed by Solomon, "prevailed or ſucceeded greatly among them down to his time." The very exiſtence of exorciſts, both before and after the time of Chriſt, and the general prevalence of magic arts among this people, as well as among the Gentiles, are a full proof that a belief of frequent poſſeſſions was common to both; and, indeed, the ſcripture itſelf furniſhes abundant evidence, that the doctrine of poſſeſſions was prior to the Chriſtian era. (See Matt. xv. 21, 22. xvii. 15. Mark vii. 24. ix. 17. Luke ix. 39. Acts xvi. 16, 18. xix. 3.) It is obſervable, that the enemies of Chriſt never reproach him with introducing dæmons into Judæa, where they were not new or extraordinary, and occaſioned no ſurpriſe, merely for the ſake of diſplaying his power over them; nor on this account accuſe him of acting in concert with them, which, nevertheleſs, it would have been natural for them to do, if poſſeſſions had never been heard of till the time of Chriſt, and then only in Judæa. Some perſons have aſſerted, that the devil's tyranny expired, which is contradicted by numberleſs facts of real or ſuppoſed poſſeſſions, as well as revived, at the coming of Chriſt. Moreover, the dæmoniacs of the New Teſtament are the ſame ſort of perſons with thoſe mentioned in other writings, and, therefore, it is reaſonable to aſcribe the diſorders expreſſed by them, or pertaining to them, to the ſame or ſimilar cauſes.

Thoſe who deny the *reality* of poſſeſſions argue, that in the ages of ignorance and ſuperſtition, the credulous part of mankind were eaſily perſuaded to believe, that maniacs and epileptics were really poſſeſſed by dæmons; but that thoſe who conſulted their reaſon, and gained an inſight into nature, pronounced what commonly paſſed for dæmoniacal poſſeſſions, to be mere natural diſorders. The divine Hippocrates wrote his book, Περι Ἱερης Νοσου, to ſhew, that the epilepſy has nothing in it ſupernatural, more than any other diſtemper; and to expoſe the ignorance and impiety of thoſe who aſcribed it to the immediate agency of the gods, and accordingly undertook to cure it by expiations and charms. Amongſt many other conſiderations which he has urged to prove that epileptical diſtempers owe their riſe to natural cauſes, he obſerves, (De Morbo Sacro, p. 307. ed. Foeſii) "that goats are remarkably ſubject to the epilepſy; and, on diſſecting the head, the brain is found to be overcharged with a rheum of a very bad ſmell, a plain proof, he adds, that the animal is diſeaſed, not poſſeſſed by a deity."

Celſus (lib. iii. c. 18.) when treating of the ſeveral kinds of madneſs, takes no notice of dæmoniacal poſſeſſion, and aſcribes them to different cauſes. Plotinus, a Platonic philoſopher of the third century, ſpeaks of thoſe who pretended to cure diſorders by expelling dæmons, "as admired only by the vulgar," while they were deſpiſed by men of ſenſe, who believed, "that all diſeaſes proceed from natural cauſes." We learn from Origen (in Matt. tom. xiii. vol. i. p. 311. Huet. vol. iii. p. 577. Bened.) that phyſicians, in his time, accounted in a natural way for diſorders imputed to dæmons, though he condemned them for ſo doing. Many other inſtances might be mentioned to the ſame purpoſe. Dr. Mead (Med. Sacr. c. ix. p. 66, 67.) alleges, that the circumſtances related of the goſpel dæmoniacs are ſymptoms of natural diſorders, and do not exceed the powers of phyſical cauſes. It has been further argued, that as the ſeveral diſorders, imputed to poſſeſſion, proceed from natural cauſes, they alſo yield to natural remedies, and each of them requires a peculiar proceſs. It has alſo been urged, particularly by Mr. Farmer, that the human ſyſtem, like that of nature in general, is ſubject to invariable laws, ſuch as no being but God can controul. Indeed, he ſays, the doctrine of dæmoniacal poſſeſſions is ſo manifeſtly repugnant to the perfections of God, to the wiſdom, equity, and goodneſs of the divine government, and to that fixed order of cauſes and effects which we diſcover in every part of nature, and particularly in the human ſyſtem, that few perhaps in this enlightened age would appear in its defence, were it not from an apprehenſion that it is ſupported by the authority of revelation. He alleges, however, that whether the doctrine of poſſeſſion be true or falſe, it was not originally founded on revelation; and that it never received the ſanction of any of the prophets of the Old or New Teſtament.

The Old Teſtament, it is ſaid, is ſilent on the ſubject of poſſeſſions, and cannot be employed to eſtabliſh their reality. When Saul is ſaid to be "troubled by an evil ſpirit from the Lord" (1 Sam. xvi. 14. xviii. 10.), it is ſufficient to obſerve, that the word ſpirit is often uſed to denote the temper and affections of the human mind, and that the Jews were accuſtomed to call all kinds of melancholy an evil ſpirit. Accordingly, Saul's diſorder was a deep melancholy; and it was cured by muſic. As to the writers of the New Teſtament, they were not the original authors of the doctrine of poſſeſſions. In Chaldæa, Egypt, Greece, and all other countries,

tries, the doctrine of dæmons generally prevailed from the earlieſt ages. From the Gentiles it was tranſmitted to the Jews, not at Babylon only, but in every other place of their diſperſion, and even in Judæa itſelf. But though this doctrine be not a diſcovery of revelation, it has been ſaid, that various expreſſions uſed by Chriſt and his apoſtles are thought by ſome to aſſert or imply the reality of poſſeſſions. We are told, that the people brought to Jeſus were ſuch as were *poſſeſſed and vexed with unclean* ſpirits; and that he *caſt out ſpirits with his word*. But perhaps theſe learned writers do not ſufficiently conſider, that the reality of poſſeſſions and diſpoſſeſſions was never taught by Chriſt and his apoſtles as a doctrine; and that they could not, with propriety, interpoſe their authority in eſtabliſhing the reality of poſſeſſions, conſidered as the ſecret cauſe of thoſe diſorders imputed to them; for the miraculous cure of theſe diſorders being a part of that evidence which was aſſigned for the conviction of unbelievers, we are to judge of the nature of the miracle in queſtion by reaſon alone, not by an authority which cannot be admitted previous to its performance. Beſides, as poſſeſſion by dæmons was anciently thought to produce ſome maniacal diſorder; and the expulſion or departure of dæmons was thought to effect a removal of the diſorder, or a recovery of the underſtanding; it hence came to paſs that poſſeſſions and diſpoſſeſſions were in common life uſed to expreſs thoſe outward and ſenſible ſymptoms they were thought to produce, or the *diſorder* and *cure* of reputed dæmoniacs. It is very common to give to an effect the name of the cauſe to which it is aſcribed. And whenever the ſuppoſed cauſe or author of any thing is put for the thing itſelf, the cauſe or author is not included. When Ceres, for example, ſtands for corn, and Bacchus for wine; corn and wine alone are intended. In like manner dæmoniacal poſſeſſion was uſed merely to expreſs madneſs, without taking the cauſe into the account. Joſephus (Bell. Jud. lib. ii. cap. 13. ſect. 4.) ſays, concerning certain demagogues, that "they perſuaded the multitude to be poſſeſſed *by dæmons*," when his whole meaning was, "That the people were worked up into *a phrenſy* by the artifices and eloquence of their leaders." Thus, amongſt the moderns, *lunacy*, which at firſt denoted that peculiar kind of phrenſy over which the moon was ſuppoſed to have an influence, is now uſed for phrenſy in general. Nor are the evangeliſts to be blamed for deſcribing the diſorder and cure of dæmoniacs in the popular language, that is, by poſſeſſions and diſpoſſeſſions; inaſmuch as they might adopt the popular language on this ſubject (as they certainly have done on other ſubjects, and all other perſons daily do) without deſigning to eſtabliſh the doctrine on which it was originally founded.

So far, ſay the anti-dæmoniſts, is the Chriſtian revelation from aſſerting the reality of dæmoniacal poſſeſſions, or repreſenting it as a part of that doctrine which they were immediately inſtructed and commiſſioned by Heaven to publiſh and confirm, that this doctrine is contradicted by revelation. It is inconſiſtent, they ſay, with the fundamental principle both of the Jewiſh and Chriſtian diſpenſations, with the proper evidence of miracles in general, and with the nature of that miracle in particular, which was performed upon dæmoniacs. What is the grand principle of the Jewiſh and Chriſtian diſpenſations, but that Jehovah is the one true God, the ſole Creator and Sovereign of the world, which he governs by fixed laws? Do not the Old and the New Teſtaments concur in referring to the immediate and miraculous agency of God alone, all effects which are contrary to that courſe and order of events, which he has eſtabliſhed? If then there be no ſovereign of nature but God, and no mediator between God and man but Chriſt, there can be no other ſuperior intelligences, who have any power over the laws of nature, or over the human ſyſtem in particular. Beſides, all the prophets of God, in every age, when profeſſedly delivering their meſſages to mankind, have with one voice proclaimed the utter impotence of dæmons, and hereby intirely ſubverted the doctrine of dæmoniacal poſſeſſions. Whoever, it is ſaid, the heathen dæmons or deities were, whether human or angelic ſpirits, they are all, without exception, branded in Scripture as being utterly void of all power to do either good or evil to mankind. See DÆMON and IDOL.

Did we not conſider, ſays an ingenious writer on this ſubject, how far prejudice is capable of perverting the underſtanding, it muſt ſeem incredible, that Chriſtians ſhould form their judgment of the ſentiments of the ſacred writers concerning poſſeſſions by their deſcriptions of dæmoniacs, rather than by their profeſſed doctrine concerning dæmons. If what all the prophets of God, under both Teſtaments, have taught us concerning the utter inability of dæmons or heathen deities to do either good or harm to mankind; if this doctrine be true, there never was, nor can be, a real dæmoniac.

The advocates of the *reality* of poſſeſſions have urged a variety of arguments in favour of their opinion. Theſe we ſhall now, in as brief and conciſe a manner as is conſiſtent with juſtice and candour, recite. If there was no agency of evil ſpirits in the time of our Saviour, it has been aſked, how came this opinion ſo generally to prevail, and why ſhould many perſons have thought themſelves to be poſſeſſed by evil ſpirits? To this argument it has been replied, that this is not the only inſtance in which unfounded notions have been very prevalent; and that the influence of dæmons in occaſioning mental and bodily diſorders had been acknowledged for a long time before our Saviour's appearance in the world. But notions of this kind had chiefly prevailed amongſt the vulgar and leaſt informed, and had been exploded, as groundleſs and fallacious, by perſons of ſuperior wiſdom, reflection, and experience. However, whilſt ſuch ſentiments prevailed, it was not unlikely, that ſome perſons, who were afflicted with grievous diſtempers, ſhould think themſelves haraſſed and tormented by evil ſpirits, and occaſionally ſpeak in conformity to their inward apprehenſions.

An appeal has been made to what is reported to have been ſaid and done by the dæmoniacs themſelves. Hence it has been concluded, that they were inſpired and aſſiſted by ſuperior agents, ſuch as dæmons are commonly ſuppoſed to be. Accordingly, it is pleaded, that the dæmoniacs knew, and proclaimed Jeſus to be the Meſſiah. (Luke, iv. 34. 41. Mark, i. 24. Matth. vii. 29.) How, it is ſaid, ſhould theſe perſons know Jeſus to be the Chriſt, if they were not under the influence of evil ſpirits of great knowledge as well as much power? Theſe dæmoniacs, it is ſaid, who were either epileptics or maniacs, with occaſional intervals of ſanity, had the ſame means of knowing Jeſus to be the Chriſt which others poſſeſſed. He was the object of univerſal attention; his fame had been propagated throughout all Judæa and the adjacent countries, and had excited a general perſuaſion that he was the Meſſiah. The dæmoniacs, before they were ſeized with their diſorder, and in their intervals of ſanity, might hear of the fame of Jeſus as the expected Meſſiah, for they had many opportunities for this purpoſe; and it is ſuggeſted, that they might adopt the common opinion concerning his character as the promiſed Meſſiah, and declare that opinion more eagerly than perſons of a cooler judgment: and this ſeems to be more probable, it is ſaid, than that infernal ſpirits ſhould freely and zealouſly aſſert the divine claims, and ſpread the glory of Jeſus as the Meſſiah.

Meſſiah. It has been further urged in ſupport of the reality of poſſeſſions, that Chriſt commanded the "devils (dæmons) not to diſcover him." (Mark, i. 23. 26. 34. iii. 12. Luke, iv. 33, 34, 35, 41.) To this argument it has been replied, that dæmoniacs were not only regarded by others, but generally conceived of themſelves, as ſpeaking and acting under the influence of the ſpirits by which they believed themſelves to be poſſeſſed, or as being thoſe very ſpirits. Hence the dæmon and dæmoniac were often confounded together; both being deſcribed under the ſame term, and the ſame act being referred indifferently to either. (See DÆMONIAC.) When the evangeliſts, therefore, tell us, "that Jeſus ſuffered not the *dæmons* to ſay, that they knew him to be the Meſſiah," they are to be underſtood of the *men* poſſeſſed by them. The ſame prohibition which he gave to the multitude, and to his own diſciples, he gave to them; becauſe their confident perſuaſion of his being the Meſſiah, and their gratitude to him for this miraculous relief, would prompt them to proclaim the high and honourable opinion which they entertained concerning him; and leſs guarded than others in their language and conduct, they would be more diſpoſed to publiſh their ſentiments. By checking their zeal, he might alſo wiſh to prevent any ſpecious pretence on the part of his enemies, that there was a ſecret agreement between him and thoſe evil ſpirits, who were judged to be ſo eager in applauding him. Some again have ſaid, that dæmoniacs could not be mere madmen, becauſe they argue with Chriſt in a very rational manner, and ſpeak to better purpoſe than the bulk of thoſe who were in their ſenſes. This aſſertion is chiefly founded upon the behaviour of the Gadarene dæmoniac: (Matt. viii. 28. Mark, v. 2. Luke, viii. 27.); and many reaſons have been ſtated by Mr. Farmer (Eſſ. on Dæmon. p. 260, &c.) in order to prove, that it did not warrant the ſuppoſition of his being directed and aſſiſted by ſuperior intelligences in all that he ſaid and did; but that it appears to be that of a madman according to the expreſs repreſentation of him in the hiſtory. In favour of the reality of poſſeſſions, it has been further alleged, that dæmoniacs exerted more than human ſtrength. (Mark, v. 3, 4.) To which it has been replied, that perſons in ſimilar circumſtances have at ſome ſeaſon exhibited uncommon ſtrength, and that the ancients were leſs ſkilful than the moderns in the methods of confining ſuch unhappy perſons. Another argument in proof of real poſſeſſions has been deduced from the deſtruction of the herd of ſwine which the dæmons are ſaid to have entered, and to have ſtimulated to inſtantaneous madneſs; which caſe has been conſidered as a deciſive evidence of the power of dæmons, both over the human and brutal race, and ſuppoſed to have been purpoſely deſigned by Providence, to convince us of this principle, and to refute the oppoſite opinion. (Matth. viii. 30. Mark, v. 11. Luke, viii. 32.) On the other hand, it has been alleged by Dr. Sykes and Dr. Lardner, that the ſwine were frighted by the two madmen, and ſo driven down the precipice into the ſea. Mr. Farmer, diſapproving the account of this fact given by theſe writers, as well as by the advocates of real poſſeſſion, maintains, that the men, if we take the words of the evangeliſts for our guide, neither drove, nor attempted to drive, the herd into the ſea. The hiſtory, he ſays, aſcribes the deſtruction of the ſwine, not to their being driven by the dæmoniacs, but to the entrance of dæmons into them, or to their being ſeized with the ſame diſorder from which the men were relieved, and which was thought to be cauſed by dæmons. Diſallowing the agency of dæmons, however, he ſuppoſes that the madneſs of the men was transferred to the ſwine by the immediate agency of God. This miraculous deſtruction of the ſwine he conſiders as a juſt puniſhment of the owners, who were probably Jews, and who were prohibited by the laws of Hyrcanus from keeping ſwine, and by the law of Moſes from partaking of their fleſh as food; and in this view of it, the miracle itſelf performed by Chriſt under a divine commiſſion, ſerved to manifeſt his regard to the law of God. The deſtruction of the ſwine ſerved alſo to aſcertain the *reality*, and to ſpread the *fame* of the miracle wrought upon the dæmoniacs. It was alſo adapted for correcting the falſe notions, concerning the power of dæmons, which were entertained in that age, as well by Jews as Gentiles, by both of whom Gadara was inhabited. Beſides, this miracle prevented ſeveral great inconveniencies that would otherwiſe have attended the miniſtry of Chriſt: *e. g.* the loſs ſuſtained by the Gadarenes prevented both Jews and Gentiles in thoſe parts from applying to Chriſt merely for the temporal benefit of his miracles, which was not their proper object, and which could not be diſpenſed to the Gentiles without increaſing the prejudices of the Jews; the behaviour of the Gadarenes in intreating Chriſt to depart out of their coaſts, ſeems to ſhew how indiſpoſed they were at that time to receive the ſpiritual bleſſings of the goſpel, and thus vindicates our Saviour in declining all familiarity with them; and the miracle, performed at the period of our Lord's higheſt popularity, ſtruck an awe upon the minds of the Jews, and in ſo doing prevented their raiſing tumults in his favour, as they were inclined to do, and their following him merely from worldly motives. With regard to this miracle, it may be further obſerved, that, though the diſpenſation of the goſpel, as a diſpenſation of mercy, was confirmed chiefly by miracles of mercy, it was nevertheleſs neceſſary that there ſhould be ſome examples of ſeverity, to check preſumption, and to warn men of the danger of rejecting a prophet, who was eminently the meſſenger of God's love, but at the ſame time the appointed miniſter of his juſtice.

After all, the moſt popular, the moſt plauſible, and the moſt perſuaſive argument in favour of real poſſeſſions is deduced from the language of Chriſt and his apoſtles, in performing and recording the cure of dæmoniacs, or in deſcribing the caſe of theſe unhappy perſons. From ſeveral paſſages of the New Teſtament, in which the mention of dæmons or dæmoniacs occurs, it has been inferred, that our Saviour and his apoſtles entertained and countenanced the doctrine of real poſſeſſions. If it was an error, the inſpired teachers of the goſpel, it is ſaid, muſt have known it, and ought therefore to have rectified it, inſtead of knowingly confirming the people in the belief of it. "It is impoſſible for me," ſays Dr. Campbell, "to deny the exiſtence of poſſeſſing dæmons, without admitting that the ſacred hiſtorians were either deceived themſelves in regard to them, or intended to deceive their readers. Nay, if they were faithful hiſtorians, this reflection, I am afraid, will ſtrike ſtill deeper." It is allowed, on the other hand, that our Lord and his apoſtles did uſe the common language of the age and country in which they lived on the ſubject of dæmoniacs, and that this language was originally founded on the ſuppoſition of the reality of dæmoniacal poſſeſſions. But, it is ſaid, that by uſing this language, they did not give their ſanction to the opinion from which it took its riſe. As neither the opinion nor the language originated with Chriſt and his apoſtles, they incur blame, if this ſhould be the caſe, merely for not departing from accuſtomed modes of expreſſion on this ſubject, and recurring to the uſe of new language concerning it. As they never aſſert the doctrine of poſſeſſions, but are thought, by thoſe whoſe ſentiments we are now ſtating, to have taught doctrines that militate againſt and ſubvert it, they muſt contradict themſelves, if by uſing the

common

common language with reſpect to dæmoniacs, they intended to countenance the opinion on which it was firſt grounded.

But it is maintained, that merely from the manner in which they ſpeak of reputed dæmoniacs, none can juſtly infer, that they deſigned to aſſert the reality of dæmoniacal poſſeſſions. Dr. Sykes and many others have obſerved, in reference to this ſubject, that it is cuſtomary with all perſons, and with the ſacred writers in particular, and with our Saviour himſelf, to uſe the language of the vulgar, though known and admitted to have been originally grounded on a falſe philoſophy. This kind of condeſcenſion and accommodation has been cuſtomary in a variety of caſes, that occur in common life; and it would argue an indecorous affectation and pedantry to abandon ordinary modes of expreſſion, eſtabliſhed by long and general uſage. When the ſacred writers, therefore, adopt the vulgar phraſeology, though grounded on an erroneous hypotheſis, we are not warranted in concluding, merely from this circumſtance, that they give their ſanction to ſuch an hypotheſis, or that they make themſelves reſponſible for its truth or falſehood; any more than the naturaliſt does, when he adopts vulgar expreſſions, and ſays, "the dew falls," "the ſun riſes, ſets, runs his race, or is eclipſed." Why then, it is ſaid, might they not adopt the common language, with reſpect to poſſeſſion, conſidered as the cauſe of a bodily diſorder? Can you infer their belief of poſſeſſions from their ſaying, that ſome "had dæmons," or "a ſpirit of Apollo," any more than you can learn a man's ſyſtem of philoſophy, from his ſaying, that his friend hath "St. Anthony's fire," or from his affirming that the ſun "riſes" and "ſets" every day? Moreover, Jews and Heathens, and even the ancient prophets, when ſpeaking of poſſeſſions, or on ſimilar ſubjects, adopt the common phraſeology, when they did not intend to countenance the opinion on which it was originally grounded; why, it is ſaid, might not this be the caſe with regard to Chriſt and his apoſtles? It is allowed, that, in ſome caſes, our Saviour and his apoſtles do uſe ſuch expreſſions, even on the ſubject under conſideration, as they could not deſign to have underſtood in a literal ſenſe, or in their fulleſt import. Thus, when they ſay, that one perſon was poſſeſſed by "ſeven dæmons" (Luke, viii. 2.), and another by "a legion" (Mark, v. 15.), is it not more natural to ſuppoſe, that they adopted the phraſeology of the Jews, in the ſame general ſenſe, than that they determined, by the aid of inſpiration, the preciſe number of dæmons, by which each of them was poſſeſſed? It was a very common opinion among the Jews, though not peculiar to them, that evil ſpirits frequent deſolate places, and this opinion is alluded to in the New Teſtament, (ſee Matt. xii. 43. Luke, xi. 24. Rev. xviii. 2.); but ſhall we repreſent him, who poſſeſſed all the treaſures of wiſdom and knowledge, as entertaining and ſanctioning this vulgar notion, becauſe he alludes to it, for the purpoſe of uſeful inſtruction, in his addreſs to the Jews? When he ſays on one occaſion, "Come out, thou unclean ſpirit" (Mark, v. 8.), and on another, "Thou dumb and deaf ſpirit, I charge thee come out of him" (Mark, ix. 25.); ſhall we hence infer, that he believed ſpirits to be dumb, deaf, and unclean? In another place (Luke, x. 18.), our Lord cannot be underſtood literally, when he declares, "I beheld Satan as lightning fall from heaven;" by which expreſſion he informs us, that he had a prophetic view of the ſudden overthrow of ſuperſtition and idolatry, (uſually deſcribed as the kingdom of Satan, or an adverſary,) or of the ſpeedy prevalence of true religion over every "oppoſing power." Hence, and from ſimilar inſtances, it is inferred, that merely from their deſcribing dæmoniacs in the common popular language, we are not warranted in concluding certainly, that either Chriſt or his apoſtles entertained the opinion to which that language owed its riſe. Dr. Lardner is of opinion, that the evangeliſts, at the time of writing their hiſtories, believed real poſſeſſions; but Mr. Farmer obſerves, that this can no more be inferred concerning *them*, from their mode of recording, than it can be inferred concerning *Chriſt*, from his manner of performing, the cure of dæmoniacs. It is further added, that Chriſt and his apoſtles had ſufficient reaſon for adopting the common phraſeology with reſpect to dæmoniacs, (ſuppoſing that they did not approve the hypotheſis on which it was grounded,) becauſe it was employed to deſcribe the real caſe of theſe perſons, the ſymptoms of their diſorder, and their cure. If we advert to the manner in which Chriſt performed cures upon the dæmoniacs, when he commanded the dæmons to come out, theſe commands, it is ſaid, manifeſtly ſuppoſe, that the beings to whom they are addreſſed are capable of obeying them, and that Chriſt expected them to obey him from a conviction and awe of his divine authority. But to this it is replied, that it was no unuſual thing with our Saviour to addreſs the elements, and other objects equally inſenſible, as agents endowed with reaſon and liberty. To the dead Jeſus ſaid, "Ariſe." He "rebuked the winds and the ſea," (Matt. viii. 26.) ſaying, "Peace, be ſtill." (Mark, iv. 39.) And he "rebuked a fever, and it left" the patient. (Luke, iv. 39.)

It is alleged further, in anſwer to the objection above ſtated, that the firſt publiſhers of the goſpel do not appear to have had any warrant for changing the vulgar language, in deſcribing the caſe of dæmoniacs; or that they were divinely commiſſioned to inſtruct mankind in the ſecret cauſes of the diſtempers which they were empowered to cure, and to rectify any phyſical miſtakes concerning them; nor, indeed, could they be commiſſioned for this purpoſe: for the miracles wrought on the dæmoniacs were deſigned for the conviction of unbelievers; and therefore their nature was to be determined by the teſt of reaſon alone, *before* men believed, *i. e.* before they could admit the authority of their performers, or pay any deference to their judgment.

The oppoſers of the common hypotheſis concerning poſſeſſions have pleaded, in vindication of Chriſt and his apoſtles for always uſing language conformable to that hypotheſis, that the prejudices of mankind in favour of the power of dæmons were very ſtrong, and almoſt invincible; and that if they had begun with an attack upon theſe prejudices, it would have prevented the converſion of multitudes, and led them to conceive of the firſt publiſhers of the goſpel as infidels and Sadducees. And it ſhould chiefly be conſidered, that their inſtructions did not directly extend to this caſe, nor could properly extend to it; the cure of dæmoniacs being a part of that evidence of the goſpel, which muſt for ever be judged of by reaſon alone.

The advocates of real poſſeſſions have further urged a conſideration of great moment, even in the eſtimation of ſome perſons who have adopted the contrary hypotheſis; and this is, that if their opinion be an error, Chriſt and his apoſtles ought to have corrected it; becauſe it was a very *dangerous* error, and the ſupport of much ſuperſtition and idolatry. This mode of reaſoning, it is argued on the other hand, indicates great preſumption, and ſeems to preſcribe to the wiſdom of God what he ought to do, and what kind and degree of inſtruction and evidence he ought to afford for correcting error, and promoting the belief of the truth. It is ſaid, however, that the firſt publiſhers of the goſpel have, in the moſt proper manner, rectified the dangerous errors that prevailed with regard to dæmons, and in ſo doing ſufficiently ſecured the intereſts of true piety. This they have done

done by their doctrine and by their miracles. As many idolatrous and ſuperſtitious practices have been grounded on a belief of the power of dæmons, the prophets of God under the New Teſtament, as well as thoſe under the Old, have openly taught, what their miracles intimated, the utter inability of theſe ſpirits to do any good or evil to mankind. Biſhop Warburton, and ſome others, have ſuggeſted, that an explicit declaration of Jeſus or his apoſtles concerning poſſeſſions would have neceſſarily determined the judgment of Chriſtians. But, ſuch was the power of prejudice, and ſo rooted the error which prevailed, that a declaration of this kind might have been as ineffectual as it was improper. They have done, however, more than this; they have repreſented all dæmons without diſtinction as mere fictions of the human imagination, and demonſtrated their nullity, and their total inability to produce any ſingle effect. In rectifying the miſtaken conceptions of mankind concerning dæmons, they have contributed to deſtroy, not one error only, but the whole fabric of Gentile idolatry and ſuperſtition. This was an object which their commiſſion comprehended, and indeed was one principal intention of it. This was one end for which our Saviour appeared in the world. This was one of the diſtinguiſhing characteriſtics that pertained to him as the Meſſiah. He was announced previouſly to his advent, and he was expected by the Jews, as the deſtroyer of dæmons; and ſo deciſive was this evidence of his divine miſſion, and of its grand object, that he himſelf appeals to it, and reaſons from it in proof of his being a divine Meſſenger and Saviour. "If I caſt out dæmons (ſays he) by the Spirit of God, then is the kingdom of God come unto you" (Matt. xii. 28.); *i. e.* If I reſtore dæmoniacs to their right mind by a divine power, the kingdom of the Meſſiah is certainly erected amongſt you. Not ſatisfying himſelf with verbally denying the power of dæmons, he declares it to have been the deſign, he adduces it as an evidence, of his miſſion from God, that he ſhould actually expoſe their impotence, and evince to mankind the folly of thoſe apprehenſions which were entertained concerning them. The ejection of dæmons, truly explained, affords one of thoſe auguſt diſplays and convincing proofs of the character of Chriſt as a Meſſiah and Redeemer, which were deſigned to recommend him to the veneration of mankind in all ages of the world.

DÆMONOLOGY. See DÆMON and IDOLATRY.

DÆMONOMANIA, in the *Pathology* of the older phyſicians, ſignifies that ſpecies of inſanity or delirium, whether real or pretended, which was attributed to the agency of the devil, or of dæmons, on the bodies of the individuals ſuppoſed to be poſſeſſed, or to hold communication with them.

It is unneceſſary, at the preſent day, to enter into arguments, with a view to confute the opinions that prevailed, in the ages of ignorance and ſuperſtition, reſpecting the effects and phenomena of dæmonical poſſeſſion. See DÆMONIAC. It muſt now be generally allowed, that all thoſe phenomena are explicable upon more obvious and ſatisfactory principles: and our wonder is excited, when we obſerve the minds of ſuch enlightened men, as Frederic Hoffmann, ſo far influenced by the vulgar prejudices of his age, as to contend for the reality of ſuch poſſeſſions, and to conſider the following circumſtances as proofs of their actual occurrence, namely, horrible noiſes, indecent geſticulations, and other unuſual corporeal motions, as well as convulſions without any previous diſeaſe, blaſphemous and obſcene language, predictions of future events; the knowledge of foreign tongues; extraordinary ſtrength, &c. (See Sauvage's Noſol. Method.) All theſe may be accounted for by a conſideration of phyſical and moral cauſes, of ordinary occurrence: and, therefore, we cannot but refer the different ſpecies of dæmonomania, deſcribed by noſologiſts, to one or other of the following ſources:

Firſt, they are inſtances of true inſanity, either mania or melancholy, or of the temporary delirium of intoxication. Such are the dæmonomania *fanatica* and dæmonomania *indica*, the fifth and ſeventh ſpecies of Sauvages. Noſol. Method. claſs viii. gen. 21. The hiſtory of fanaticiſm affords but too ample proofs of the madneſs of thoſe who have unhappily fallen under its influence. See FANATIC. Sauvages mentions a ſet of fanatics, who believed that the artillery, by which they were inhumanly ſlain in crowds, would, in conſequence of their religious zeal, play upon them with impunity. The dæmonomania *indica* is a temporary inſanity, induced by the uſe of an intoxicating herb, under the influence of which the Malays, in the iſland of Ceylon, run furiouſly through the ſtreets, armed with daggers, and ſtab indiſcriminately whomſoever they meet, crying, *amok*, or *kill*; whence this maniacal paroxyſm is termed by Europeans, "running a muck." See CEYLON.

Secondly, theſe ſuppoſed caſes of dæmoniacal poſſeſſion were, in other inſtances, the reſults of certain diſeaſes, falſely attributed by the by-ſtanders to the power of dæmons. Thus various convulſive ſymptoms, triſmus, and tetanus, diſtortions of the body, ſcreamings, delirium, &c. originating obviouſly from irritations in the bowels, or ſkin, or in the ſcalp, as from ſuppreſſed *plica polonica*, (Sauvages, ſp. 8. alſo ſp. 4. 6. and 9.) and ceaſing with the removal of thoſe irritations by cathartics, emetics, and other means, have been enumerated among the examples of dæmoniacal poſſeſſion, and attributed to the charms and incantations of witchcraft.

But, thirdly, other inſtances of dæmonomania, and thoſe amounting to no ſmall number of the recorded examples, were decidedly deceptions; the tricks of deſigning perſons, practiſing upon the credulity and ſuperſtition of the multitude. Such are the three firſt ſpecies of Sauvages: dæmonomania *ſagarum*, dæmonomania *vampiriſmus*, and dæmonomania *ſimulata*. The opinion that certain perſons, by a compact with dæmons, have obtained great powers over the lives and conditions of the reſt of the world, and the conſequent ſenſations, dreams and diſorders, ſuppoſed to be thus produced, has been propagated among the ignorant and credulous, and in darker ages even among the comparatively enlightened portion of mankind, in ſeveral ways. Theſe potent perſonages have, in ſome inſtances, effected their purpoſes, by exciting ſtrong impreſſions on the mind; the influence of which on the body cannot be queſtioned, by thoſe who are acquainted with the proceeding of the animal magnetizers, or the tractorizers, where the powerful aid of ſuperſtition was leſs employed. They have, at other times, employed certain narcotic drugs, which produce a great derangement of the nervous ſyſtem, a temporary delirium, much dreaming, or a pleaſurable ſort of intoxication, when the operation of the excited imagination itſelf, as well as of the wizzard upon it, was attributed to the power of his diabolical agency. In later times, the Meſmers and De Mainuducs have employed the former means of deranging the animal economy, *viz.* by exciting ſtrong impreſſions on the mind, without any pretenſions to diabolical powers; and dæmonomania, therefore, though not in fact, is by name, an obſolete diſeaſe. See Cullen Noſol. Method. gen. 66.

DÆRSTETTEN, or DARSTETTEN, in *Geography*, a ſmall town of Switzerland, or, as it is now ſtyled, of the Helvetic republic, ſituated in the canton of Berne in the diſtrict of Wimmis. It had anciently a celebrated monaſtery of

of Auguſtines, which in 1486 was incorporated with a monaſtery of the ſame order at Berne.

DÆSION, in *Chronology*, the Macedonian name for the Athenian month Antheſterion, which was the ſixth of their year, and anſwered to the latter part of our November, and beginning of December. See MONTH.

DÆSITIATÆ, in *Ancient Geography*, the name of a people placed by Strabo in Pannonia, and by Pliny in Dalmatia, whoſe chief was Baton or Bato.

DAFAR, DOFAR, or *Dolfar*, in *Geography*, a ſea-port town of Arabia Felix, in the province of Hadramaut, on the weſt coaſt of a bay in the Arabian ſea, to which it gives name, governed by a ſcheik, who is a ſovereign prince, and diſtant 160 miles E. N. E. from cape Fartach. The chief export from this town is the incenſe called olibanum, which is much inferior in quality and value to that of India.

DAFFNI, in *Biography*, an ancient architect, who, together with Peonius of Epheſus, fabricated the temple of Apollo at Miletus, a marble building of the Ionic order, and celebrated for its beauty and magnificence. Milizia Mem. degli Architetti.

DAFFODIL, in *Botany*. See NARCISSUS.

DAFFODIL, in *Gardening*, is a plant of the bulbous rooted flowery ornamental kind, for the borders, clumps, and other parts of pleaſure grounds. See NARCISSUS.

DAFFODIL, *Lily*. See AMARYLLIS and PANCRATIUM.

DAFFODIL, *Sea*. See PANCRATIUM.

DAFNE, in *Geography*, a river of European Turkey, in Bulgaria, which runs into the Urana between Marcenopoli and Varna.

DAFNE, in *Muſic*, the firſt melodrama, after the invention of recitative, that was performed to this new kind of narrative muſic. It was written by Rinuccini, author of the firſt great opera, Euridice, and ſet by Jacopo Peri and Giulio Caccini, and privately performed at Florence in 1600, previous to the public performance of Euridice, the firſt regular opera that was exhibited on a public ſtage in Italy, on the nuptials of Henry IV. of France with Mary of Medicis.

DAG, in *Agriculture*, a term ſignifying the dew hanging upon the graſs. It is chiefly applied when it remains long in the mornings upon the graſs-lands.

DAGANA, in *Ancient Geography*, *Thana-war*, a maritime town in the ſouthern part of the iſland of Taprobana, which, according to Ptolemy, was conſecrated to the moon.

D'AGAR, JACQUES, in *Biography*, a painter born at Paris in the year 1640. He became the diſciple of Ferdinand Vouet, and acquired under that maſter ſome ſkill in hiſtory-painting.

He however principally confined himſelf to portrait, and attained ſuch reputation that he was invited to the court of Denmark, where he enjoyed the favour of Chriſtian V. and of his ſucceſſor Frederick IV. He reſided ſome time in London, from whence he returned with conſiderable wealth to Copenhagen, and there died in 1716.

D'Agar deſigned with conſiderable elegance, and his tone of colouring is pleaſing and lively. His own portrait by himſelf is in the gallery of eminent painters at Florence. Pilkington.

DAGEBULLER KOEG, in *Geography*, a conſiderable tract of land, gained from the ſea in that part of Denmark which is called the duchy of Sleſwick, belonging to the Prefecture of Tundern in the iſland of Fohr. See KOEG.

DAGELET, a name given by Perouſe to an iſland about 20 leagues diſtant from the coaſt of Corea, from the aſtronomer who firſt diſcovered it. It ſcarcely exceeds three leagues in circumference, is very ſteep, and covered from its ſummit to the water's edge with the fineſt trees. A rampart of bare rock almoſt as perpendicular as a wall entirely ſurrounds it, with the exception of ſeven ſmall ſandy creeks where it is poſſible to land. On this iſland are ſome huts, which neither formed a village nor were ſurrounded by any appearance of cultivation. Hence it is probable that the ſhipwrights of Corea came hither in ſummer with their proviſions, to build boats, which they ſell upon the continent. In the creeks of the iſland ſeveral boats were obſerved upon the ſtocks, conſtructed exactly on the Chineſe model. The N. E. point of the iſland lies on N. lat. 37° 25′. and E. long. 129° 2′. from Paris.

DAGENHAM, a village of Eſſex, in England, on the banks of the river Thames, is remarkable for a ſingular inundation, which happened near it in the winter of the year 1707. By an unuſual ſwell of tide, and a violent wind ſetting up the river with it, a moſt deſtructive *breach* was made in its banks. A ſmall ſluice had been made for draining the land-floods, which being neglected, on the firſt aſſault of the tides, blew up; by which an opening was formed in places 20 feet deep, and 300 feet wide. Through this extenſive channel the influx of waters was ſo great, that upwards of 1000 acres of rich land were overflowed on the levels of Havermy and Dagenham; and the valuable ſoil of nearly 120 acres was carried into the Thames: by which a large ſand-bank was formed, reaching almoſt half way acroſs the river. The danger thence ariſing to its navigation occaſioned an application to parliament for aid to effectually repair the breach, and a ſmall tax was laid on veſſels entering the port of London for defraying the expence. After an ineffectual attempt had been made under the direction of Mr. Boſwell, a contract was entered into with captain Perry, who had been employed under the czar Peter in erecting the city of Veronitz on the river Don. The work was commenced under this gentleman in April 1718. Previouſly to this period, freſh inroads had been made by the tide; and the breach rendered much worſe. After various expedients captain Perry ſucceeded in effecting his purpoſe, but not before the works had been three times nearly waſhed away by the rapidity of the tides. The original contract for this important work was 25,000*l.*; but before its completion, it appeared that 40,472*l.* 18*s.* 8½*d.* had been expended. Of this ſum 15,000*l.* more were afterwards voted by Parliament. Yet this left a minus to the able engineer of almoſt five hundred pounds. Thus was he ungenerouſly left to defray part of the expence, after five years of exertion, anxiety, and care.

A pool ſtill is left, as a memorial of the event, within the embankment, and near it a ſmall houſe, ſupported by the ſubſcription of gentlemen, who form fiſhing parties here during the ſummer months.

While the men were digging in the works, an extenſive ſtratum of various kinds of rotten trees, with a very little intermixture of earth, was diſcovered beneath the ſurface. Among theſe were oak, hornbeam, hazel, willow, and yew; which latter were in an undecayed ſtate. In this foſſil ſtratum, called *moorlogg*, ſeveral ſtags' horns were alſo found lying on the ſurface.

It is a fact worthy of obſervation, that when this breach happened a vaſt inundation alſo took place on the weſtern coaſt; by which all the moors of Somerſetſhire, in the vicinity of Bridgewater, were completely overflowed; much valuable land irrecoverably loſt, and a new channel formed in the bed of Huntſpil river. See Perry's Account of the ſtopping of Dagenham Breach, 8vo. 1721.

DAGERORT, or DAGEROTH, a ſmall town on the extremity of the weſtern promontory of the iſland of Dago in the Baltic, remarkable for a light-houſe which ſtands

about three miles from the ſea, on a mountain computed to be 22 fathoms in perpendicular height.

DAGESTAN, Daghestan, or *Dagiſtan*, a province of Aſia, ſituated on the weſt coaſt of the Caſpian ſea, between the rivers Terek and Kur, or Circaſſia and the province of Schirvan, inhabited by Tartars, and included in the government of Caucaſus. This province includes four ſmall ſtates; the firſt of theſe is the territory of the Schamchal, or Schabaal, ſtretching about 14 German miles along the ſhore of the Caſpian ſea, from the river Kura-Koiſu, a branch of the Koiſu, called the dry Koiſu, becauſe it is deſtitute of water except when the ſnow diſſolves in the mountains, to the rivulet Uruſai-Bulak or Ruſſian Spring, and is in breadth from ſeven to eight German miles. The plain is moſtly in tillage, and being well watered by rivers and brooks that deſcend from the neighbouring mountains, produces corn. In this plain there are only ſheds for cattle; the dwellings of the inhabitants being ſituated in the mountains, which are covered with woods, ſteep and interſected by many narrow glens. The capital is Tarki, ſituated on the declivity of the mountain towards the plain, and ſaid to contain about 10,000 inhabitants, among whom are many Armenian and Georgian merchants: another leſs conſiderable town, called Buinacki or Boinak, is ſituated on a rivulet of the ſame name, where it iſſues from the mountains. The ſecond ſtate is the territory of the Uzmey, between the Uruſai-Bulak and the little Darbach, which is for the moſt part mountainous, about 8 German miles in length, along the coaſt, and equally broad. It is watered by three pretty conſiderable rivers, the Chamraſeni, the great Buam, and the great Darbach, which are divided into ſmall canals for the purpoſe of navigation, and alſo by ſeveral brooks. This tract of country produces abundance of wood and corn, and is well inhabited. The Uzmey reſides in Baſchli, a ſmall town ſeated on the brook of the ſame name, at the diſtance of four German miles from the Caſpian ſea. On the rivulet Jntſché lies the town of Ottemiſch, and many villages are ſituated on the mountains. Along the banks of the Buam the inhabitants are Kaidaks; on the Darbach, Karakaidaks; and between the mouths of the great Buam and Darbach, Bereközes. The third ſtate is the territory of Derbent or Derbend, which is of inconſiderable extent, being only four German miles in length on the ſea-coaſt, and extending from $1\frac{1}{2}$ to 2 miles inland, and owes its importance ſolely to the advantageous ſituation of the city of Derbend. The Darbach and Rubas form the northern and ſouthern boundaries; between which rivers lies a broad and partly marſhy level, interſected by many ſmall brooks, and interſperſed with beautiful and well cultivated corn-fields. For an account of Derbend, ſee Derbend. The fourth ſtate is Tabaſſeran or Tabäſſaran, and lies between the Darbach and Rubas, towards their ſources, extending about ſix German miles inland from above the territory of Derbent, as far as the higheſt ridge of the Leſgian mountains, which is very rocky and woody. Reinegg⁹, in his "General Hiſtorico-topographical Deſcription of Caucaſus," &c. vol. i. eſtimates the ſtrength of the different tribes that inhabit Tabaſſeran, who beſides the Tartarian ſpeak another language peculiar to themſelves, at about 10,000 families; and according to him the reigning family have held the ſovereignty over the country for more than 600 years.

DAGGER, in *Military Language*, a ſhort ſword or poignard, about 14 inches long. This weapon is too frequently employed for the purpoſe of aſſaſſination, and in many parts of the world forms a part of the ordinary dreſs of ſome claſſes. The dagger is ſeen under various forms; in Italy, the *ſtiletto*, as it is there called, is ſmall and eaſily concealed; having generally a very ſmall handle, and a flat, or a triangular blade, grooved very deeply. In the ſouth of France, the *couteau* is more like that kind of knife uſed by our pork-butchers; in Spain, it is more on the Italian plan, and commonly worn in the waiſt, having a ſmall ornamented handle. We had a dagger lately in the Leverian Muſeum, that had appertained to a monk, who committed various murders, ſuppoſed with that inſtrument: it was concealed within the blade of a common table knife, in which it was retained, and could be drawn at pleaſure, by means of a ſpring in the handle. The Malays uſe daggers with ſerpentine blades; theſe are called *creeſſes*, and inflict a moſt deſperate wound; the extent of which, however, is rarely of moment, it being the cuſtom of thoſe people to ſtab into the thorax, between the collar-bone and the *æſophagus*, or gullet. The Perſians, as alſo the people of Aſia in general, conſider the dagger as a part of their full-dreſs, and wear ſometimes two or more of them in their waiſts. The handles of theſe are for the moſt part ornamented with inlaid gold, or with precious ſtones; and the ſheaths are covered with velvet, tipped with gold ornaments. The gripe is formed in a curious manner, conſiſting of two croſs bars, at about an inch aſunder, lying at right angles between two ſtilts, that communicate with the blade; which is of a triangular form, and nearly flat. Daggers are prohibited by ſtatute in this country, and happily are only to be ſeen upon the ſtage, or in muſeums, &c. The wiſdom of the legiſlature was in this eminently conſpicuous, ſince it obviated a train of ſerious miſchiefs naturally reſulting from the immediate readineſs of laying the hand on an offenſive weapon. Hence, although the law makes allowance for the fatal iſſue of ſudden quarrels, where a weapon is *in the hand* of him who deprives another of life, it wiſely exempts the dagger, as being, in itſelf, an indication of malice prepenſe, or of a criminal intention. In many parts of the continent, the lower claſſes decide all their controverſies with knives or daggers; in the uſe of which many exhibit conſummate ſkill: it is, indeed, conſidered there as much a ſcience as our exerciſe with the broad-ſword: trials of proweſs with blunt daggers, being a very common recreation.

DAGGIAL, the name given by the Mahometans to their falſe meſſiah or antichriſt, denoting a perſon with one eye and one eye-brow, who, as they pretend, will make his appearance at the end of the world, mounted on an aſs, in imitation of the true Meſſiah; but they further conceive, that Jeſus Chriſt, who is not yet dead, will then fight with him and put him to death.

DAGNO, in *Geography*, a town of European Turkey, in Albania, on the Drin; 15 miles S.E. of Seutari.

DAGO, Dagen, or *Dagho*, one of the ſmall iſlands of the Baltic ſea, in the bay of Riga, belonging to Ruſſia, lies nearly in the 59th degree of north latitude, and the 24th of eaſtern longitude, exactly oppoſite to another Ruſſian iſland called Oeſel, from which it is ſeparated by a ſmall ſtrait. It is diſtant from the main land upwards of 18, and in ſome places above 30 miles.

The iſland of Dago is of an oblong ſhape, having a promontory, which extends weſtward far into the ſea; a ſmaller one to the north-eaſt, another to the ſouth, and a fourth almoſt due eaſt. The others are leſs conſiderable. Each of the four principal ſides, which are not all quite equal, reaches in a ſtraight line from about 25 to 35, and along the ſhore, on account of its ſinuoſities, to at leaſt 48 miles. In regard to the main body of the iſland, the inhabitants reckon it in length from 30 to 36 miles, and 24 in breadth: but taking the promontories into the account, the right line from

from eaſt to weſt gives a breadth of 48 miles, and from ſouth to north a length of 36 miles. The weſtern promontory is about 18 miles long, and as many broad.

The paſſage from Livonia, the main land, to Dago is uſually either acroſs the iſland of Vorms, or paſſing by the little iſle of Hertholm ſouthward or northward. Many direct their courſe by the village of Vachterby, where a foreſt of alders, ſeen at a great diſtance, ſerves for a landmark. In ſummer time the paſſage is very ſafe acroſs the ſound, even in a ſmall boat: but numerous ſhallows, ſand-banks, and ſmall iſlands render the navigation about Dago ſomewhat perilous in ſtormy weather. Ships are often ſtranded here. At low water the ſand-banks reſemble iſlands: but after long weſterly winds they are overflowed.

No peſtilential diſeaſe was ever known to make any ravages at Dago. The population is ſo great that the eſtates are almoſt overburthened with vaſſals. In ſummer many of them go to the main land, and gain a livelihood by embanking, bricklaying, plaſtering, and frequently whole families are ſold. The landlords would derive no profit from their eſtates, if they were obliged to maintain their vaſſals, and as theſe cannot all live by agriculture, many turn their hands to various arts and handicrafts, in which they ſucceed uncommonly well. The majority of the country people are Eſthonians, though there are whole villages of Swediſh boors, Dago having been conquered, along with Livonia, by the Ruſſians from the Swedes, under Peter the Great.

The iſland of Dago is deficient neither in foreſts nor in ſtone. On the weſtern part is much ſand, but the ſouthern and eaſtern parts conſiſt of a blueiſh clay, and have therefore a fertile ſoil. A conſiderable quantity of good corn is produced, only the ſeed requires to be ſown ſomewhat early. Barley thrives well in rainy ſeaſons. The Swediſh counts De La Gardie were the principal proprietors in the iſlands, and four capital eſtates belong ſtill to one of their deſcendants, the counteſs Steinbock. Tooke's View of Ruſſia.

DAGOBERT I. in *Biography*, king of France, the only prince of that name that appears to have any claim to a place in this work, was ſon of Clotaire II., and born A. D. 602. At a very early age he was appointed, under the direction and aſſiſtance of the biſhop of Metz, and Pepin mayor of the palace, to the government of Auſtraſia. Upon the death of his father, in 628, he ſucceeded to the other parts of the kingdom, allowing, however, his younger brother a ſmall portion as his inheritance. Dagobert engaged in a war with the Sclavonians on the banks of the Danube, in which, at firſt, he was defeated, owing to the diſaffection of his own troops, but, at length, he became victorious, and repreſſed the incurſions of the Sclavonians. The Bulgarians put themſelves under his protection, and, through ſome apprehenſion of his own ſafety, he cruelly and infamouſly ordered 9000 of the people who looked to him for protection to be maſſacred. He extended his power, and the greatneſs of his fame gave him conſiderable influence among ſurrounding nations. His private life was, in the early part of his reign, truly exemplary; but he afterwards became extremely licentious, and, as he advanced in life, he hoped to atone for his miſdeeds by his zeal for the externals of religion, and by founding churches. Among theſe was St. Dennis, celebrated as the burial-place of the French monarchs. In this Dagobert was interred in the year 638. He has been praiſed by hiſtorians on account of his liberality to the church; but he better deſerves applauſe for collecting, reviſing, and making public the laws of his country. In religion, he partook of the bigotry of the times, and iſſued an order for all the Jews in his dominions to ſubmit to Chriſtian baptiſm. Moreri.

DAGOLASSOS, in *Ancient Geography*, a town of the Leſſer Armenia.

DAGON, in *Mythology*, one of the moſt celebrated divinities of the Philiſtines, commonly repreſented as a monſter, half man, and half fiſh; whence ſome have derived his name, the Hebrew word *dag* denoting a *fiſh*. According to Sanchoniathon the origin of this deity is very ancient, and he was the ſon of Cœlus, ſo called from the word *dagan*, which, in the Phœnician language, ſignifies *wheat*. As he was the inventor of the plough, and taught men the uſe of corn for bread, he was, after his death, ſurnamed Jupiter Agrotes, or the labourer; and being the inventor of agriculture, he was deified after his death. We have various conjectures concerning this divinity. According to ſome, he was Jupiter; according to others, Saturn. Others, again, repreſent him as Venus, or a female deity, alleging, that Venus was worſhipped under the form of a fiſh; and Diodorus Siculus relates, that, at Aſhulen, a famous city of the Philiſtines, Derceto, or Atergatis, (the ſame as Venus,) was worſhipped under the figure of a woman, whoſe extremities terminated in the tail of a fiſh. Some repreſented it as having the upper part of a human body, and as a fiſh from the waiſt downwards, while others gave it the form of a fiſh above, and a human figure from the thighs down; and others, again, made it altogether a fiſh. According to an ancient fable, Oannes, a kind of monſter, half man and half fiſh, roſe out of the Red ſea, and came to Babylon, and, having taught ſeveral arts, returned again into the ſea. Several of theſe animals are ſaid to have ariſen from this ſea in ſubſequent ages; one of which was called "Octagon," and hence, ſays Selden, was derived the appellation Dagon. Some have ſuppoſed that Dagon and Neptune were the ſame deity. Bochart conjectures, that Dagon was Japhet, the third ſon of Noah, and that he was made the god of the ſea, becauſe the lot aſſigned to him and his deſcendants included the iſlands, peninſulas, and countries beyond the ſea, or, according to Lactantius, the continent of Europe. Jurieu ſuggeſts, that Noah himſelf, who eſcaped from the deluge, was diſguiſed under the name of Dagon or Neptune. From the Scripture we learn, that when the Philiſtines had taken the ark of God from the Iſraelites, and brought it to the city of Aſhdod, or Azotus, or Azoth, as it was differently called, they placed it in the temple of Dagon, cloſe to the image of that deity; but when they afterwards entered the temple, they found the idol fallen on its face, with its head and hands broken off. The Philiſtines held this idol in great veneration; and erected in honour of it magnificent temples. His temple at Gaza muſt have been very large, ſince Sampſon, having pulled down the pillars that ſupported it, buried more than 3000 men in its ruins. This deity continued to have a temple at Aſhdod, during all the ages of idolatry, till the time of the Maccabees; for we read, that when the army, vanquiſhed by Jonathan, one of the Maccabees, fled to Azotus, and attempted to ſhelter themſelves in Beth-Dagon, or the temple of Dagon, Jonathan ſet fire to Azotus, and burned the temple, and all who fled into it. The head of Saul, as we learn from the book of Samuel, (1 Sam. ch. v.) was placed in one of the temples of this god, and his arms in that of Aſtaroth, whence we may infer that Dagon and Aſtaroth were diſtinct divinities. Banier's Mythology, vol. ii. p. 37. Milton's Par. Loſt, B. i.

DAGONVILLE, in *Geography*, a town of France, in the department of the Meuſe, and diſtrict of Commercy: 3 leagues E. of Bar-le-Duc.

DAGOTI, in *Biography*, ſee GAUTIER.

DAGOUA, in *Geography*, a town of Egypt on the

Nile, ſaid to be a harbour for thieves and pirates; 12 miles N. of Cairo.

DAGOUNG, or SHOEDAGON, *temple of*, ſituated about 2½ miles N. of Rangoon, the chief port of the Birman empire, is a grand building, more ornamented than that of Shoemadoe at Pegue, though not ſo high by 25 or 30 feet. The terrace on which it ſtands is a rocky eminence, conſiderably higher than the circumjacent country. It is aſcended by above 100 ſtone ſteps, now decayed. The ſituation renders it a conſpicuous object at the diſtance of many miles. The top and the whole of the ſpire are richly gilded, which, when the ſun ſhines, exhibit a ſingularly ſplendid appearance. Shoedagon, the name of this temple, which ſignifies golden Dagon, naturally reminds us of the houſe of Dagon, mentioned in Scripture, and the image of idolatry which bowed down before the holy ark. See DAGON.

DAGSBOROUGH, a poſt-town of America, in the county of Suſſex and ſtate of Delaware, ſituated on the N. W. bank of Peper's creek, a branch of Indian river, and containing 40 houſes: 19 miles from Broad-hill or Clowe's, and 127 S. from Philadelphia.

DAGUSSA, in *Ancient Geography*, a town of Aſia, placed by Ptolemy in the country called Melitana.

DAGYSA, in *Zoology*, a genus of the Molluſca tribe, of which only a ſingle ſpecies has hitherto been diſcovered, and which was taken by ſir Joſeph Banks and Dr. Solander in the Spaniſh ſea, as related by Hawkeſworth. Theſe curious animals are three inches long and one in breadth, and adhere to each other by the ſides. They have been deſcribed by ſome writers under the name of *Carcinum opalinum;* and by others are conſidered as appertaining to the Salpa genus. In the Gmelinian ſyſtem the Dagyſa genus is defined as having the body looſe, nayant, angular, tabular, and open at each extremity; and the ſpecies which is named *notata*, as having the body marked at one end with a brown ſpot.

DAHÆ, in *Ancient Geography*, a people who inhabited the territory lying to the eaſt of the Euxine ſea and of the Palus Mæotides, according to Strabo, who claſſes them among the Scythian Nomudes. They are mentioned by Virgil, and deſcribed as the "Indomitique Daæ." Servius (in loc.) ſays that they extended to the northern part of Perſia.

DAHALAC, or DAHHLAK, in *Geography*, the largeſt iſland in the Red ſea, near the coaſt of Abyſſinia. Its whole length from N. W. to S. E. is 37 miles, and its greateſt breadth 18. It is low and even, the ſoil of it is fixed gravel and white ſand, mixed with ſhells and other marine productions. In ſummer it is deſtitute of all ſorts of herbage, except a ſmall quantity of bent graſs, ſufficient to feed the few antelopes and goats that are on the iſland: of the laſt animal there is a beautiful ſpecies, ſmall, ſhort-haired, with thin black ſharp horns, having rings upon them, and very ſwift-footed. This iſland is in many places covered with large plantations of acacia trees: although it is in the neighbourhood of Abyſſinia, it does not partake of its ſeaſons; no rains falls here from the end of March till the beginning of October; but in the intermediate months, eſpecially December, January, and February, there are violent ſhowers that laſt 12 hours, deluge the iſland, and fill the ciſterns ſo as to ſerve for the enſuing ſummer; as the iſland has no hills or mountains, and conſequently no ſprings. Of theſe ciſterns for preſerving water, there are 370, all hewn out of the ſolid rock. Tradition ſays that they are the works of the Perſians; but Mr. Bruce ſuggeſts that they were more probably conſtructed by the firſt Ptolemies. After the fall of rains, the graſs immediately ſprings up; which ſerves to feed the goats that ſupply the inhabitants with milk, the chief article of their ſubſiſtence in winter, for they neither plough nor ſow. Their whole employment conſiſts in working the veſſels which trade to the different parts of the coaſt. The ſuſtenance of the poorer ſort is altogether ſhell and other fiſh. The women are very adventurous expert fiſhers. Theſe miſerable people, who live in the villages not frequented by barks from Arabia, ſubſiſt ſometimes for a whole year without taſting bread: and yet ſuch is their attachment to their native ſoil, that they prefer this barren and parched ſpot, deſtitute of almoſt all neceſſaries, eſpecially ſuch as are moſt eſſential, bread and water, to thoſe pleaſant and plentiful countries that lie on both ſides of them. People of the better ſort have a brown complexion, but thoſe of the common ſort, who are employed in fiſhing, are of a reddiſh hue, ſomewhat darker than the colour of new mahogany. Among them are alſo blacks, who come from Arkeeko and the Main; but theſe, upon marrying, become leſs black in the courſe of a generation. The inhabitants of Dahalac are a ſimple, timid, inoffenſive people, who carry no kind of hoſtile weapon. The iſland is ſalubrious, and yet none of the inhabitants ſeem to attain an age of more than 60 years.

The ſouthern cape of this iſland, called "Ras Shouke," which in Arabic ſignifies the Cape of Thorns, becauſe it has upon it a number of acacia-trees, is in N. lat. 15° 27′ 30″; and the northern cape, or "Ras Antalou," is in N. lat. 15° 54′; 30″; the longitude of the iſland is 39° 20′ E. The harbour of Dobelew is of a circular form, and ſufficiently defended from all winds, but its entrance is too narrow, and within it is full of rocks, conſiſting of ramifications of white coral intermixed with large black ſtones. Three miles S. W. of the harbour is the village, called Dobelew, conſiſting of about 80 houſes, built of calcinable ſtone, drawn from the ſea, and covered with bent graſs. The ſouth-weſt extremity of the village is in N. lat. 15° 42′ 22″. Irwee, a ſmaller village, lies at the diſtance of about four miles from Dobelew, and is ſituated in the centre of the iſland. In Dahalac there are 12 villages or towns, little different in ſize from Dobelew; each has a plantation of doom-trees round it, which furniſh the only manufacture in the iſland; the leaves of this tree, when dried, are of a gloſſy white, which may be eaſily miſtaken for ſattin; and of theſe are made baſkets, that are very neat and beautiful, and ſo well wrought, that they will contain water for 24 hours without leaking.

Dahalac depends upon Maſuah, and is conferred by a firman from the grand ſignior, on the baſha of Jidda, and from him on Metical Aga, then on the Naybe, and his ſervants. The revenue of the governor conſiſts of a goat brought to him monthly by each of the 12 villages. Every veſſel, that puts in there from Maſuah, pays him alſo a pound of coffee; and every one from Arabia, a dollar or pataka. No ſort of ſmall money is current at Dalahac, except Venetian glaſs-beads, old and new, of all ſizes and colours, broken and whole.

Notwithſtanding the preſent miſerable ſtate of this iſland, the pearl-fiſhery was very flouriſhing here under the Ptolemies; and long after, in the time of the caliphs, it produced a great revenue, and till the ſovereigns of Cairo began to withdraw themſelves from the dependency on the Porte, Dahalac was the principal iſland that furniſhed the pearl fiſhers, or divers. It was, indeed, the chief port for the fiſhery on the ſouthern part of the Red ſea, as Suakem was on the north; and the baſha of Maſuah paſſed part of every ſummer here, to avoid the heat at his place of reſidence on the continent. The fiſhery extended from Dahalac and its

iſlands nearly to lat. 20°. The inhabited iſlands furniſhed each a bark, and ſo many divers, and they were paid in wheat, flour, &c.; ſo that a few months employment furniſhed them with every thing neceſſary for the reſt of the year. The fiſhery was rented, in later times, to the baſha of Suakem. The pearls found here were of the largeſt ſize, and inferior to none in water or roundneſs. Tradition ſays, that this was excluſively the property of the Pharaohs, or the old kings of Egypt before Mahomet. In the ſame extent between Dahalac and Suakem, there was another very valuable fiſhery, that of tortoiſes, from which the fineſt ſhells of that kind were produced; and a great trade was carried on with the Eaſt Indies, (China eſpecially) at little expence, and with great profit. The animal itſelf was very plentiful between lat. 18° and 20°. In proceſs of time Dahalac became dependent on the baſha of Jidda, and he appointed an aga, or ſubaltern governor, who paid him a moderate ſum, and appropriated to himſelf the greater part of the proviſions and ſalary allowed for the pearl fiſhery. When the princes of Arabia became again free from the Turkiſh power, Dahalac, Maſuah, and Suakem, returned to their ancient maſters, to whom they are now ſubject, governed, indeed, by ſcheiks of their own country, and preſerving only the name of Turkiſh government, each being under the command of a robber and aſſaſſin.

The immenſe treaſures at the bottom of the Red ſea have been abandoned for near 200 years, though they were probably never richer than they are at preſent. A ſettlement upon the river Frat, in N. lat. 21° 28′, which has never yet belonged to any but wandering Arabs, might open to the Eaſt India company a market both for fine and coarſe goods from the ſouthern frontiers of Morocco to Congo and Angola, and ſet the commerce of pearls and tortoiſe-ſhell again on foot. The whole portion of the gulf from Suez, ſays Mr. Bruce, is in their charter; and 20 ſhips might be employed on the Red ſea, without any violation of territorial claims. At Dahalac they have neither horſes, dogs, ſheep, cows, nor any ſort of quadruped, except goats, aſſes, a few half-ſtarved camels, and antelopes, which laſt are very numerous. The inhabitants have no knowledge of fire-arms; and there are no dogs nor beaſts of prey in the iſland to kill them; ſome few, indeed, are caught in traps.

The language at Dahalac is that of the "Shepherds;" Arabic too is ſpoken by moſt of the inhabitants. From this iſland are ſeen the mountains of "Habeſh," running in an even ridge like a wall, parallel to the coaſt, and down to Suakem. Bruce's Travels, vol. i. B. i.

DAHHMAK, a town of Arabia, in the country of Yemen; 16 miles S.S.E. of Abu-Ariſch.

DAHL, Michael, in *Biography*, a painter, native of Stockholm, who at an early age came into England, being introduced into this country by an Engliſh merchant. Dahl afterwards travelled to Paris, and reſided there ſome time. He then viſited Italy, where he painted, amongſt others, the portrait of queen Chriſtina of Sweden. In 1688 we find Dahl returned to England, where he acquired ſome reputation as a portrait painter. He died in London in 1743 at the advanced age of 87 years. The following portraits are a few of thoſe engraved after this artiſt: Joſeph Addiſon, 1719, by Simon; queen Anne, by W. Faithorne; prince George of Denmark, by J. Simon; the duke of Marlborough, by ditto; the duke of Ormond, by ditto. Walpole.

Dahl, or Dal, in *Geography*. See Dal Elbe.

DAHLBERG, Eric, in *Biography*, a celebrated Swediſh general, whoſe talents and virtues led him to the higheſt diſtinctions in his country, was born in October, 1625. His education was very limited, but by dint of application, and with ſcarcely any aſſiſtance, he made a rapid progreſs in mathematics, a ſcience always of the laſt importance to thoſe who are deſtined for high military command. The elements of geometry he took great pains to apply to the art of fortification, and to his ſucceſs in this he was indebted for the rank to which he afterwards attained. In 1648 he was appointed engineer under Guſtavus Adolphus, and in 1656 he joined the army in Poland, and was appointed lieutenant-general-quarter-maſter of the main diviſion. During the moſt remarkable events of the war in Poland, he was the attendant, and probably chief adviſer of his ſovereign. In the following year, when the king found it neceſſary to tranſport his army to Denmark, Dahlberg was ſent to ſurvey the Great Belt, then frozen over, and in conſequence of his opinion his majeſty reſolved to march his army acroſs the ice, by which he ſpeedily made himſelf maſter of the whole country, to the very walls of Copenhagen. From this time he was employed in the moſt important offices, both as a military commander, and alſo in political miſſions. So much did he improve the ſtate, and augment the ſtrength of his country, that he has with great juſtice been ſtyled the Swediſh Vauban. In 1696 he was appointed governor of Livonia, which he defended when invaded by the Saxons in 1700. He died at Stockholm in 1703, in the ſeventy-eighth year of his age. He left behind him a work of great merit entitled "Suecia Antiqua Hodierna," in three vols. folio. This work conſiſts of plates only, and the drawings from which they were executed were almoſt all taken on the ſpot by Dahlberg himſelf. Gen. Biog.

DAHLEN, in *Geography*, a ſmall town of Saxony, in the circle of Meiſſen or Miſnia, with 916 inhabitants, belonging to the counts of Bunau, and remarkable for extenſive plantations of mulberry trees and large crops of the beſt madder.

DAHLIA, in *Botany*, (named by the late prof. Cavanilles in honour of Andrew Dahl, a Swediſh botaniſt, author of a little volume of botanical obſervations.) Cavan Ic. Plant. v. 1. 56. t. 80. (Georgina. Willd. Sp. Pl. v. 3. 2124.) Claſs and order, *ſyngeneſia polygamia-ſuperflua*. Nat. Ord. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common Cal.* double; the outer of ſeveral leaves, ſix or ſeven, ovato-ſpatulate, reflexed; inner of one leaf cup-ſhaped, in ſeveral ovate ſegments. *Cor.* compound, radiant; florets of the centre perfect, with a tubular, ſtalked, five-cleft petal; thoſe of the radius fertile, with an ovate three-toothed petal, equal in number to the ſegments of the calyx. *Stam.* (in the perfect florets,) filaments five, broadeſt at the baſe, inſerted into the bottom of the petal; anthers united into a tube. *Piſt.* Germen ſomewhat ſpatulate, obſcurely triangular, notched at the top; ſtyle thread-ſhaped; ſtigmas ſomewhat ſpreading, pubeſcent. *Seeds* ſolitary, ſhaped like the germen. *Recept.* flat, chaffy; the ſcales large, the middle ones keeled, the reſt flat. *Down* none.

Eſſ. Ch. Calyx double; the outer of many leaves. Corolla radiant, its rays equal in number to the ſegments of the calyx; ovate, three-toothed. Receptacle chaffy. Stigmas downy. Seed-down none.

This genus comes very near Polymnia, and Dr. Sims has obſerved in one ſpecies, D. *coccinea*, Curt. Mag. t. 762, that the florets in the centre of the diſk are barren, thoſe in its circumference fertile, the radius being neuter or abortive, ſo that the genus, if all its ſpecies agreed in this reſpect, ſhould be referred, like Polymnia, to the order *Polygamia-neceſſaria*.

The

The ſpecies of Dahlia are ſeveral, all natives of mountainous parts of the Spaniſh ſettlements in South America. Their flowers are large and handſome, like thoſe of a ſunflower, but the rays moſtly red or purple like the China-aſter, and likewiſe variable in this reſpect. The herbage is coarſe and rank, with compound leaves. The moſt complete hiſtory of the genus is juſt given in the ſecond part of the Tranſactions of the Horticultural Society by Mr. Saliſbury, who recommends the cultivation of ſome ſpecies in poor gravelly ſoil, in the open ground, by which means they grow leſs luxuriantly, and flower earlier and more copiouſly.

DAHME, in *Geography*, a ſmall town of Saxony, in the principality of Querfurt, with 1964 inhabitants, and remarkable for its manufactures of linen and woollen cloth and worſted ſtockings. It has a royal palace, an infirmary, and an orphan-houſe. Its diſtrict contains 14 villages, and counts a population of 4162 individuals.

DAHMEC, a town of Aſia, in the country of Candahar; 28 miles S.W. of Candahar.

DAHN, a ſmall town of France, in the department of the Lower Rhine, chief place of a canton, in the diſtrict of Weiſſembourg. The place contains 608, and the canton 4892 inhabitants, diſperſed in fifteen communes on a territorial extent of 225 kiliometres. Dahn is 9 miles N.W. of Weiſſembourg.

DAHOMAY, Dauma, or, as it is ſometimes called, Fouin, an inland kingdom of Africa, ſituated N. of the Slave Coaſt, about 60 or 70 miles from the Atlantic, and extending 150 or 200 miles into the unknown interior of the country. It is ſaid to be bounded by Gaoga and Tombucto on the weſt, Bita on the north, Biafara on the eaſt, and the mountains of Guinea on the ſouth. It lies behind the maritime coaſt of Whidah, and is ſaid by Norris, in his "Memoirs of the reign of Boſſa Ahadee, king of Dahomy, &c." publiſhed in 1717, to have received its name from Tacoodonou, a chief of the Foy nation, early in the 17th century, who reduced Da, king of Ahomay, ripped open the belly of Da, and placed the body under the foundation of a palace, which he built in his newly acquired territory, as a memorial of his conqueſt. This he called Dahomy, from *Da*, the name of this unfortunate victim, and *homy*, belly; that is, a houſe built in Da's belly. Of this country very little was known, prior to the reign of Guadja Trudo, who ſucceeded Wacbaigah in 1708. Trudo was diſtinguiſhed by courage, generoſity, and magnanimity; and his memory continued to be held in ſuch veneration by the Dahomans, that they even ſwore by his name as the moſt ſolemn of all aſſeverations; but, notwithſtanding his ſplendid qualities, he appears to have entailed, by his ambition, laſting miſeries on his country. He was ſucceeded in 1732 by his ſon Boſſa Ahadee, who was raiſed to the throne by the two prime miniſters, to whom belongs the right of chuſing the future monarch, in preference to his brother Zingah. Zingah, preparing to aſſert his right, was ſeized, and it being unlawful to ſhed royal blood, he was ſewed up in a hammock, and thrown into the ſea. One of the firſt edicts of the new king was, that every man of the name of Boſſa throughout his dominions ſhould be put to death, as he thought it an inſult to majeſty, that any of his ſubjects ſhould bear his name. Another inſtance will be ſufficient to mark the character of this negro prince. When his father reduced the Whidahs, the greater part of the conquered nation deſerted their country, and ſettled in a neighbouring ſwamp, where they frequently haraſſed the Dahomans. Theſe refugees continued under a king; and on a diſpute between two brothers for the ſupreme power, Boſſa Ahadee, to improve this diviſion, patroniſed the younger, who engaged to become his tributary; and as a teſt of his fidelity, Boſſa required him, on the murder of his brother, to devour his heart; it is added, that this unnatural condition was fulfilled! During the long reign of this cruel and ferocious tyrant, Boſſa Ahadee, the country was haraſſed and waſted by wars, foreign and domeſtic, in which multitudes were ſlain; but nothing fills the mind with ſo much horror as the ſacrifices of human victims for the purpoſe of watering (according to the country expreſſion) the graves of the deceaſed royal family. Without ſuppoſing that the Dahoman monarchs can receive ſome pleaſure from the contemplation of the monuments of their vengeance and wanton cruelty, it is difficult to account for their paſſion for decorating the walls of their houſes and their apartments with the ſkulls and bones of the unhappy wretches who have periſhed by their hands. In the reign of Adahoonzou, the ſucceſſor of Boſſa Ahadee, after the ſlaughter of the priſoners whom he had taken in war, their ſkulls were ordered to be applied to the decoration of the royal walls. On one occaſion, a calculation having been made that 127 ſkulls were wanted for the completion of this extraordinary embelliſhment, the priſons were thrown open, and the requiſite number of devoted victims dragged forth from among the wretched captives, to be ſlaughtered in cold blood, for this helliſh purpoſe. Previouſly to their execution, they were informed that the heads brought home by the Agaow had not been found ſufficient to garniſh the palace, and that theirs were required to ſupply the deficiency. This act of barbarity was applauded by all preſent.

The capital of this kingdom, Abomey, lies in about N. lat. 9° 50′., and between 3° and 4° E. long. The country is fertile and luxuriant; the ſoil is a deep rich clay of a reddiſh colour, with a little ſand on the ſurface, except about Calmina, where it is more light and gravelly; but through the whole country, as far as it has been examined by Europeans, there is not found a ſtone as big as an egg. The country yields a plentiful ſupply of farinaceous vegetables, ſuch as maize, millet, kidney beans, called callavances, and a ſpecies of beans called ground beans. The Dahomans likewiſe cultivate yams, potatoes, the caſſada or manioc, the plantain, and the banana. Pine-apples, melons, oranges, limes, guavas, and other tropical fruits, are alſo abundant. Nor is it deſtitute of productions adapted for commerce and manufacture; ſuch as indigo, cotton, the ſugar-cane, tobacco, palm-oil, together with a variety of ſpices, particularly a ſpecies of pepper, ſimilar in flavour to the black pepper of the Eaſt Indies, and ſcarcely diſtinguiſhable from it. The Dahomans, like the other inhabitants of tropical climates, plant twice a-year, *viz.* at the vernal and autumnal equinoxes, after which the periodical rains fall. The language of the country, called by the Portugueſe "lingua geral," or general tongue, is ſpoken not only in Dahomy proper, but in Whydah, and the other dependent ſtates; and likewiſe in Mahee and ſeveral neighbouring places. With reſpect to the Dahoman religion, it conſiſts of a jumble of ſuperſtitious ceremonies, of which it is not poſſible to convey to the reader any intelligible and ſatisfactory account. The Portugueſe word "feitiço," or as the Engliſh pronounce it "fetiſh," ſignifying witchcraft, has been adopted by moſt of the maritime nations of Africa, as well as by the Europeans who trade thither. The term is now comprehenſive in its ſignification, and includes either the ſeveral objects of worſhip, ideal or corporeal, the act of worſhip itſelf, or the various amulets, charms, and ſuperſtitious mummery of the prieſts, or fetiſhmen, who abound in this country. They obſerve no ſabbath, unleſs their market days, which are conſidered as days of recreation, may be ſo called. Moſt of the ſavage nations have ſome confuſed ideas of a ſupreme intellectual Being, the maker of the univerſe; but theſe ideas not being eaſily

underſtood among a people unaccuſtomed to metaphyſical reaſoning, a variety of material and corporeal beings have been ſelected as objects of devotion, ſuch as the ſun, moon, living animals, trees, and other ſubſtances. The tiger is the fetiſh of Dahomy; the ſnake, that of Whydah. Among the amulets or charms, the principal is a ſcrap of parchment, containing a ſentence of the Koran, which the natives purchaſe from the moors who viſit this country. This they hang up in their apartments, which are likewiſe decorated with rude miſhapen images, tinged with blood, beſmeared with palm-oil, ſtuck with feathers, bedaubed with eggs, and other abſurd applications, of which a particular account would be both tedious and unprofitable.

As to the nature of the Dahoman government, it is the moſt perfect deſpotiſm that exiſts, perhaps, on the face of the earth; nevertheleſs, at particular times, the moſt licentious anarchy prevails; for, on the death of the king, till the appointment of his ſucceſſor, the government is diſſolved; and a horrid ſcene commences in the palace immediately on the king's deceaſe. His wives begin with demoliſhing the furniture of the houſe, the gold and ſilver ornaments and utenſils, the coral, and, in ſhort, every thing valuable that belonged either to themſelves or to the late king, and then murder one another. The policy of the country admits of no intermediate degree of ſubordination between king and ſlave; at leaſt in the royal preſence, when the prime miniſter is obliged to proſtrate himſelf with as much abject ſubmiſſion as the meaneſt ſubject: all acknowledging the right of the ſovereign to diſpoſe of their perſons and property at pleaſure. Beyond the precincts of the palace, indeed, the miniſters enjoy very eminent privileges, and are diſtinguiſhed by a variety of inſignia, and by the ſervile homage of their inferiors. One of the miniſters, peculiarly dreſſed and equipped, is always found in waiting at the king's gate; but is never allowed to enter till the monarch ſignifies his permiſſion by one of the women. On his entrance, he crawls into the royal preſence on his hands and knees, rubbing his head in the duſt, and uttering the moſt humiliating expreſſions. No perſon is permitted to ſit, even on the floor, in the king's preſence, except the women; and they muſt kiſs the earth, when they receive or deliver the king's meſſage. The king, and all his ſubjects, receive ſtrangers with the moſt remarkable courteſy; and every one ſalutes the ſovereign according to the faſhion of his own country, without being under the previous neceſſity of learning the court etiquette. White viſitors are always honoured with a glaſs of ſome cordial liquor, filled by the king himſelf; and the refuſal of it gives offence. When a ſubject receives a favour of this kind, he lies on his back, while the king holds the bottle to his mouth, and he is obliged to drink till the royal hand be withdrawn. The doctrine of paſſive obedience and non-reſiſtance is univerſal among the Dahomans, and the moſt oppreſſive mandates of the monarch are ſubmitted to without a murmur.

The king of Dahomy maintains a conſiderable ſtanding army, commanded by an agaow, or general, with ſeveral other ſubordinate military officers. The payment of theſe troops chiefly depends on the ſucceſs of the expeditions in which they are engaged, at the king's peremptory and irreſiſtable orders. On extraordinary occaſions, all the males, able to bear arms, are obliged to repair to the general's ſtandard; every "Caboceer" (formed from the Portugueſe, *cabecciro*, a head-man) marching at the head of his own people. The king himſelf ſometimes takes the field at the head of his troops; and, on peculiar emergencies, at the head of his women. For, within the different royal palaces in Dahomy, 3000 women, at leaſt, are immured: of theſe ſeveral hundreds are trained to the uſe of arms, under a female general and ſubordinate officers; and they go through their evolutions with as much expertneſs as the male ſoldiers. They have their large umbrellas, their flags, their drums, trumpets, flutes, and other muſical inſtruments. The flute, though ſimple, open at both extremities, and having a ſmall notch at the mouth end, is capable of producing very agreeable notes; and the king's women underſtand and practiſe the combination of the perfect concords, thirds, and fifths, and their little airs are not inelegant.

The chief part of the public revenue conſiſts of voluntary gifts, paid by the ſubjects at the time of the annual ceremonies, called the "Cuſtoms," when the Caboceers and traders attend, bringing their contributions, according to their reſpective circumſtances. Beſides theſe, a duty is levied on commerce, and ſomething ariſes from captives taken in war, all of whom that are carried to market being ſold on the king's account; but, as he pays a certain ſum to his troops for every priſoner, and as moſt of the captives are put to death, few are reſerved for ſale. The currency of this country conſiſts of the well-known ſhells called cowries, 1000 of which are reckoned equal to half a crown. All diſburſements from the king's houſe are made in bunches of ſtrung cowries, containing 2000 each, deducting $\frac{1}{40}$th part as a perquiſite to the king's women for piercing and ſtringing them. Of theſe diſburſements, a conſiderable part conſiſts of an annual tribute paid to a formidable neighbour, the king of Eyeo, ſituated north-eaſt from Dahomy. The king of Dahomy has ſeveral palaces, each occupying a piece of ground nearly a mile ſquare; that at Calmina, called "Simbamy," or a great houſe, is encompaſſed with a very ſubſtantial clay wall, of a quadrangular form, and about 20 feet high. In the middle of each ſide is a guard-houſe, with two centinels at the gate, and a guard of armed women and eunuchs within. On the thatched roofs of theſe guard-houſes, are ranged, on ſmall wooden ſtatues, many human ſkulls. Within are ſeveral large courts, ſurrounded by clay walls, and having in each of them a ſort of piazza or ſhed, formed of poſts about 7 feet high, at the diſtance of 12 or 14 feet from the wall; the intermediate ſpace is covered with a ſlanting thatched roof, ſupported by bamboo rafters. In the middle of the palace is a large building, of two ſtories, and about 30 or 40 feet high, ſo that the top of it is viſible from without. The receſſes of the palace are ſcarcely ever entered by men; and the female apartments are guarded from intruſion, with more than eaſtern jealouſy. The vulgar among the Dahomans affect to believe that their king does not eat; and, indeed, he does not eat in public, though he makes no ſcruple to drink. However, he entertains the whites with great hoſpitality, and with diſhes prepared by European cooks. The table-cloth, on ſuch occaſions, is a new piece of linen, cut off for the purpoſe; the diſhes are of pewter or earthen ware; and the knives and forks are ſilver-handled. The white men are ſeated on chairs; but the caboceers, and heir-apparent, are placed on the ground near the Europeans, who hand them ſome of the victuals; which they eat, as if by ſtealth, without knife or fork.

The dreſs of the men in Dahomy conſiſts of a pair of ſtriped or white cotton drawers, of the manufacture of the country, over which they wear a large ſquare cloth of the ſame, or of European manufacture. A piece of ſilk or velvet, 16 or 18 yards, forms cloth for a caboceer. The head is uſually covered with a beaver or felt hat; and the king, and alſo ſome of his miniſters often wear a gold or ſilver laced hat, with a feather; the arms and upper part of the body are generally naked; and the feet are always bare, none but the

ſovereign

ſovereign being permitted to wear ſandals. In the hand is uſually carried either a cutlaſs or wooden club; that of an officer of ſtate is ivory. Inferior caboceers carry a ſort of blunt ſabre, with a broad blade and wooden handle; warriors wear what is called a graſs-cloth, made in the country of the ſkin of palm-tree leaves, parted into ſmall threads, knotted and wove, and tinged with various dirty dyes, which is wrapped round the loins. They alſo wear a cartouch-box of their own manufacture, a powder-flaſk of calibaſh, with many groteſque ornaments and fetiſhes, which, together with the uncouth devices painted on their faces and bodies, give them a very fiend-like appearance. Every Dahoman man carries alſo a tobacco pouch, containing tobacco, a flint, ſteel, and tinder; together with one or two tobacco pipes, in a neat wooden caſe. The dreſs of the women conſiſts of a greater number of articles than that of the men. Their ornaments are beads and cowries, and rings of ſilver or baſer metal. Their ears are pierced, ſo as to admit a coral bead of the ſize of the little finger, or a portion of red ſealing-wax, or a piece of poliſhed oyſter-ſhell. Girls, before the age of puberty, wear nothing but a ſtring of beads or ſhells round the loins, and young women uſually expoſe the breaſts to view. The Dahomans are leſs addicted to the practice of *tattowing* the body than their neighbours; contenting themſelves with a perpendicular inciſion, which leaves a mark between the eye-brows.

Circumciſion is univerſally practiſed in Dahomay, but not at ſo early an age as among the Jews; and it is ſo indiſpenſible that the females do not admit the careſſes of the uncircumciſed. A certain operation, peculiar to this country, is likewiſe performed upon the women: "prolongatio artificialis labiorum pudendi, capellæ mamillis ſimillima." The Dahoman women do not admit the embraces of their huſbands during pregnancy, nor at the time of ſuckling, which continues two or three years, nor at the time of the catamenia; during which they retire to a part of the town allotted for their reception. The proſtitutes, licenſed by royal authority, are obliged to confine themſelves to a particular diſtrict, and are ſubject to an annual tax.

The general character of the Dahomans is marked by a mixture of ferocity and politeneſs. They are brave, hoſpitable, generous; and, where the tranſactions of their government allow, affable and communicative.

The annual ceremony, called "Cuſtoms," is uſually celebrated ſoon after Chriſtmas, on which occaſion the king leaves Calmina, where he generally reſides, and repairs to Abomey, his ancient capital, and the burial-place of his family. He then invites, by ſpecial meſſengers, called "half-heads," becauſe half of their heads is ſhaved, the European governors at Grigwee, to witneſs the ſolemnization of this feſtival. Each governor brings his annual preſent, conſiſting of various articles, in value amounting to about 50*l.* ſterling.

For this preſent the king returns more than an equivalent; ſuch as a young female ſlave, and one fine cotton cloth, entertaining his gueſts during their ſtay, with great liberality and kindneſs. On their journey thither they are accommodated at caravanſeras, provided for their convenience, and on their arrival at Abomey, they are received with a ſalute of cannon, and lodged in ſuitable apartments. The celebration of the "Cuſtoms" uſually continues about a month, during which there is ſome public exhibition every fourth, or market day, the intermediate days being employed in preparations. One of the market days is ſet apart for ſinging and dancing; the ſongs are extemporary, in praiſe of the monarch and his exploits, and the performers are rewarded according to the merit of their compoſitions. The bards alſo rehearſe the whole hiſtory of their country, which continues ſeveral days, during which they ſit at the king's gate. Another day is allotted for feaſting in the market-place, where tents are pitched for the accommodation of the king, caboceers, white viſitors, and embaſſadors from foreign ſtates. Various other ſcenes are exhibited during this carnival, which cloſes with a ſingular exhibition, on a ſtage erected and prepared for the purpoſe, of cowries ſtrung in bunches of 2000 each, pieces of brocade and other ſilks, ſtrings of coral, European and country cloths, Brazil tobacco, pipes, bottled liquors, and a variety of other articles. At an appointed time the king, with his caboceers and vaſſals, repair to the ſtage; and each perſon preſent ſelects a cloth according to his rank; and ſometimes a ſtring of coral is preſented to each. The king, then, throws a bunch of cowries over the fence that guards the ſtage among the multitude; the caboceers, and Europeans, following his example, toſs over all the goods, except a few bunches of cowries, which are reſerved for ſome of the favourite ſervants. The rabble, prepared for this ſport, contend for the ſeveral prizes. But, as an effuſion of blood commonly forms a part of a Dahoman exhibition, this ſcene is cloſed with the death of at leaſt one victim, who, together with ſeveral other animals, is thrown, bound, from the ſtage, to be murdered below.

The Dahomans diſplay great ingenuity, conſidering the rude ſimplicity of their tools, in their ſpecimens of art. Although their looms are very aukward machines, yet they manufacture cloths of cotton, held in high eſtimation among themſelves, and often purchaſed by the Europeans for counterpanes, at a high price. They likewiſe weave cloths of the palm-tree leaves, which they ſometimes dye, but more frequently wear in the natural colour, which is ſomewhat higher than that of nankeen. They likewiſe make neat mats of the ſame ſubſtance. The forges uſed by their ſmiths are of a very ſimple conſtruction; and yet they contrive to fabricate not only the neceſſary inſtruments of huſbandry, but carpenters' tools, cutlaſſes, ſpears, and other weapons. They have alſo braziers or ſilver-ſmiths, who make bracelets, handles for cutlaſſes, rings for the fingers, and other trinkets of braſs or ſilver, which they melt in crucibles of their own manufacture. They make likewiſe earthen pots, water jars, and other utenſils, of the ſame materials. The cookery of the Dahomans comprehends but a few diſhes; theſe, however, are excellent; of which black ſoup is the chief. This is made either of fleſh or fiſh, with a variety of mucilaginous vegetables, well ſeaſoned with pepper and ſalt, and enriched with palm-oil. An exquiſite flavour is given to this diſh by an ingredient made of the ſeeds of a tree, called in the country wild tamarind, ſomewhat reſembling thoſe of the cucumber. Their bread is made of maize or millet, ſometimes boiled into a ſtiff pudding, and ſometimes baked, either with or without leaven. They make alſo a very light white and delicate fermented bread of calavanſes, firſt ſtripped of the huſks, and a kind of paſte or flummery of fermented Indian corn, not unlike blanc-mange, though not ſo adheſive. The Dahomans are at all times very cleanly in their perſons, and particularly ſo with reſpect to their food, and the utenſils uſed in the kitchen and at table. A very good ſoup is manufactured in the country of palm-oil and pot-aſh.

From a remarkable ſpeech of Adahooneou to Mr. Abſon, when he was informed of what had paſſed in England on the ſubject of the ſlave-trade, we are led to infer that the Dahomans never go to war for the purpoſe of ſupplying European ſhips with ſlaves, and that they never ſell their wives and children for the ſake of procuring a few kegs of brandy. We cannot,

not, however, forbear lamenting the misery of those people, by whom a transportation into a distant country, accompanied with slavery, is considered as a situation to be envied. See "The History of Dahomy, an inland kingdom of Africa;" compiled from authentic Memoirs, with an Introduction and Notes. By Archibald Dalzel, formerly governor at Whydah, and now at Cape Coast Castle, 4to.

DAHRA, a small island in the Red sea, near the coast of Arabia; one league S.W. of Loheia.

DAHRIJE, a town of Egypt, situated on the Nile; 13 miles S.S.W. of Damietta.

DAIBOTH, in *Mythology*, an idol of the Japanese, in honour of whom they have erected many temples, to which numerous devotees and worshippers resort. The access to the chief temple of this deity lies through a kind of gateway, on either side of which are two monstrous figures with several arms, holding arrows, swords, and other offensive weapons. The idol is seated in the centre of the pagoda, on a table-altar, elevated above the ground. His height is such, that he touches the roof of the temple with his hand; and his bulk is so enormous, that his hands are more extended than the body of an ordinary man. This idol has the breasts and face of a woman, and black locks, which are crisped and woolly, like those of a negro. He is encompassed on all sides with gilded rays, on which are placed many images, representing the inferior idols of the Japanese. Others are placed on pedestals, and crowned with a nimbus or glory. The altar on which he rests is furnished with a profusion of lighted lamps. The temple is supported by wooden pillars, consisting of trees in their natural and unformed state, so as to give the building a romantic appearance. The frame-work is painted red, and near it is a chapel, externally varnished, in which the sacrifices are prepared, and where the people worship, except on the greater festivals.

DAIGREMONT, M. in *Biography*, a French engraver, who flourished towards the end of the 17th century. He was the disciple of Pierre le Pautre, and assisted J. Berrain in the Books of Ornaments, published in Paris. Besides these, we have by his hand some prints of architecture, and a set of Views of Versailles. At length he quitted the graver to engage in commercial pursuits. Heinecken.

DAIKOKU, in *Mythology*, a Japanese deity, whom the people regard as the source of all their riches. This idol is seated on a sack of rice, the oriental symbol of plenty, and holding in his hand a hammer, by every stroke of which he confers every kind of domestic convenience, gay habits, and great riches.

DAILE, in a ship, the trough wherein the water runs over the decks.

DAILLE', John, in *Biography*, a French protestant minister of considerable celebrity, was born in the year 1594. He was designed by his father for business, but his inclination being decidedly for books, he was inducted into the learned languages and philosophy by the most celebrated professors of the age and country in which he lived. In 1612 he undertook the education of the grandsons of M. du Plessis-Mornay. This he esteemed a most fortunate occurrence, as giving him the friendship and assistance of the grandfather, who frequently read with him books of the highest interest, and imparted to him those rich stores of learning and knowledge with which his own mind was imbued. Seven years did M. Daillé reside in the family of this excellent and venerable man, when he set out with his pupils on their travels. In Italy one of the young men died, and it was with difficulty that the tutor, by the aid of the excellent father Paul, was enabled to transmit the body to France, to be interred with his ancestors. From Italy he accompanied his surviving pupil to Switzerland, Germany, Flanders, Holland, and England, and returned to his native country in the year 1621. Shortly after, he engaged in the ministerial functions, under the patronage of M. du Plessis-Mornay, who in a very short time died in the arms of M. Daillé. He now engaged in revising and preparing memoirs of his friend, which had been collected by De Ligues, and which were afterwards published in two volumes. He was in 1625 elected minister of the church at Saumur, where he had scarcely been a year when he was called by the consistory of Paris to take charge of the church at Charenton. Here he spent the remainder of his life, and was regarded as one of the most excellent as well as judicious defenders of the Protestant cause. He died in the year 1670, at Paris, much esteemed by the Catholics, as well as by the Protestants, for his learning, abilities, integrity, moderation, and his polite and obliging manners. By his works he was distinguished among contemporary writers, as well for his candour, as for the strength of his arguments, and the clearness of his style. The principal works published by M. Daillé, and which we shall notice, are, 1. "De l'Usage des Peres," or "Concerning the right Use of the Fathers," which is characterized as "a very strong chain of arguments that form a moral demonstration against those who would have differences in religion to be decided by the authority of the fathers." 2. "An Apology for the reformed Churches," &c. in which he vindicated them from the charge of schism brought against them by the advocates of the Romish church; and, 3. "An Apology for the Synods of Alençon and Charenton." The first two were translated into the English and Latin languages, and enjoyed a very high reputation; the last gave rise to a bitter controversy, which injured the fame of all the parties engaged in it. Bayle. Moreri.

DAINUR, in *Geography*, a town of Persia, in the province of Irak-Agemi; 50 miles W. of Amadan.

DAJON, a town of Africa, in the country of Agonna.

DAIRA, in *Mythology*, one of the Oceanides, mother of Eleusis, by Mercury.

DAIRI, or Dairo, in the *History of Japan*, is the sovereign pontiff of the Japanese; or, according to Kæmpfer, the hereditary ecclesiastical monarch of Japan. In effect, the empire of Japan is at present under two sovereigns, *viz.* an ecclesiastical one, called the *dairo*, and a secular one, who bears the title of *kubo*. The last is the emperor, and the former the oracle of the religion of the country. See Japan.

DAIRIER, in *Rural Economy*, a name sometimes applied to the person who keeps a dairy, or a dairy-man.

DAIR-KARRAN, in *Geography*, a town of Asiatic Turkey, in the province of Kurdistan; 30 miles S.S.E. of Kerkuk.

DAIRY, in *Rural Economy*, a name sometimes applied to the different sorts of products of this kind, and sometimes to the place where milk, butter, and cheese, are laid up and preserved; hence these repositories are further distinguished into butter, cheese, and milk dairies, according as one or other of these articles constitutes the principal object of the dairy-farmer. It has been remarked by a late partial writer, that there are some sorts of grass lands that answer better in this management than others. It is not, he says, well decided, though general experience seems to favour the opinion, that the very fertile pasture lands may be more profitably applied to the purpose of grazing or fattening animals, than that of the dairy; but such as are not capable of bring-

ing the larger ſorts of cattle to a complete ſtate of fatneſs, and which uſually let from twenty to five-and-twenty ſhillings the acre, may be more profitably employed in this way. And that moſt of the low and more moiſt kinds of meadow lands, which, though the value may be high, as they do not ſucceed ſo well for the purpoſe of fattening, may be found highly uſeful under the dairy ſyſtem. The high, open, and expoſed uplands are always, he conceives, leſs proper for this ſort of practice, than thoſe which are ſituated lower, and which are more encloſed and warm. It is added, that in this buſineſs the nature of the paſtures and other ſorts of food which the farmer has at command, muſt chiefly direct him in the extent and kind of dairy which he is to purſue. Where the graſs lands are of the older kinds, and tolerably rich and fertile, butter ſhould probably, in general, he thinks, be the principal object; but where they have been more recently converted to the ſtate of ſward, and are of a more cool as well as leſs rich quality, cheeſe may be the moſt depended upon. It is, perhaps, ſays he, only under particular circumſtances and ſituations that the different methods or modes of dairying can be profitably and conveniently combined or carried on together. Some ſituations, however, admit of it with very conſiderable advantage.

It is an obſervation, ſanctioned by long experience in this ſort of management, in the midland diſtricts, that grounds which have been for a great length of time in the ſtate of paſture, are capable of affording milk which abound more in the oily principle, or that of cream, while thoſe which have been laid down to ſward for a ſhorter period, and are of a more moiſt, cold quality, are more productive in ſuch milk as has the caſeous or curdy material in a large proportion in compariſon to that of the cream. And which the practice of the Yorkſhire dairy-farmers ſtill further confirm, by being much in the habit of preſerving their old paſtures in their original ſtate, in conſequence of their finding that the milk which is produced from them is churned with much greater facility, and the butter capable of being kept in a better manner, than where ſuch naturally rich grounds are improved by tillage. It has been ſtated that much difficulty has been found, not only in the making, but the keeping of the butter, eſpecially in the warmer months, in thoſe caſes where the land had been broken up by tillage, and rendered more rich, by the application of manure, eſpecially that of the calcareous deſcription, where, while in the natural ſtate, there were not the ſmalleſt difficulties of this nature, the butter being of the fineſt quality. From which a concluſion is drawn, that old paſtures have in addition to the property of the oily or bituminous matter being ſupplied in larger proportion, that of rendering the butter more firm and waxy in its quality. It has likewiſe been noticed by an able writer, that in the highlands of Scotland the richneſs of the butter has been univerſally aſcribed to the cows feeding upon the old graſs in the remote glens; though it is hinted that this may partially depend on the manner in which it is made. In Cheſhire the inferior ſorts of paſture lands are likewiſe ſtated by the author of the "Six Months Tour" as being there found the moſt proper for the purpoſe of making cheeſe. However, though this may be the caſe in a certain degree, there cannot be any diſpute, but that excellent butter may be made in many ſituations, where the paſtures are comparatively new, and even where they have been but lately laid down to the ſtate of graſs; as well as that cheeſe of a good quality may be produced where the ground, uſed as paſtures, has been long in the ſtate of ſward or old herbage. Indeed later experience ſeems to have ſhewn that butter, equally good and rich in quality with that produced on the old fertile paſtures, has been afforded while the cows were foddered in the ſtalls on cut clover, rye-graſs, and other ſorts of green food.

The deterioration of land for the purpoſe of the cheeſe dairy, by the application of ſuch ſubſtances of the manure kind as have a tendency to render it more fertile, as by the uſe of dung, or ſheep feeding, &c.; is ſuppoſed by Mr. Rudge, in his Survey of Glouceſterſhire, to be probably owing to the introduction of ſuch plants as did not grow there before, or the deſtruction of ſome that did. "The cauſe does not," ſays he, "originate with the cow, but the herbage on which ſhe feeds. The ſame cow, on two paſtures ſeparated only by a hedge, will give milk of different qualities; from one ſhall be made fine, rich, and cloſe cheeſe; while from the other ſhall be made rank, "heaving," hollow, unpleaſant to the palate, and unfit for the market."

It is further ſtated on this curious and intereſting ſubject by the ſame writer, that "in the pariſh of Haresfield, two grounds adjoining each other were alternately uſed for the paſture of cows; while they were on one, excellent cheeſe was made, but on the other, it was difficult to make any tolerably good. The latter had been lately well dreſſed with manure which produced plants unfavourable to the dairy; and the dairy-woman herſelf remarked, that if the farmer continued to enrich the herbage with dung, ſhe muſt give up making." This ſuggeſts ſome circumſtances which ſhould be regarded in the regulation of cow paſtures, but which will be noticed in ſpeaking of dairy management. See DAIRYING.

It is ſuppoſed that, "among the plants which are uſeleſs or unfavourable to the making of good cheeſe, are the following; the white honey-ſuckle *(trifolium repens)*, the different kinds of crow-foot *(ranunculus)*, and wild garlic *(allium ampeloprafum)*, &c." The "white honey-ſuckle is brought forward by manure and ſheep-ſtock," and is "a proof of good land, at leaſt of land in a ſtate of high cultivation, and hence has a tendency to raiſe the quality of the milk and make the cheeſe heave." But that "all the ſpecies of crow-foot "crazeys," or "butter cups," except the ſweet wood crow-foot (as it is ſaid, found only in woods), are uſeleſs, if not noxious. However their bloſſoms may add to the beauty of the herbage, or give an apparent richneſs to the paſture, the milk is not," the writer ſays, "indebted to them for colour, as is ſometimes ſuppoſed, ſince the cows never crop them, if they can avoid it." See CRAZEY and CROW-FOOT.

The garlic, which is "common in ſome meadows, gives a diſagreeable flavour to butter and cheeſe; and it does not appear that cows much diſlike or refuſe eating it; perhaps in conſequence of its being ſo much blended with the graſs, they cannot help cropping a little." And in the autumn, "the decayed leaves, particularly of the aſh tree, communicate a rank and bitter taſte to milk; when theſe, therefore, cover the ground, it is adviſeable either to keep the cows in the yard, or, what is better, to rake the leaves off the paſture to the dungheap."

The poiſonous quality of the leaves of the yew tree ſhould conſtantly prevent its being grown in or even near to ſuch grounds as are uſed for cow paſtures.

It has been remarked by doctor Anderſon, that there is no ſet of experiments, which can be depended upon with any degree of certainty, whether the butter or cheeſe dairy is capable of affording the better profit to the farmer, in caſes where the management is equally judicious and proper. It is however ſuggeſted, that, in each caſe, the moſt valuable part of the milk is converted into an article of great uſe and importance as food; and that though the former may afford

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a conſiderably higher price than the latter in the market, yet from the great difference in the quantity of the products, in the expence and trouble in the management, and in various other circumſtances, it would ſeem that the real advantages are nearly equal. It has been ſtated, he obſerves, previouſly to the late great riſe in the prices of theſe different articles, to amount, whether of butter and butter-milk, or of cheeſe and whey, to nearly four-pence half-penny for each gallon of milk; which at preſent is perhaps little leſs than from ſix-pence to ſix-pence half-penny or ſeven-pence. It is however ſuppoſed, that in the neighbourhood of large towns, and other places where the demand for butter is conſtantly extenſive, it may be more profitable to have a butter-dairy than one of the cheeſe kind. But in all caſes of this nature much muſt depend, in reſpect to profit and advantage, on the care and exactneſs of the management which is employed in conducting the buſineſs. See DAIRYING.

It has been ſuggeſted, in an intereſting paper in the fifth volume of "Letters and Papers of the Bath Agricultural Society," that when a dairy is eſtabliſhed, the undertaker may ſometimes think it his intereſt to obtain the greateſt poſſible quantity of produce, ſometimes it may be more beneficial for him to have it of the firſt quality, and at other times it may be neceſſary to have both theſe objects in view, the one or the other in a greater or leſs proportion; it is conſequently of importance that he ſhould know how he may accompliſh the one or the other of theſe purpoſes, in the eaſieſt and moſt direct manner. To be able to convert his milk to the higheſt poſſible profit in every caſe, he ought to be fully acquainted with every circumſtance reſpecting the manufacture of butter as well as of cheeſe; and it may in ſome caſes happen that a certain portion of that milk may be more advantageouſly made into butter than into cheeſe, while another portion of it would return more profit, if made into cheeſe. See DAIRYING.

In ſhort, the conſequence and the credit of the dairy muſt, under all circumſtances, principally depend on the neatneſs of the management which is purſued, every part being kept perfectly clean, ſweet, and in order, the floors being regularly rendered cool, by frequent waſhing with cold water, and the various utenſils well cleaned and ſcalded after every time of being uſed.

DAIRY-*Farm*, in *Agriculture*, is that ſort of farm which is chiefly of the graſs-land kind, conſiſting of meadow and paſture, with but little of the ground in the ſtate of tillage; in which the profit of the farmer principally depends upon the dairy. In Cheſhire, Glouceſterſhire, Wiltſhire, Buckinghamſhire, and ſome of the midland diſtricts, as well as in ſome parts of Eſſex, Cambridge, Suffolk, and the county of Dorſet, &c. there are extenſive farms of this nature. In moſt, if not all farms of this deſcription, there ſhould, however, always be a portion of the land under the ſtate of tillage, in order that a ſufficiency of grain, and ſtraw for litter, may be provided for the teams, and at the ſame time green cattle crops be raiſed in due proportion to the number of cows which are kept, as it has been lately ſhewn that in this way the dairy farmer may derive conſiderably more profit and advantage than in the uſual old method of management. See DAIRYING.

It is ſtated by Mr. Holland, that "the more general introduction of green crops, and of the practice of ſtall feeding for dairy cows, may certainly be reckoned among the moſt conſiderable improvements which have taken place of late years in the agriculture of Cheſhire. With the dairy-farmer," ſays he, "it is a principal object to increaſe the quantity of his milk, and to continue it as long as poſſible. This can in no way be more effectually done than by giving green food to his cattle; and he is informed by ſeveral intelligent farmers, that by this management the milk may be continued a month longer in the autumn than could be effected by truſting to the paſtures only for a ſupply of food." It is therefore conceived, that the importance of this circumſtance in a dairy diſtrict muſt be ſufficiently evident to every one who has in the leaſt degree attended to it. And the reſults of the ingenious experimental trials of Mr. C. Curwen in keeping milch cows in this way, with the view of affording milk in the winter ſeaſon, have placed the benefits to be derived from it in ſo clear a point of view, that there cannot be the leaſt difficulty or doubt concerning it. See DAIRYING.

DAIRY-*Houſe*, in *Rural Economy*, a building or place erected for the purpoſe of carrying on the buſineſs of dairying. Theſe ſorts of buildings ſhould conſtantly be ſituated and diſtributed in ſuch a manner, in reſpect to the other farm-offices, as that labour may be abridged as much as poſſible, and the greateſt poſſible convenience be obtained, while a due temperature is preſerved in them. The chief points to be aimed at, in order to accompliſh theſe objects, are thoſe, of having them ſufficiently near the ſheds or cow-ſtandings, that the milk may be readily conveyed to them; the form being ſuch as to combine well with the nature of the other erections; the door or entrance into the room deſtined for the milk, being made through that of the ſcalding room, which ſhould have the copper for heating water and other purpoſes placed in a ſhed without it, that the heat may be kept at as great a diſtance as poſſible from the milk, a cock being fixed in the bottom of it, for conveying the heated water through a trough or pipe acroſs the ſcalding room, in which another cock ſhould be fixed, for the convenience of waſhing ſmaller utenſils, paſſing the wall into the milk-leads, pans, trays, or coolers, that whenever they are required to be ſcalded, the boiling water may at once paſs through the whole range of them, or be detained at pleaſure in any one of them, ſo as to effect the buſineſs in the moſt complete and perfect manner, being afterwards taken off by a ſuitable drain made for the purpoſe. The paſſage for the water, through the wall of the dairy, ſhould be in a trough of ſufficient dimenſions to admit the diſcharging of a pailful of milk into it with perfect ſafety, having a hair ſieve ſo placed in it as that the whole of the milk of the cows may be made to paſs through it into the neceſſary trays or coolers in which it is to ſtand; as by this ſimple contrivance, the neceſſity of dirty men or boys entering the dairy-houſe is wholly prevented. There ſhould likewiſe be a trough, pipe, or ſome other ſimilar contrivance, for the purpoſe of conveying the waſte milk, whey, &c. from the dairy-houſe to the ciſterns for containing the waſh for the pigs. Theſe conveniences have many of them been ſuggeſted by Mr. Young in his excellent "Calendar of Huſbandry."

Where theſe buildings are intended to become objects of ornament, and expence is not regarded, ſituations ſhould be ſelected ſo as that the effects of them may be the moſt pleaſing and complete.

The regulation of temperature may be accompliſhed either on the plan ſuggeſted by doctor Anderſon, of having double walls and roofs; or by means of hollow walls; and for common purpoſes, by the walls having a vacuity left, of eight or ten inches in width, between the lath and plaſter, as ſuggeſted by Mr. London in his "Treatiſe on Country Reſidences." Where a ſpring, fountain, or *jet d'eau* can be ſo contrived as to break or burſt forth, in the centre of the principal room or apartment, it will not only afford a highly agreeable effect, but be of great convenience to the perſon who has the management of the buſineſs of the dairy.

In farm-dairies, it is neceſſary for the buildings to vary according

cording to the nature of the dairy buſineſs to be carried on in them, as whether they are uſed for butter, cheeſe, or milk; and the ſizes of them ſhould be regulated by the number of cows which are to be kept. In the Glouceſter dairy-houſes twenty feet by ſixteen are the uſual dimenſions for forty cows; and thirty feet by forty, for one hundred cows.

A well-conſtructed butter-dairy ſhould conſiſt of three rooms, or apartments; namely, a milk-room, a churning-room, with neceſſary apparatus; and a room for the different utenſils, and the cleaning and airing them in, when it may be requiſite.

The cheeſe-dairy ſhould in the ſame manner be conſtituted of three rooms; one for the reception of the milk; another for the ſcalding and preſſing of the cheeſe; and a third for the purpoſe of ſalting it in. And in addition, there ought to be a room for the ſtowing of the cheeſe, which may conveniently be a loft made over the dairy. It is frequently at a diſtance, which is inconvenient and troubleſome.

The milk-dairy only requires two good rooms, one for the reception of the milk; and another for the purpoſe of ſerving it out in, and that of ſcalding, cleaning, and airing the different utenſils.

It is utterly impoſſible to conduct the dairy buſineſs with propriety and due advantage, except where a place ſuitable for preſerving the milk, and for performing the various operations in, be firſt provided. In order that an equable temperature may prevail at all ſeaſons of the year in this ſort of building, a northern expoſure has been ſuggeſted as the moſt proper, and which ſhould be dry and near a ſpring or running water, that it may be rendered clean and ſweet at all periods without difficulty. And where it is ſo ſituated, as that the action of the ſun upon its roof and walls can be prevented by the ſhade of trees or buildings, it is a circumſtance of much importance to the ſucceſs of the buſineſs.

From the general difficulty of obtaining theſe different requiſites in the farm-houſe, it has been recommended that a detached building ſhould be erected or converted to the purpoſe. This need not, however, be the caſe where there is already a proper convenience, or an old erection that can be altered with facility, ſo as to anſwer the intention.

The plan which a writer, who has beſtowed much attention upon the ſubject, has propoſed, is, that it ſhould be conſtructed in a ſort of range of narrow buildings, as ſhewn in the ground plan at *fig.* 1. in *Plate* XII. of *Agriculture*, in which the middle diviſion, A, is the proper milk-houſe or room; that ſhewn at B, is intended to ſerve as a room for cleaning, and laying up the different neceſſary utenſils in; and that at C, is deſigned as a ſtore-room, in which the cured butter, and various other products, as well as the ſpare dairy utenſils, may be ſecurely kept, by being locked up. Near large towns it might alſo be employed as a place for keeping ice in, by being properly fitted up for the purpoſe. In cheeſe-dairies another room would be neceſſary for the purpoſe of ſalting and preſſing; which might be added at either end, as moſt convenient.

It is adviſed that the walls of the middle diviſion ſhould be conſtructed of brick, or ſtone and lime, all round on the inſide, but which need not be more in thickneſs than one brick in length, where that ſort of material is uſed, or one foot in the caſe of ſtone being employed; but the wall beyond this, which ſhould be full ſix feet in thickneſs, may be formed of ſod on the outſide, being well rammed with earth within, ſo as to fill up the ſpace between the two walls. The firſt or inſide wall of this compartment may be raiſed ſeven, eight, or more feet in height on the ſides upon which the roof may be reared, where a loft above is not wanted, the end walls being carried up to the full height of the roof. The beſt covering for the roof in this caſe, is ſuppoſed to be reed or thatch, which ſhould not be leſs than three feet in thickneſs, being carried downwards ſo as to cover the whole of the walls on each ſide; but where theſe materials are not in plenty, they need not be applied to quite ſo great a thickneſs. A wooden pipe ſhould be fixed through the roof, exactly above the middle of the building, having ſufficient length to riſe a foot or more above it, which may occaſionally ſerve as a ventilator. The top of it ſhould be covered ſo as to prevent rain from getting through it, having a valve ſo fixed in it, as to be capable of being opened or ſhut at pleaſure by means of a cord from below. There ſhould likewiſe be a window on one ſide for the admiſſion of light, which ſhould be conſtructed in the manner ſhewn at F G, *fig.* 2, in the ſection of the building. And this opening ſhould be cloſed by means of two glazed frames, one on the outſide at G, and the other on the inſide at F, which, together with the great thickneſs of the walls, the thatch of the roof, and of the buildings at the end, contributes to render the temperature of the room more equable at the different ſeaſons of the year, by more effectually preventing the influence of the external air upon it. The ſmall ſpaces or apartments ſhewn at R, S, are ſimply cavities formed in the thickneſs of the partition walls, which may be employed for any uſe that may be convenient; the double doors in the paſſages being deſigned wholly for cutting off more perfectly all communication between the external air and the milk-room, when either the great heat or exceſſive coldneſs of it may render it neceſſary. The thatch above theſe ſmall ſpaces, or rooms, ſhould come one foot lower within than in the milk-room, in order more fully to prevent all communication of air from the outer apartments at the place where the couples for the roof are placed. At periods when the ſtate of the air is temperate, the door at T may be generally left open to facilitate the entry to and from the milk-room, for common purpoſes. All the doors open as ſhewn by the dotted lines: and through each of theſe doors, as well as the outer doors of the rooms or apartments, B and C, an aperture or opening ſhould be made of about a foot ſquare, having a ſmall door exactly fitted to it, which can be opened and ſhut at pleaſure. Likewiſe over the whole of the inſide of each of theſe apartments, a piece of fine gauze ſhould be ſtretched, being covered with a fine netting of wire, ſo that when the air is temperate, and the wind blows in a proper direction, by opening theſe little doors, a draught or current of air may be carried through the whole of theſe buildings, which will keep them ſweet and dry, without admitting flies or other vermin. The whole of theſe apartments ſhould be neatly plaſtered, with lime on the inſide of the walls and ceiling. Likewiſe the apartment A, at leaſt, ſhould be paved with flat ſtones, which ſhould be raiſed ſix inches higher than the ſurface of the ground without, having ſlanting gutters made to convey away readily water or any other liquid which may be accidentally ſpilled. The walls quite round ſhould be lined with ſhelves of a convenient breadth, in ranges, one above another, on which the diſhes may be placed; and a large table ſhould ſtand in the middle, as ſhewn by the dotted lines in the plan; which, if made of ſtone, is the moſt cleanly and convenient of any ſort of material. Beneath it a piece of the pavement, about a foot in breadth, ſhould be raiſed ſix inches higher all round than the level of the floor, ſo as to form a ſort of trough or ciſtern within it for holding water. This trough or baſon ſhould be capable of being wholly emptied at pleaſure by means of a plug fixed in a hole which opens into and admits the water to be diſcharged into the common gutters.

The cleaning and repoſitory room ſhould be fitted up, by having

having ranges of ſhelves placed all round the walls, as well as tables and other neceſſary furniture put where they may be requiſite. In this the walls may be thinner than in the other caſe, and be wholly built of brick or ſtone, the thatch being likewiſe leſs thickly applied. There ſhould be ſet up in one corner a boiler, or cauldron, of ſufficient ſize for the dairy, for the purpoſe of heating the water for ſcalding the veſſels, being placed over a cloſe furnace, the flue of which ſhould be made to terminate in a chimney carried in a ſlanting manner over the door in the gable end above which it riſes, ſo as to afford a paſſage to diſcharge the ſmoke. This boiler is ſhewn at H, in *fig.* 1.

The third diviſion, or room, may be made uſe of for different purpoſes, as ſuggeſted above; but where ice is to be preſerved in it for the ſummer, which may often be found advantageous to the dairy, the walls ſhould be built in the ſame manner, and of the ſame materials, as thoſe in the firſt diviſion, or that marked A, as ſhewn by the dotted lines *i, k, l, m*; the thatch or reed being applied in the ſame thickneſs. And in this caſe there ſhould be firm poſts of wood placed in the floor, in the manner as ſhewn at *n, o, p, q*, ſo as to form a ſort of inner ſquare, with an open walk all round of two feet in breadth; wicker-work hurdles of a proper ſhape ſhould be placed within theſe poſts, being wholly compoſed of peeled wands, which have been previouſly dipped in coal-tar in a warm ſtate, in order to preſerve them from decay. The receptacle for containing the ice, being within this ſquare, is capable of being filled from the double doors at K L, by opening them at the time, and immediately cloſing them again, not to be reopened till the period of its being again neceſſary to fill it; the aperture between the doors being filled with ſtraw rammed ſo as to become firm, and thereby prevent the admiſſion of air. The ice ſhould be taken out as it may be wanted, by paſſing through the middle diviſion, or milk-houſe. Various advantages and conveniences, it is ſuppoſed, would attend this accommodation and contrivance, and the expence at the ſame time be but trifling. In this manner the products of the dairy would conſtantly be capable of being cooled to that degree, in the ſummer ſeaſon, which ſhould be found to give them their greateſt perfection. And the attentive and ingenious dairy-farmer would find ſuch an accommodation capable of other beneficial applications.

It is obvious that all the contrivances of this dairy-houſe, as deſcribed above, are ſolely intended to enable the careful dairy-farmer to preſerve his milk in a proper temperature in the ſummer as well as the winter ſeaſon, with the leaſt poſſible trouble and expence to himſelf; as it is well known, that any conſiderable variation in the degree of heat has a great tendency to derange the operations of the dairy, and conſequently to diminiſh the value of the products of it. It is found by experience, that if the heat be too great, the milk ſuddenly coagulates, without admitting of any ſeparation of the cream; and it becomes ſo ſuddenly ſour as to greatly injure every operation. While, on the contrary, when the milk is kept in too cold a temperature, the cream ſeparates from it in a ſlow manner, and with difficulty, acquiring a bitter diſagreeable taſte, the butter being ſcarcely able to be made to come at all; and when obtained, is of ſo pale a colour, ſo ſmall in quantity, ſo poor to the taſte, hard and brittle in its conſiſtence, and in every reſpect of ſo little value, as to bring a very low price at the market, in compariſon to what it would have produced had it been preſerved in a proper degree of warmth. In order, therefore, to avoid theſe different extremes as much as poſſible, the milk properly ſo called is, in this form of dairy-houſe, depoſited in the centre of the building, into which there is no direct acceſs immediately from the open air; nor even from the porch, except through double doors, one of which ſhould conſtantly be ſhut before the other is opened, whenever either the heat or coldneſs of the weather is exceſſive; but under other circumſtances, this precaution may be overlooked. The walls which encloſe this part of the building, being formed of ſuch a thickneſs, and of ſuch earthy materials, as well as the roof ſo thickly covered with thatch, as theſe ſubſtances are found to tranſmit heat and cold with leſs facility than any others, which can be eaſily had, conſequently a long continuance of either hot or cold weather could have no ſenſible effect in altering the temperature of this room or diviſion; and if it ſhould at any time acquire a ſmall degree of heat or cold more than was proper, and this were corrected by artificial means, it would retain that artificial temperature for a long time. Theſe are the principal objects deſigned to be acquired by this conſtruction of dairy-houſe.

The ingenious inventor further remarks, that from fifty to fifty-five degrees of heat on Fahrenheit's ſcale is about the average temperature that a building, conſtructed in the manner of the above, would naturally preſerve at all ſeaſons of the year in this climate, if not affected by external objects. But that, as the heat of the milk, if in conſiderable quantities, would tend in ſummer to alter the temperature of the air, there is no improbability but that it might in ſome caſes be raiſed in this way to a much higher degree than was proper. Therefore, as a convenient remedy for this inconvenience, the aſſiſtance of the ice-houſe has been had recourſe to, as by having a ſmall quantity of ice placed in the milk-room, when neceſſary, the heat may be quickly brought to the proper ſtate. In the two ſmall chambers adjoining the ice-houſe, or in the paſſage around it, the butter may be depoſited, and preſerved in a much cooler ſtate than even in the milk-room. Beſides this, other benefits may be derived from this additional diviſion of the building. It is likewiſe ſuggeſted, that if the cold ſhould ever become too great in the winter ſeaſon, it might be remedied either by means of a barrel of hot water, cloſely bunged up, being placed upon the table of the milk-houſe, and ſuffered to remain till it cools, or by having hot bricks laid down for the ſame purpoſe; which are much preferable to any kind of chaffing-diſh with burning embers in it, as preventing more certainly a bad taſte being communicated to the milk.

But dairy-houſes may be contrived and conſtructed on various other more ſimple and cheap forms; the ground plan and internal parts of one of which may be ſeen at *fig.* 3. in the ſame plate, in which A is the milk-houſe or room, the coolers for containing the milk being ſhewn at *a, a, a*; *b*, the ſlab for depoſiting the butter upon, when made up; *c, c, c*, the cocks for drawing off the milk from the coolers, one of which is ſo contrived as to ſerve two coolers, by having a ſhort piece of leaden pipe from the holes *o, o, o*, which are ſtopped by the plug *p*, made ſufficiently long to reach above the ſurface of the milk; *d*, a large cock, by means of which water can be thrown upon the floor, which is made to ſlope a little from that part; *e, e, e*, are likewiſe cocks fixed at the back parts of the coolers, for the purpoſe of letting in water; *f*, the door, which is latticed in the manner ſhewn at *fig.* 4; *g*, another door, which is commonly made uſe of, but which is made with pannels.

The churning-room is ſhewn at B, in which *h* is the fire-place; *k*, a boiler; and *l*, a large copper, which may be employed for the purpoſe of brewing.

The room for the purpoſe of airing and drying the different ſorts of dairy-utenſils is ſeen at C; and which may likewiſe

wiſe be made uſe of occaſionally as a laundry: over the whole of theſe rooms, apartments for lodging the ſervants may be made with much convenience, where they may be neceſſary.

At *fig.* 5. is given an inſide view of the milk-room of this dairy, at the end Q.

An ingenious dairy-farmer near Liverpool (Mr. Wakefield) has his dairy-houſe conſtructed on this plan, which he finds to anſwer well, and be convenient.

It has been obſerved by Mr. Marſhall, that the rooms of the Wiltſhire dairy-houſes have commonly outer doors, which often open under a ſort of pent-houſe, or incloſed lean-to ſhed; which he conſiders as convenient, and beneficial in affording ſhade and ſhelter, as well as a degree of coolneſs to the whole dairy building. And in particular caſes double doors are had recourſe to, the inſide one being cloſe-boarded, and that on the outſide open-paled, ſomewhat in the manner of a common gate; in this way air is not only freely admitted when the weather is cloſe and warm, but at the ſame time dogs, poultry, &c. guarded againſt. This he thinks an improvement which in all caſes would be of great advantage in the ſummer ſeaſon.

Another conſtruction of farm dairy-houſe which is found uſeful, is ſhewn at *figs.* 6 and 7, in the ſame plate.

Beſides theſe ſorts of dairies, there are others which are chiefly contrived as ornamental buildings, and at the ſame time to be employed for the purpoſe of preſerving milk and butter, in attachment to country reſidences. Theſe ſhould always be planned and contrived with proper taſte, according to the nature and ſituation of the particular place on which they are to be erected, and the circumſtances which regard their management; being careful that they have a ſufficient protection from too much heat in the ſummer ſeaſon.

At *figs.* 1 and 2, in *Plate* XIII. is repreſented an elegant dairy-houſe of this kind, taken from that of his grace the duke of Bedford's, at Woburn Abbey.

DAIRY-*Huſbandry*, is that kind of farm-management which principally relates to the buſineſs of dairying. It is a ſort of huſbandry which is practiſed in ſome of its branches in either a greater or leſs degree, in almoſt every diſtrict of the kingdom; though there are but few in which it has attained to any very high ſtate of excellence. So far as the buſineſs of cheeſe-making is concerned, Cheſhire, Glouceſterſhire, and Wiltſhire, in the ſouthern parts of the iſland, and Ayrſhire in the more northern, are the moſt diſtinguiſhed; while the counties of Eſſex, Cambridge, Dorſet, and Suffolk, are thoſe which are the moſt celebrated for the quality and quantity of their butter. In the northern part of the country, with the exception of the diſtrict noticed above, Mr. Donaldſon conſiders this ſort of huſbandry as ſtill but in its infancy. In order to the carrying on of this kind of huſbandry with full effect and advantage, a ſufficiency of room in the dairy-houſe, for the convenience of performing all the various operations without embarraſſment, in proportion to the number of cows, is eſſential. And beſides this, great knowledge and ſkill in the management, with much attention to cleanlineſs, are requiſite. It has been remarked by the writer already mentioned, that whoever has attended to the operations carried on in a well-conducted buſineſs of this nature, even for a ſhort time, muſt have been ſatisfied that ſkill was as requiſite in the perſon who directed, as attention and alertneſs in thoſe who executed them. In fact, he thinks, it muſt have been evident, that without a knowledge of the beſt modes proper to be adopted, under different circumſtances, and a regularity, method, and prompt attention to their execution, buſineſs of this kind muſt ſoon go into the utmoſt confuſion and diſorder.

In the moſt modern and improved manner of performing this ſort of buſineſs, much regard is likewiſe neceſſary in the farmer to the abundant cultivation of the moſt proper and uſeful kinds of crops of the green ſort, for the food of the cows. See DAIRYING.

DAIRY-*Leaſe*, in *Agriculture*, is that ſort of covenant or agreement under which lands in ſome diſtricts are let, for the purpoſe of being conducted under the dairy ſyſtem. Leaſes of this kind are common in Dorſetſhire and ſome other counties. See LEASE.

DAIRY-*Maid*, in *Rural Economy*, a name applied to the woman who has the chief management of a dairy. This ſort of perſon ſhould always be perfectly regular and ſteady, and at the ſame time fully converſant with all the various proceſſes which are neceſſary to be performed in managing the buſineſs. She is ſometimes denominated dairy-woman. See DAIRYING.

DAIRY-*Man*, a name frequently applied to ſuch men as have dairy-farms, or who are extenſively engaged in the dairy buſineſs.

DAIRY-*Utenſils*, are all ſuch kinds of implements as are employed in the operations of the dairy. It is adviſed by an excellent writer, that, from their uſe, they ſhould in general be made of wood. Though lately, ſome, from an affectation of a ſuperior degree of neatneſs and elegance, have had recourſe to veſſels which are formed of lead or of common earthen-ware, for different uſes in the dairy. But that, as the acid of the milk is found to be capable of decompoſing and diſſolving a portion of lead, braſs, or copper, and with theſe of forming a compound of a poiſonous nature, ſuch ſorts of veſſels muſt be highly pernicious in the buſineſs of the dairy, and of courſe ſhould be baniſhed from ſuch ſituations. And this is equally neceſſary with reſpect to any of the common ſorts of earthen-ware, which, from their being glazed with lead, and the glazing being ſoluble in this ſort of acid, are improper in the ſame degree. It is likewiſe ſuggeſted that caſt-iron has been recommended as a proper ſubſtitute for theſe; but as this metal is alſo ſoluble in the acid of milk, though the ſolution be not poiſonous, yet, as it may affect the taſte of the products of the dairy, and render their qualities different from what they would have naturally been, veſſels of this kind ſhould likewiſe be ſet aſide. In fact, excepting veſſels of true porcelain, or glaſs, which are much too expenſive, it is ſuppoſed there are none that can with propriety be ſubſtituted for wooden ones in this intention. It is obvious that neither china nor glaſs veſſels can ever come into general uſe for dairy purpoſes; nor is it neceſſary for the dairy-farmer to think of any other ſort of diſhes for his milk than thoſe of wood; as theſe, when properly managed, can be kept as clean and ſweet as is needful for ſuch veſſels. This circumſtance is indeed ſo well underſtood, that wooden dairy utenſils are almoſt in general uſe through the whole country, and can of courſe be readily procured in almoſt every ſituation, of ſuch qualities, forms, and conſtructions, as may be the moſt proper under the particular circumſtances of the caſes.

It has lately been found that ſlate is an uſeful material for the purpoſe of making milk coolers, and in ſome of the midland diſtricts the common flag ſlate has been employed in this way. The better ſorts would ſeem, however, to be the moſt proper.

The moſt material utenſils for the purpoſes of the dairy-farmer are milk-ſkeels or creaming-diſhes, milk-pails, milk-cowls or coolers, milk-ſtrainers or ſieves, cheeſe-ladders, lading-diſhes, ſkimming-diſhes, churns, cheeſe-vats and cheeſe-preſſes; the expences of which muſt evidently vary

in

in different ſituations, but in the county of Glouceſter they are ſtated to be as below:

	£	s.	d.
Cheeſe-tub or cowl	1	10	0
Milk-bowl and ſieve	0	3	0
Barrel-churn, iron work and ſtand	2	12	0
Common barrel-churn	2	10	0
Harland's improved barrel-churn	5	5	0
Set of vats, lined with lead	3	3	0
Or, which is better:			
Whey-ſkeel	1	1	0
Milk-ſkeel	0	8	4
Milk pail	0	6	8
Butter-ſkeel	0	5	0
Cheeſe vat	0	3	0
Lade-bucket, or ("gawn") gallon	0	1	6
Skimming-diſh	0	0	10
Pair of butter-ſcales	0	3	0
Braſs pot for warming milk in	2	0	0
Cheeſe-preſs and cloths	10	10	0

Conſequently a ſet of this ſort of utenſils, with one churn, will amount to about twenty or twenty-two pounds; but for a dairy of eighteen or twenty cows, a greater number of ſeveral of the articles will be required, as two whey-ſkeels, three milk-ſkeels, three milk-pails, ſix cheeſe-vats, and two butter-ſkeels.

DAIRYING, the art of making cheeſe, butter, and other dairy products. This is a ſort of management which is only adapted to particular ſituations and circumſtances. See DAIRY.

It has been obſerved as plain and deciſive, "that much of the profit, in this ſort of management, muſt conſtantly depend upon the care and aſſiduity that is beſtowed in conducting the different proceſſes of the buſineſs." And that "it ſhould only be undertaken by thoſe who are capable of paying the moſt minute attention to every department of it; as, unleſs this becomes a fixed and eſtabliſhed principle in the farmer's mind, the chance of ſucceſs is precarious and uncertain. To truſt wholly to common ſervants, in this ſort of buſineſs, is always hazardous, and never to be practiſed where it is carried on to any extent."

The firſt thing to be attended to in an undertaking of this nature is, to chooſe cows of a proper ſort, according to the mode of dairying which is to be practiſed. Among this claſs of animals it is found, by experience, that ſome kinds give milk of a much thicker conſiſtence and richer quality than others; nor is this richneſs of quality neceſſarily connected with the ſmallneſs of the quantity yielded by cows of nearly an equal ſize; it therefore behoves the owner of a dairy to be peculiarly attentive to this circumſtance. In judging of the value of a cow for the purpoſe of the butter dairy, it ought rather to be the quantity and the quality of the cream produced from the milk of her in a given time, than the quantity of the milk itſelf, that ſhould determine the farmer. This is a circumſtance that will be ſhewn in future to be of more importance than is generally imagined: but where cheeſe is the main object, both the quality and proportion ſhould be conſidered. The ſmall cows of the Alderney breed afford the richeſt milk hitherto known; but individual cows in every county may be found, by a careful ſelection, that afford much thicker milk than others; theſe therefore ought to be ſearched for with care, and their breed reared with attention, as being particularly valuable in the intentions of the dairy farmer.

It has been remarked, by an able practical writer, that on "comparing the milk of two cows, in order to judge of their reſpective qualities, particular attention ſhould be paid to the time that has elapſed ſince their calving; as the milk of the ſame cow is always thinner ſoon after calving than it is afterwards, as it gradually becomes thicker, though generally leſs in quantity, in proportion to the time the cow has calved. The colour of the milk, however, ſoon after calving, is richer than it afterwards becomes; but this, eſpecially for the firſt two weeks, is a faulty colour that ought not to be regarded."

The next thing that is neceſſary in this ſort of management is that of being provided with a ſufficiently large and convenient dairy-houſe, whether the object be cheeſe or butter. It ſhould be ſo proportioned to the number of cows, as that there may be ſufficient convenience for performing all the neceſſary operations without embarraſſment; and much attention muſt be paid to cleanlineſs in every thing that relates to it, ſuch as the ſhelves, floors, and different implements which are made uſe of, by daily ſcalding, ſcrubbing, rinſing, and drying, in order to prevent any ſort of acidity taking place; as, without due regard in theſe reſpects, it is impoſſible that the produce can be of ſuperior quality, or ſuch as will keep ſweet and good for any length of time, &c. Cleanlineſs may indeed, ſays Mr. Donaldſon, be ſaid not only to be neceſſary in dairy-huſbandry, but to be the foundation of it, and the moſt eſſential and indiſpenſable part of good management. And it is likewiſe added, that "a farmer may be in poſſeſſion of the moſt valuable breed of cows, and theſe be fed in the richeſt paſtures; but unleſs cleanlineſs prevail in the dairy, his butter or his cheeſe will never ſtand high in general eſtimation." See DAIRY, and DAIRY-*Houſe*.

Next to the ſize and ſituation of the dairy-houſe, and to keeping it and the utenſils clean, is that of ſkill and attention in the general management. In ſhort, without a knowledge of the beſt modes proper to be adopted under different circumſtances, and a regularity, method, and prompt attention to their execution, it is obvious that the buſineſs muſt ſoon run into confuſion, and become unprofitable.

In reſpect to the neceſſary expence of the proper apparatus for this purpoſe, ſuch as churns, milk-pails, cheeſe-cloths, trays or pans, braſs milk-kettle, and boiling copper, &c. excluſive of the cheeſe-preſs, for a dairy of twenty cows, it will moſtly be about fifty pounds. For fuel either coal or wood will anſwer, but faggots preſerved in the ſtack one year are much the beſt material that can be employed.

Sorts of Cows proper for dairying.—It is ſuggeſted that, on the richer and more fertile paſtures, it is probable that the large and middle-ſized breeds of cows may be the moſt beneficial, eſpecially where both cheeſe and butter are made; but in ſuch as do not poſſeſs ſuch a high degree of fertility, the middle and ſmaller breeds may prove more profitable to the dairy-farmer. Some ſuppoſe the long-horned breed not well ſuited for the dairy; but experiments that have been carefully made ſhew that more cheeſe may be produced from the ſame quantity of milk in that breed than in thoſe of the ſhort-horned, as well as more butter from the ſame quantity of cream. And in Ireland, the Craven breed afford more butter than the Holderneſſe. Of the ſmaller breeds, the Alderney, the Suffolk-polled, and the Kiloe or Scotch breeds, may be found the moſt profitable. In the dairies of the Iſle of Wight, as well as thoſe of ſome parts of Hampſhire, the Alderneys prevail much, and are highly eſteemed for butter. Two-thirds of the Suffolk-polled breed, and one-third Alderney, have been recommended as conſtituting an excellent dairy-ſtock, the milk

milk being mixed. And it is added, that, beſides the milk, there is another object to be attended to in forming a cow-ſtock, which is, that they be ſufficiently hardy for the ſituation. In this reſpect the long-horned breed is much ſuperior to the ſhort-horned cattle, from the difference in the thickneſs of their hides; and the Scotch is probably better than either. This breed and the long-horned are therefore the moſt proper for bleak expoſed ſituations. And as many of the mixed-breeds afford excellent milkers, and in moſt of the genuine breeds there are great differences in the individuals, it may be the beſt mode, in order to eſtabliſh a good dairy-ſtock, whether for butter or cheeſe, for the farmer to breed from ſuch cows, of whatever kind they may be, as he has found from experience the beſt for the purpoſe, without being at the trouble of purchaſing the more expenſive breeds. In this caſe good bulls ſhould always be procured, as much is ſuppoſed to depend on the male.

In the vale diſtrict of the Glouceſterſhire dairy-farmers, it is remarked by Mr. Rudge, that thoſe neat cattle are in general kept which have the beſt bags, and which are the moſt likely to afford the largeſt ſupply of milk; the beauty of the animal being of courſe an inferior conſideration, though not wholly overlooked, or neglected; as it is well known, that when the cows are turned off to fatten, thoſe will improve in the moſt ſpeedy manner which have the beſt forms, and conſequently the feweſt coarſe points about them. Although ſeveral varieties have been introduced, in ſome of the old dairies, the Glouceſterſhire breed is ſtill much valued; yet few ſtocks are met with in the county in which there is not ſome mixture, and perhaps ſtill fewer in which the "genuine old ſtock is preſerved." It is added, that this breed differs but little in its general appearances from that of the Glamorganſhire, except in colour, which is a dark red or brown: the bones are fine, the horns of a middling length, white in colour, having a black tip at the ends, the bag by no means fleſhy, but large, affording a great deal of milk, and continuing it for a long time, when on good keep. They have generally a ſlight ſtreak of white running along the back, and conſtantly on the rump end of the tail. They are light in the carcaſe, commonly weighing from eight to nine ſcore the quarter. Their milk is ſaid to be leſs rich in quality than in ſome other breeds.

In the higher vale diſtrict of the ſame county, the improved long-horned ſort from the ſtock of Bakewell and Fowler are in the moſt eſtimation. And on the Cotſwolds, the principal occupiers encourage the ſame kind. Thoſe of the Devonſhire ſort are likewiſe admired by ſome for this uſe in theſe ſituations, being tolerable milkers, good breeders, little conſumers, and excellent feeders. The merits of this breed, as milkers, have probably not been ſufficiently attended to and aſcertained by proper trials; as it has been found, by a perſon in the vicinity of Devizes, Wiltſhire, who, as well as his father before him, has been in the habit of letting cows to men who ſupply that town with milk; and who buys all his cows, and conſequently, can have no partiality for any particular ſort, having, at different times, had all kinds; that the milk-men have uniformly, for the laſt thirty years, given the preference to the Devonſhire ſort at the ſame price, as being, on the whole, the beſt milkers. The Suffolk duns are found in ſome inſtances, in this diſtrict, milking indifferently well, and having much propenſity to fatten.

But a croſs of the Glouceſterſhire breed with that of the long-horned is found, on the experience of an extenſive cow-keeper, who raiſes his own ſtock, to anſwer his purpoſe in the moſt perfect manner; ſome of this ſort of cows affording from two to three gallons or more of milk at each time of milking.

In Cheſhire the cows of the dairy-farmers are compoſed of almoſt all the different ſorts or breeds: and, according to Mr. Holland, ſome perſons prefer "half-bred cattle from the Lancaſhire and preſent Cheſhire; others prefer a breed between the Cheſhire and Lancaſhire; and there are thoſe who prefer a half breed between the Cheſhire and the Welſh; whilſt a croſs between the Lancaſhire and Holderneſſe, and one between the Lancaſhire and Welſh, have alſo their advocates."

It is ſtated, that on the better ſorts of land, "a breed partaking of the ſhort-horned Holderneſſe, or the long-horned Lancaſhire, ſeems to be the moſt prevalent." While, on the inferior ſorts of land, "a middle-ſized ſhort-legged breed, with a croſs of the Welſh in them, are the moſt preferred." In ſhort, the "ſize, form, and production of the udder," is there more attended to than "the figure and bulk of the beaſt." The improved breeds do not appear to have anſwered. The cows that are bred *upon the land* are found, it is ſaid, to anſwer beſt. The cows kept for the purpoſe of the Cheſhire dairies, it is ſuppoſed, will not, on the average, weigh more than ſeven ſcores the quarter, when fattened. It is found and admitted in this diſtrict, that this ſort of ſtock is often kept too long without changing. Where cows are found to be good milkers, they are, indeed, too frequently kept for that uſe, until of little value for any other. "An old cow may give more milk than a young one, but it is not of ſo rich a quality; but this is not the whole, "for an old beaſt will require more and better food to keep her in a condition, and in full milk, than one of a proper age; which is thought to be between four and ten years; but there are many who think that a milker is not in her prime till five years old." See Cow.

In the rearing of young cow-ſtock in this diſtrict, the calves are ſelected from the beſt milkers, a cuſtom which applies to the males as well as the females. Thoſe are chiefly fixed upon which are calved early, as in February, or early in the following month; being, for the firſt three weeks, moſtly kept on the cows; but afterwards ſerved with warm green whey, ſcalded whey and butter milk mixed, or hard fleetings; of which latter ſorts of food, about five quarts conſtitute a meal for each calf: but with the firſt kind or green whey, water is often mixed, with oat-meal, wheat, or bean-flour, in the proportion of about a quart to forty or fifty quarts of the liquid, which is ſufficient for a meal for ten calves. And where flax ſeed is had recourſe to, a quart of the boiled ſeed is given, in addition to the whey, for the ſame number of calves. A gruel made with oat-meal and butter-milk, in mixture with a little ſkimmed milk, is likewiſe ſometimes uſed for the ſame purpoſe. One or other of theſe kinds of food being at firſt ſerved night and morning, but in the latter part of the time only once in the day; as, till the calves are turned out to graſs, and for ſome time afterwards, being, on the whole, continued for about ten weeks. A good paſture is reſerved for the calves in the firſt winter, a little hay being given them night and morning, as ſoon as hard weather takes place. In the ſecond winter they have the dry food of ſtraw, having an open ſhed near the paſture for an occaſional ſhelter, but which is better in the farm-yard. The ſummer following, the heifers, which are two years old offs, are put to the bull. In the third winter, in ſome caſes, they lie out in the fields till near calving time; but in others, which is much better, they are tied up at the ſame time with the milking cows; being, in each caſe, fed with ſtraw, night and morning, till about a month before calving. See Calf-*Rearing*.

Proper kinds of Food for the Cows.

In order to make cows give abundance of milk, and of a good quality, they muſt at all times have plenty of food. Graſs is the beſt food yet known for this purpoſe; and that kind of graſs which ſprings up ſpontaneouſly on rich dry ſoils is the beſt of all. But ſo little attention has hitherto been beſtowed on this ſubject, Dr. Anderſon ſays, that he does not know of any ſet of experiments that have ever yet been made, with a view to aſcertain the effects of any of the natural graſſes that ſpontaneouſly ſpring up in abundance on our fields, either on the quantity or the quality of the milk of cows, and few that have been attempted even with regard to thoſe plants that have been cultivated by art as green forage for them; though it be well known, that ſome particular kinds of plants ſtrongly affect the taſte and alter the quality of particular products of milk. It is, indeed, in all caſes, confidently aſſerted, that old paſtures alone can be made to afford rich butter or cheeſe. This, however, he knows from his own repeated experience to be a popular error, as he has frequently ſeen much richer butter made by one perſon from cows that were fed in the houſe chiefly with cut clover and rye-graſs, than that which was made by others where the cows were fed on very rich old paſtures. Mankind, ſays he, are in general diſpoſed to throw the blame of every failure upon ſome circumſtance that does not reflect on themſelves as bad managers. Hence it is, that the graſs of a farm is often blamed for the want of richneſs of the butter produced upon it; when, if the circumſtances were fully inveſtigated, it would be found to be occaſioned by the unſkilfulneſs of the dairy-maid, or the want of attention in the choice of proper cows.

If, in the management of the cows in the ſummer ſeaſon, the temperature of the climate be ſuch as to permit them to graze at eaſe throughout the day, they ſhould be ſuffered to range on ſuch paſtures at freedom; but, if the cows are ſo much incommoded by the heat, as to be prevented from eating through the day, they ought, in that caſe, to be taken into cool ſheds for protection; where, after allowing them a proper time to ruminate, they ſhould be ſupplied with abundance of green food freſh cut for the purpoſe, and given to them by hand frequently, in ſmall quantities, freſh and freſh, ſo as to induce them to eat it with pleaſure. In very warm climates, where the heat is extremely oppreſſive to cows, and the flies are exceedingly troubleſome, ſheds open on one ſide, the roof being only ſupported there by pillars, would not, the writer thinks, afford them ſuch effectual ſhelter as they would require. In theſe caſes, the ſheds ſhould be walled upon both ſides, and be left open only at the two ends, which, if properly placed, would produce a continued ſtream of air throughout the whole building that would prove highly ſalutary to the cattle. When the heat of the day is over, and they can remain abroad with eaſe, they may be again turned into the paſture, where they ſhould be allowed to range with freedom all night during the mild weather of ſummer. See DAIRY.

It is adviſed by Mr. Rudge, in his account of the management of the cows in Glouceſterſhire, that the dairy farmer ſhould mark out thoſe incloſures for cow-paſtures, which are known either from a previous examination of the herbage, or from the experience of others, to be the moſt ſuited to the purpoſe of producing good milk, without its being of a rank quality.

In the winter keeping of the cows, there are different methods in uſe in different diſtricts; but in the ſouthern parts of the iſland they do extremely well in warm ſheltered yards, with open ſheds, eſpecially when plenty of litter, ſuch as ſtraw, ſtubble, fern, or other ſimilar materials, can be afforded for keeping the whole well bedded. In the northern diſtricts, however, and wherever a proper ſupply of litter cannot be obtained, it is better to have them tied up in ſtalls, with raiſed ſtandings, and ſunk paved floors immediately behind them, for receiving the dung and urine, as by theſe contrivances they may be kept perfectly clean without litter, and at the ſame time be more warm, as two cows may be confined in the ſame ſtall. The ſtalls ſhould be kept conſtantly clean and well ſweeped out.

It has been obſerved to be of great conſequence to the produce of a dairy, that the cows ſhould not drop their calves too early in the ſeaſon. When that happens, they fall off in the quantity of milk in the autumn, when, owing to its ſuperior richneſs, it is more valuable than at any other period. From the end of March to the end of April is the beſt time, in the more northern diſtricts, that a cow can drop her calf, as ſhe ſoon gets into good condition on the early graſs, and yields a greater quantity of milk in the courſe of the ſeaſon than thoſe that calve either conſiderably earlier or later. But in the ſouthern parts of the iſland it is an advantage for them to calve much earlier. In Cheſhire, the above period is the uſual time, only a few cows dropping their calves in January or the following month.

With regard to the management of cows in ſummer, there is a ſimilarity in almoſt every diſtrict. They are uſually kept on the oldeſt paſtures on the farm: when theſe are at a diſtance from the farm-houſe, they are milked on the paſtures; but otherwiſe they are brought home morning and evening for that purpoſe.

But in winter the dry cows, that is, ſuch as do not give milk, are fed on ſtraw in the ſtraw-yard; while thoſe that are in milk, or are near calving, are kept in ſome incloſed paſture, or in ſheds erected for the purpoſe, and maintained chiefly on hay. Where artificial graſſes, turnips, cabbages, or potatoes, are cultivated on a large ſcale, the milch cows have a daily and regular allowance of one or other of theſe ſorts of food during the winter and ſpring months. Potatoes, in particular, are admirable food for cows; as, while they tend to keep them in good condition, the quantity of milk is generally abundant and of good quality, both in reſpect to richneſs and flavour. In ſhort, the dairy-farmer, in every part of the iſland, will find it for his intereſt to be attentive in feeding his cows, whatever the ſort of food may be which he employs. It may be ſtated that of theſe different ſorts of food, the diſtribution for ſummer and winter may be in the following manner:

For the ſummer, red clover, ſainfoin, lucern, burnet, and tares, may be made uſe of with great advantage. But in employing the firſt, great care ſhould be taken to guard againſt injury either to the animals, or the quality of the butter or cheeſe being rendered of a bad kind or flavour by it. On poor chalky hills, the ſecond will be of the greateſt importance to the dairy-farmer. Lucern and tares ſhould always be employed in the way of ſoiling; in which method, where the cows have proper ſhade and ſufficient water, they will be found of the utmoſt uſe, as they afford a very certain ſupply of food and go a great way. Beſides, the cows are found to milk well in this management, where proper attention is beſtowed in the foddering of them. It is ſuppoſed a method that can hardly be too ſtrongly adviſed, by a writer in the thirty-ſecond volume of the Annals of Agriculture. In Mr. Baker's experiments, a middle-ſized cow was found to conſume in the proportion of from ninety to one hundred pounds of green lucern in the courſe of twenty-four hours.

But for winter, hay, ſtraw, cabbages, turnips, carrots, potatoes, cole, malt-grains, &c. ſhould be had recourſe to. The keeping of cows with hay is in general too expenſive to

afford the dairy-man an adequate profit: therefore, in order to leſſen the expence of this ſort of keep, other articles of the green and root kind muſt be had recourſe to; till near the period of calving they may be ſupported on freſh threſhed ſtraw in cribs in the fold-yard, beginning with the worſt, and gradually proceeding to that which is of a better quality. Thoſe in good condition ſhould have the worſt ſtraw; but when it is not of the beſt kind, and the cows are of a valuable ſort, they may be fed once a day with cabbages, turnips, or other ſimilar ſorts of food, in bins for the purpoſe. When within about a month or ſix weeks of calving, a little hay ſhould be given at night, or the allowance of green food increaſed, and on the day of calving they ſhould be confined and have warm water, and for a fortnight after calving be very well fed with both hay and green food, in ſuitable diviſions for the purpoſe. In this view the cabbages are extremely valuable, as the produce on the acre is large, and they afford much milk; but care muſt be taken to pick off all the dead and decayed leaves, which may be given to the young ſtock. A middle-ſized cow will conſume from one to two hundred pounds in a day; but ſeventy is ſuppoſed as much with ſtraw as can be paid for by the produce. In Mr. Dodſworth's trials, as aſſerted by Mr. Young in his ſix months' Tour, a cow of fifty ſtone was found to eat twelve ſtone of this ſort of food in the ſame time. An extent of this kind of crop, proportioned to the dairy, ſhould always be provided. The only objection to turnips as food for milch cows, is their impairing the flavour of the butter; but they are a ſort of food that affords much milk, and without this, or the preceding green food, a large dairy cannot, perhaps, be ſupported to much profit. A larger weight of this food than the former is conſumed in the ſame time.

In reſpect to carrots and potatoes, they are very advantageous ſorts of food for cows, where they are raiſed in great abundance; but even in ſuch caſes they can only be made uſe of with profit as a feed once or twice in a day with other ſorts of food. It is out of the queſtion that a cow could pay for being kept wholly on them. Cole, as being fed off in the field, can only be had recourſe to on the firm dry ſoils; but in ſuch ſituations it is a very profitable crop applied in this way, eſpecially when uſed in ſucceſſion to turnips in the ſpring months. Malt-grains, where they can be had in plenty, are uſeful with other ſorts of food, as producing a large proportion of thin milk. They are conſe-ſequently better for the purpoſes of the milkman than the dairy-farmer.

In the Cheſhire practice of dairying, the uſual dry foods are, according to Mr. Holland, wheat, barley, and oat-ſtraw, hay, and cruſhed oats; the two former kinds of ſtraw are, however, found to make cows go dry much ſooner than the latter: and there is, likewiſe, another effect, which is generally admitted, as depending upon this ſort of keep, which is, that the cream of the cows, which have been thus fed, will require more than the uſual time in churning. Wheat-ſtraw, notwithſtanding, is conſidered much more wholeſome than that of barley, as having leſs of ſuch effects attending it.

Thoſe cows which, at the period of houſing, are not expected to calve until rather late in the ſpring, are fed with oat-ſtraw, and ſometimes hay, while they are milked; having wheat, or barley-ſtraw, afterwards given them. On the contrary, the more forward in calf cows, on being taken up, are put either to wheat or barley-ſtraw, according as circumſtances may ſuit; oat-ſtraw not being given them until the whole of the other ſtraw is conſumed. This, however, depends much on the price of the markets for grain. In either caſe, the ſtraw fodder is continued until about three or four weeks before the time the cows are expected to calve; when they have hay in the proportion of from two to two and a half hundred weights per week each cow. And from the time the cows have calved, until they are turned out to graſs, a portion of ground, or cruſhed oats, is given them twice a day; in general, from twenty to twenty-five quarts per week, to each cow. And chopped ſtraw has frequently been made uſe of in years when hay has been ſcarce, by many farmers, a little corn being mixed with it; two ſmall fodderings of hay being only given in the day, and occaſionally a foddering of ſtraw at night.

In the management of the cows, they are turned out into an *out-let*, (a bare paſture field contiguous to the buildings,) about ten o'clock in the morning, and houſed again about four in the afternoon, throughout the whole winter, in which they have, however, no fodder. It is, indeed, ſuggeſted, as the practice of many dairy-farmers, after the cows have been turned into the out-let or paſture, and begin to manifeſt a diſpoſition to be taken up again, to let them into the yards and be houſed, which, in cold or wet weather, is conſidered a much better practice than that of ſuffering them, as is uſually done, to ſtand ſhivering with cold in the field without ſhelter or protection.

It is ſtated as a matter of much conſequence, to turn the cows out to graſs in good condition, in order, as the term is, that they may "ſtart well;" as where a cow is not in good condition, when turned out to graſs, or has been too much dryed with barley-ſtraw, it is a long time before ſhe gets into full milk.

It is ſtated by John C. Curwen, eſq. in the fifth volume of Communications to the Board of Agriculture, that much advantage has been found in his winter milk-dairy, from the practice of combining ſteamed chaff and ground oil-cake with different ſorts of green food. He has found, from actual experiment, that, when ground and boiled with chaff, the cake is more productive of, and increaſes the quantity of the milk much more than when given in the ordinary manner. And, beſides, there is a conſiderable reduction in the daily expence of the keep. In this way, the keep of a middling-ſized cow is ſtated to be only five-pence halfpenny *per* day, thus:

	ſtones.	*lbs.*	*d.*
Green food - -	2	0 -	$0\frac{1}{2}$
Boiled chaff - -	2	0 -	2
Oil cake ground -	0	2 -	2
Straw from ſix to -	0	8 -	1
Total weight -	4	10 -	$5\frac{1}{2}$

This is a method of feeding cows in the ſtate of milking, which, from its convenience and beneficial effects, is much deſerving of the dairy and cow-farmer's notice. We have ſtated it more in detail in ſpeaking of the buſineſs of the milk-dealer. See Cow-*Keeping*.

In reſpect to the practice of giving green food, or what is termed ſtall-feeding, cows, it is remarked by Mr. Holland, in his Survey of Cheſhire, that the more general uſe of this ſort of food, and that of conſuming it in the ſtalls or yards, are unqueſtionably to be conſidered as the greateſt improvements which have lately taken place in the rural management of that diſtrict. It is a principal object, he ſays, with the dairy-farmer, to increaſe the quantity of his milk, and continue it as long as poſſible; which can be no way more effectually accompliſhed, than by the giving of green food to his cattle. The writer is, indeed, aſſured, by different ſenſible farmers, that by this means the milk may be

continued

continued a month longer in the autumn than could be done by truſting ſolely to the paſtures for the ſupply of food, which is a circumſtance, the importance of which is ſufficiently evident.

The ſorts of green food which are moſt in uſe in this diſtrict are the ox-cabbage, and the Swediſh turnip; the former being moſtly given to the cows, when the after-graſs has been conſumed; though ſometimes in the ſpring, to ſuch cows as have newly calved. And when the paſtures begin to fail, and the after-graſs is not ready, which often happens, eſpecially in dry ſeaſons, they have recourſe to the large ſugar-loaf cabbage. The latter ſort of food or turnips are given to the cattle, while feeding on ſtraw in the winter ſeaſon, and to which, as at this period no cheeſe is made, there can be no objection to their uſe, in the ſuppoſition of their injuring the flavour of the milk.

It is ſtated by the ſame intelligent writer, that, on inquiry, whether the practice of ſtall-feeding the milch cows might not be continued the whole year round, he has found the general opinion of farmers in the diſtrict to be againſt it; though it does not appear, he ſays, that this is founded upon any deciſive trials which have been made with a view to aſcertain the point. It has, however, been ſuggeſted to him as an improvement on the preſent management, to let the cows ſtand in their houſes during the heat of the day, in the ſummer ſeaſon; in which caſe, by giving them a few cabbages or tares, the milk would continue forming, and the cattle be defended from the gad-fly, which, by tormenting them in the fields, frequently injures the milk both in quantity and quality.

In the practice of Mr. Curwen, above alluded to, various other articles of green food were had recourſe to with advantage; ſuch as kohlrabi, red turnip, and cole, the laſt of which was found excellent in promoting a flow of milk, as well as for continuing as a food.

But, whatever kinds of green or ſucculent food may be uſed in the way of feeding dairy-cows, it is remarked, by a late writer, that experience has ſhewn that great advantage may be derived from varying it as much as poſſible, probably on the phyſiological principle, that the novelty of ſtimulus is the moſt powerful in exciting the action and promoting the ſecretions of the ſyſtem. The uſe of day and night paſtures, which is a method employed in ſome diſtricts, may alſo partly depend, it is ſuppoſed, on this principle, and partly on that of better ſhade and water. This mode, according to Mr. Wedge, is in uſe on the Cheſhire dairy-farms.

In Cheſhire, and moſt of the other dairying diſtricts, the cows are uſually taken up into the cow-houſes, ſheds, yards, or other places, towards the middle of November, or as ſoon as the weather begins to ſet in unfavourably. And, as it is ſuppoſed, that when the cows are kept to their milk too long, they are rendered leſs profitable in the following ſeaſon; it is common there to permit them to become dry about ten weeks before the time of their calving. Where they are well fed, this is, however, wholly unneceſſary. See Cow.

It may be remarked, that, in the ſtocking of paſture-lands with cows, it ſhould always be done according to their goodneſs; ſuch graſs-lands as afford, in rent, tythe, and taxes, twenty-ſeven or twenty-eight ſhillings, may ſupport, during the ſummer ſeaſon, in the proportion of a cow of fifty ſtones to an acre and a half, with a few ſheep. But in ſuch as are not worth more than twenty ſhillings, one cow to two acres may be often fully ſufficient. But in this management the rule ſhould be for the paſtures never to be too cloſely ſtocked, or have too many upon them at a time. The intelligent author of the corrected Cheſhire Report on Agriculture, ſtates, that the quantity of land which is ſufficient to keep one cow the whole year, muſt, of courſe, vary with the quality and produce of different ſoils, and the ſize and nature of the beaſt; but that, probably, on the average, having regard to the quantity of hay and corn conſumed, as well as to the graſs and ſtraw, a cow, in the courſe of the year, will conſume the produce of three ſtatute acres of land.

In the care and management of a large dairy of cows, or, what, in moſt of the dairy diſtricts, is termed a *pack* of cows, there is almoſt a conſtant and unabated attention required. In Cheſhire, it is the common rule, at the period of the cows calving, for the cow-man, or maſter of the dairy himſelf, to get up two or three times during the night, to ſee that every thing is right. The racks, cribs, or mangers, are kept conſtantly well cleaned; and great regard paid to the appetites of the different beaſts, in order that the quantity of food may be ſuitably apportioned. And after this, it is not unfrequently a practice with the maſter to go round himſelf, from ſtall to ſtall, immediately before he goes to bed, in order that he may add to or diminiſh the quantity of fodder in the manner that may be neceſſary.

The labour which is neceſſary in the management of dairy buſineſs, muſt evidently differ materally, according to convenience, and various other points of inferior conſideration; but it is ſeldom poſſible for an ordinary dairy-maid to manage a greater number of cows than fourteen or fifteen in any very perfect manner, particularly where the practice of making both butter and cheeſe is had recourſe to. Where a greater number are undertaken, aſſiſtance will be required in the dairy. And, as it is eſſential that the cows ſhould not be kept longer in being milked than an hour, in which time one maid cannot milk more than five or ſix cows, it is evident, that where ſixteen or eighteen cows are kept in the ſtate of milking, it will be neceſſary to have the aſſiſtance of two others at ſuch periods; in which proportion the work of the dairy may be conſtantly regulated.

Milking the Cows.

It has been ſtated, as a general practice, that cows are only milked twice a day; but that, when "abundantly fed, they ſhould, probably, be milked three times a day during the whole of the ſummer ſeaſon: in the morning early, at noon, and in the evening, juſt before night-fall. For, if they be milked only twice in the twenty-four hours, while they have abundance of ſucculent food, they will yield a much ſmaller quantity of milk in the ſame time, than if they were milked three times." It has, indeed, been obſerved, by ſome attentive inquirers, that a cow, in theſe circumſtances, will give nearly as much milk at each time of milking, if milked three times, as if ſhe were milked only twice. This is, however, a ſtatement which has not probably been aſcertained by the teſt of experiment. But it is ſuppoſed, there is no doubt of their giving more, though how much more has not been fully decided. Nor has it been aſcertained whether it would be advantageous, in any caſe, to have the cows milked four times, or oftener; or what effect frequent milking produces on the quality of the milk. In ſpeaking of the practice of procuring milk for the purpoſe of ſale in large towns, ſome experiments were ſtated on this ſubject. See Cow-*Keeping*.

In the choice of perſons for milking the cows, great caution ſhould likewiſe be employed: for, if that operation be not carefully and properly performed, not only the quantity of the produce of the dairy will be greatly diminiſhed, but its quality alſo very highly debaſed; for, if all the milk be not thoroughly drawn from a cow when ſhe is

milked, that portion of milk which is left in the udder ſeems to be gradually abſorbed into the ſyſtem, and nature generates no more than to ſupply the waſte of what has been taken away. If this leſſened quantity be not again thoroughly drawn off, it occaſions a yet farther diminution of the quantity of milk generated; and ſo on it may be made to proceed in perpetual progreſſion from little to leſs, till none at all is produced. In ſhort, this is the practice in all caſes followed, when it is meant to allow a cow's milk to dry up entirely, without doing her hurt. In this manner, therefore, the profits of a dairy might be wonderfully diminiſhed; ſo that it behoves the owner to be extremely attentive to this circumſtance if he wiſhes to avoid ruin. It ought to be a rule without an exception, never to allow this important department to be entruſted, without controul, to the management of hired ſervants; as cows ſhould always be treated with great gentleneſs, and ſoothed by mild uſage, eſpecially when young and tickliſh, or when the paps (teats) are tender: in which laſt caſe the udder ought to be fomented with warm water before milking, and touched with the greateſt gentleneſs, otherwiſe the cow will be in danger of contracting bad habits, becoming ſtubborn and unruly, and retaining her milk ever after. A cow never lets down her milk pleaſantly to the perſon ſhe dreads or diſlikes. The udder and paps ſhould always be waſhed with clean water before milking; but care ſhould be taken that none of that water be admitted into the milking-pail. The importance of this is ſtill more manifeſt from many circumſtances which take place in reſpect to milk; and many of which, in ſo far as they reſpect the dairy, have been but little, if at all, noticed, though they have evidently much effect on the different proceſſes and products reſulting from them. See MILK and COW-*Keeping*.

In caſes where two milkings are only practiſed in the courſe of the day, they ſhould be performed about five o'clock in the morning, and about ſix at night. And it is a practice which the dairy-maid or man ſhould conſtantly attend to with exactneſs, to examine the cows carefully after the milkers, where they cannot be fully depended upon, in order to aſcertain that the operation has been effectually performed; as, under the contrary circumſtances, loſs may not only be incurred in the richeſt part of the milk, but the cows rendered dry before the proper period, and at the ſame time made more liable to diſeaſes of the udder.

The average quantity of milk which is afforded by cows is very different in different circumſtances, depending materially on paſtures, ſeaſon, and the mode of winter keeping; but in the principal cheeſe diſtricts, from eight to twelve quarts per day is the uſual proportion; though many cows will give twice theſe quantities for ſhort periods; but when cows give more than the firſt of theſe quantities at a meal, it is remarked that they "either go off their milk much ſooner, or elſe their milk has leſs richneſs in it, than that of others which do not give ſo large a quantity."

Managing of the Milk, for Butter.

In reſpect to the managment of the milk, it may be obſerved to be a circumſtance of the utmoſt importance to the ſucceſs of the dairy-buſineſs, as upon its being properly executed, the profit of the farmer muſt in a great meaſure depend.

It is the commor practice in moſt of the dairy-diſtricts of the kingdom to paſs the milk, as ſoon as it has been brought from the cows, through ſome ſort of ſtrainer, which is uſually a hair or fine wire ſieve, firmly ſecured in the bottom of a large bowl formed of wood; or where the dairy is extenſive, a ſort of trough fixed conveniently for the purpoſe, ſo as to diſcharge the milk into the trays or other veſſels deſtined for the purpoſe of receiving it. See DAIRY-*Houſe*.

The trials which have hitherto been attempted, in order to aſcertain or determine the moſt beneficial manner of diſpoſing the milk, with the view of producing and throwing up the cream in the greateſt abundance, and the ſhorteſt ſpace of time, have been but few, and thoſe made without much accuracy or correctneſs. But as the oily portion of the milk which conſtitutes the butter ſeems to be diffuſed throughout the whole ſubſtance of the milk, and to be entangled among the ſerous and caſeous particles of it, in ſuch a manner as to be thrown up to the ſurface only in conſequence of its having a leſs ſpecific gravity than the part which is commonly denominated milk, while in the ſtate of reſt; it would appear that the method of placing it, which is moſt adapted to the proper, full, and expeditious creaming, is that of depoſiting it in very ſhallow baſons, pans, trays, or leads, ſo as not to ſtand at a greater depth than about three inches; as under ſuch circumſtances, there will be the leaſt reſiſtance afforded to its riſing, and at the ſame time the greateſt poſſible extent of ſurface for it to collect upon. And experience has ſhewn, in ſome of the beſt butter dairy-diſtricts, that, in this way, a large proportion of cream is afforded, and at the ſame time, in conſequence of the more expeditious manner in which the milk cools, the tendency of it to run into the ſtate of acidity, in warm ſeaſons, is much checked and reſtrained.

It has not been ſhewn, as the reſult of experiments, what kind of ſubſtance is the moſt proper and advantageous in this intention, for the forming of ſuch veſſels of; though there can be little doubt, but that wood, ſtone, or ſlate, are any of them preferable to lead, not only from their being capable of being kept clean with much greater facility, and being leſs apt to fur, but from their being more ſafe, in conſequence of their not being liable to be acted upon by the acid of the milk.

The following obſervations have been made by doctor Anderſon with reſpect to milk: firſt, that, of the milk that is drawn from any cow at one time, that which comes off at the firſt is always thinner, and of a much worſe quality, than that which comes afterwards; and the richneſs goes on, continually increaſing, to the very laſt drop that can be drawn from the udder at that time. Few perſons, ſays he, are ignorant, that milk which is taken from the cow laſt of all at milking, which is often provincially called ſtroakings, is richer than the reſt of the milk; but very few are aware of the greatneſs of the diſproportion between the quality of the firſt and the laſt drawn milk from the ſame cow at one milking. The following facts reſpecting this circumſtance were, he ſays, aſcertained by him many years ago, and have been confirmed by many ſubſequent experiments and obſervations. Having taken ſeveral large tea-cups exactly of the ſame ſize and ſhape, one of theſe tea-cups was filled at the beginning of the cow's milking, and the others at regular intervals till the laſt, which was filled with the dregs of the ſtroakings. Theſe were each weighed, the weight of each cup being ſettled ſo as to aſcertain that the quantity of milk in each was preciſely the ſame; and from a great number of experiments, frequently repeated with many different cows, the reſult was in all caſes thus:—the quantity of cream obtained from the firſt drawn cup was, in every caſe, much ſmaller than from that which was laſt drawn; and thoſe between afforded leſs or more as they were nearer the beginning or the end. It is unneceſſary here to ſpecify, he ſays, theſe intermediate proportions; but it is proper the reader ſhould be informed, that the quantity of cream obtained from the laſt drawn cup, from ſome cows, exceeded that from the firſt

In the proportion of ſixteen to one; in other cows, however, and in particular circumſtances, the diſproportion was not quite ſo great, but in no caſe did he find it fall ſhort of the rate of eight to one. Probably, upon an average of a great many cows, it might be found to run as ten or twelve to one. And that in the next place, the difference in the quality of the cream, however, obtained from theſe two cups, was much greater than the difference in the quantity. In the firſt cup the cream was a thin tough film, thinner, and perhaps whiter, than the paper on which he writes: in the laſt, the cream was of a thick butyraceous conſiſtence, and of a glowing richneſs of colour, that no other kind of cream is ever found to poſſeſs. And laſtly, that the difference in the quality of the milk, that remained after the cream was ſeparated, was, perhaps, ſtill greater than either, in reſpect of the quantity or the quality of the cream. The milk in the firſt cup was a thin blueiſh liquid, like as if a very large proportion of water has been mixed with ordinary milk; that in the laſt cup was of a thick conſiſtence and yellow colour, more reſembling cream than milk, both in taſte and appearance. From this important experiment it appears, he ſays, that the perſon who, by bad milking of his cows, loſes but half a pint of his milk, loſes in fact about as much cream as would be afforded by ſix or eight pints at the beginning; and loſes, beſides, that part of the cream which alone can give richneſs and high flavour to his butter, when that is the object of the dairy-man. Many other uſeful corollaries may, he ſays, be drawn from it, ſome of which will occur in the ſequel.

In the ſecond place, he ſays, that if milk be put up in a diſh, and allowed to ſtand till it throws up cream, that portion of cream which riſes firſt to the ſurface is richer in quality, and greater in quantity, than what riſes in a ſecond equal portion of time; and the cream that riſes in the ſecond interval of time is greater in quantity, and richer in quality, than that which riſes in a third equal ſpace of time; and that of the third than the fourth, and ſo on: the cream that riſes decreaſes in quantity and declines in quality continually, as long as any riſes to the ſurface. Theſe experiments not having been, in this caſe, made with ſo much accuracy as in the former, he has not been able to aſcertain the difference in the proportion that takes place in equal portions of time; but they have been ſo often repeated as not to leave any room to doubt the fact; and it will be allowed to be a fact of no ſmall importance in the management of the dairy. It is not certain, however, but that a greater quantity of cream may upon the whole be obtained from the milk, by taking it away at different times; but the proceſs is ſo troubleſome, as not to be counterbalanced by the increaſed quantity obtained: if, indeed, an additional quantity be thus obtained, which is not as yet, he thinks, fully certain.

In the third place, it is added, that thick milk always throws up a ſmaller proportion of the cream it actually contains to the ſurface than milk that is thinner; but that cream is of a richer quality; and if water be added to that thick milk, it will afford a conſiderable greater quantity of cream than it would have done if allowed to remain pure; but its quality is at the ſame time greatly debaſed. This is, he believes, a fact that every perſon attentive to a dairy muſt have remarked; but he has never heard of any experiment that could aſcertain either the preciſe amount of the increaſed quantity of cream that might thus be obtained, or of the ratio in the decreaſe of its quality: but it aſcertains the effects, at leaſt, of mixing water with milk in a dairy; and the knowledge of this fact will enable attentive perſons to follow that practice which they think will beſt promote their own intereſt.

In the fourth place, that milk which is put into a pail, bucket, or other proper veſſel, and carried in it to any diſtance, ſo as to be much agitated, and in part cooled, before it be put into the milk-pans to ſettle for cream, never throws up ſo much nor ſo rich cream, as if the ſame milk had been put into the milk-pans directly after it was milked. In this caſe, it is believed, he ſays, that the loſs of cream will be nearly in proportion to the time that has elapſed, and the agitation it has ſuſtained, after being drawn from the cow; but he is not yet in poſſeſſion of any experiments that ſufficiently aſcertain how much is to be aſcribed to the time and the agitation taken ſeparately. From the whole of the facts and circumſtances, the ingenious author thinks the following corollaries ſeem to be clearly deducible. 1ſt. That it is of importance that the cows ſhould be always milked as near the dairy as poſſible, to prevent the neceſſity of carrying and cooling the milk before it be put into the diſhes: and as cows are much hurt by far driving, it muſt be a great advantage in a dairy-farm to have the principal graſs-fields as near the dairy, or homeſtead, as poſſible. 2dly. That the practice of putting the milk of all the cows of a large dairy into one veſſel, as it is milked, there to remain till the whole milking be finiſhed, before any part of it is put into the milk-pans, ſeems to be highly injudicious, not only on account of the loſs that is ſuſtained by agitation and cooling, but alſo, more eſpecially, becauſe it prevents the owner of the dairy from diſtinguiſhing the good from the bad cow's milk, ſo as to ſeparate theſe from each other, where it is neceſſary. He may thus have the whole of his dairy-product greatly debaſed by the milk of one bad cow for years together, without being able to diſcover it; as the author once ſaw a cow that gave milk which could never be made to yield any butter at all, though it had the appearance of being very rich milk. The perſon who ſold that cow had had her ſeveral years, along with a good many others, without having ſo much as had any ſuſpicion of this peculiarity. It was only diſcovered when ſhe came into the poſſeſſion of a perſon who had but one cow. A better practice, therefore, would be, to have the milk drawn from each cow ſeparately, put into the creaming-pans as ſoon as it is milked, without being ever mixed with any other. Thus would the careful *dairy* or perſon that ſuperintends the dairy, be able on all occaſions to obſerve the particular quality of each individual cow's milk, as well as its quantity, and to know with preciſion which of his cows it was his intereſt to diſpoſe of, and which of them he ought to keep and breed from. 3dly. That if it be intended to make butter of a very fine quality, it will be adviſable in all caſes to keep the milk that is firſt drawn ſeparate from that which comes laſt; as it is obvious, that, if this be not done, the quality of the butter will be greatly debaſed, without much augmenting its quantity. It is alſo obvious, that the quality of the butter will be improved in proportion to the ſmallneſs of the proportion of the laſt-drawn milk that is retained, ſo that thoſe who wiſh to be ſingularly nice in this reſpect will do well to retain only a very ſmall proportion of the laſt-drawn milk.

The writer here further remarks, that to thoſe owners of dairies who have profit only in view, it muſt ever be a matter of trial and calculation, how far it is expedient for them to carry the improving of the quality of their butter, at the expence of diminiſhing its quantity. In different ſituations, prudence will point out different kinds of practice as moſt eligible; and all perſons muſt be left, after making accurate trials, to determine for themſelves. It is likewiſe a conſideration of no ſmall importance, to determine in what way the inferior milk that is thus to be ſet apart, where fine butter is wanted, can be employed with the greateſt profit. In the

the highlands of Scotland, he ſays, they have adopted, without thinking of the improvement of their butter, a very ſimple and economical practice in this reſpect. As the rearing of calves is there a principal object with the farmer, every cow is allowed to ſuckle her own calf with a portion of her milk, the remainder only being employed in the dairy. To give the calf its proportion regularly, it is ſeparated from the cow, and kept in an incloſure along with all the other calves belonging to the ſame farm. At regular times cows are driven to the door of the calves' incloſure, where the young ones fail not to meet them. Each calf is then ſeparately let out, and runs directly to its mother, where it ſucks till the dairy-maid judges it has had enough, when ſhe orders it to be driven away, having previouſly ſhackled the hinder legs of the mother, by a very ſimple contrivance, to oblige her to ſtand ſtill. Boys drive away the calf with ſwitches, and return it to the incloſure, while the dairy-maid milks off what was left by the calf. Thus they proceed till the whole of the cows are milked, and thus do they obtain a ſmall quantity of milk, it is true, but that milk of an exceeding rich quality; which, in the hands of ſuch of the inhabitants as know how to manage it, is manufactured into the richeſt marrowy butter that can be any where met with. This richneſs of the Highland butter is, he obſerves, univerſally aſcribed to the old graſs the cows feed upon in their remote glens; but it is in fact chiefly, he conceives, to be attributed to the practice here deſcribed, which has long prevailed in theſe regions; and perhaps in ſome meaſure to the nature of the beaſt. Whether a ſimilar practice could be economically adopted elſewhere, he does not take upon him to ſay; but doubtleſs other ſecondary uſes might be found for the milk of inferior quality; on ſome occaſions, it might be converted into butter of an inferior quality; on others, it might be ſold ſweet, where the ſituation of the farm is within reach of a market town; on other occaſions, it might be converted into cheeſes, which, by being made of ſweet milk, would be of a very fine quality, if carefully made; and ſtill other uſes might be deviſed for its application. One mode of managing milk, by means of which the inferior kinds of it might, on many occaſions, eſpecially within reach of towns, be diſpoſed of to great advantage, is however mentioned, which is this: Take common ſkimmed-milk when it has begun to turn ſour, put it into an upright ſtand churn, or a barrel with one of its ends out, or any other ſimilar convenient veſſel. Heat ſome water, and pour it into a tub that is large enough to contain with eaſe the veſſel in which the milk was put. Set the veſſel containing the milk into the hot water, and let it remain there for the ſpace of one night. In the morning it will be found that the milk hath ſeparated into two parts; a thick cream-like ſubſtance which occupies the upper part of the veſſel, and a thin ſerous watery part, that remains in the bottom; draw off the thin part (called wigg) by opening a ſtop-cock placed for the purpoſe cloſe above the bottom, and reſerve the cream for uſe. Not much leſs than the half of the milk is thus converted into a ſort of cream, which, when well made, ſeems to be as rich and fat as real cream itſelf, and is only diſtinguiſhable from that by its ſourneſs. It is eaten with ſugar in ſome places, and is eſteemed a great delicacy, and uſually ſells at double the price of freſh ſkimmed milk. It requires practice, however, to be able to make this nicely; the degree of the heat of the water, and many other circumſtances, greatly affecting the operation. Theſe things practice beſt diſcovers.

And 4thly, that if the quality of the butter be the chief object attended to, it will be neceſſary not only to ſeparate the firſt from the laſt drawn milk, but alſo to take nothing but the cream that is firſt ſeparated from the beſt milk, as it is this firſt riſing cream alone that is of the prime quality. The remainder of the milk, which will be ſtill ſweet, may be either employed for the purpoſe of making ſweet milk-cheeſes, or it may be allowed to ſtand, to throw up cream for making butter of an inferior quality, as circumſtances may direct.

5thly. That, from the above facts, we are enabled to perceive that butter, of the very beſt poſſible quality, can only be obtained from a dairy of conſiderable extent, when judiciouſly managed; for, when only a very ſmall portion of each cow's milk can be ſet apart for throwing up cream, and when only a very ſmall proportion of that cream can be reſerved as of the prime quality, it follows, that, unleſs the quantity of milk was, upon the whole, very conſiderable, the quantity of prime cream produced would be ſo ſmall, as to be ſcarcely worth the while of manufacturing ſeparately.

6thly. That, from theſe premiſes, we are alſo led to draw another concluſion, extremely different from the opinion that is commonly entertained on this ſubject; *viz.* That it ſeems probable that the very beſt butter could only be with economy made in thoſe dairies where the manufacture of cheeſe is the principal object. The reaſons are obvious: if only a ſmall portion of the milk ſhould be ſet apart for butter, all the reſt may be made into cheeſe, while it is yet warm from the cow, and perfectly ſweet; and if only that portion of cream which riſes during the firſt three or four hours after milking is to be reſerved for butter, the rich milk, which is left after that cream is ſeparated, being ſtill perfectly ſweet, may be converted into cheeſe with as great advantage nearly as the new-milked milk itſelf. But as it is not probable that many perſons could be found who would be willing to purchaſe the very fineſt butter made in the manner above pointed out, at the price that would be ſufficient to indemnify the farmer for his trouble in making it, theſe hints are thrown out merely to ſatisfy the curious in what way butter poſſeſſing this ſuperior degree of excellence may be obtained, if they chooſe to be at the expence: but for an ordinary market, he is ſatisfied, from experience and attentive obſervation, that if, in general, about the firſt drawn half of the milk be ſeparated at each milking, and the remainder only be ſet up for producing cream; and if that milk be allowed to ſtand to throw up the whole of its cream, even till it begins ſenſibly to taſte ſouriſh; and if that cream be afterwards carefully managed, the butter thus obtained will be of a quality greatly ſuperior to what can uſually be obtained at market, and its quantity not conſiderably leſs than if the whole of the milk had been treated alike. Among other reaſons that induced him to ſeparate about the half of the milk is the following. Whilſt he was employed in making experiments on milk, it chanced, that among his cows there was one which had miſſed having a calf that ſeaſon, and ſtill continued to give milk. Her milk, as is not uncommon in theſe circumſtances, taſted ſenſibly ſalt. On trying the different parcels of that milk, however, it was perceived that the firſt-drawn milk was extremely ſalt to the taſte, and that the laſt was perfectly ſweet. On an after-trial, made with a view to aſcertain what proportion of the milk was ſalt, it was found that the ſaltneſs decreaſed gradually from the beginning, and was entirely gone when near the half of the milk was drawn off, ſo that all the laſt-drawn half of the milk was quite ſweet. He intended to have tried if other nauſeous taſtes that ſometimes affect milks, ſuch as that from turnips, cabbages, &c. was particularly confined to the firſt-drawn milk or not; but other avocations prevented him from aſcertaining this fact. He, therefore, concludes,

concludes, that this is the practice which he thinks moſt likely to ſuit the frugal farmer, as his butter, though of a ſuperior quality, could be afforded at a price that would always enſure it a rapid ſale. In the extenſive and ſucceſsful practice of ſome butter dairies, it has been found beneficial, in the winter ſeaſon, to add hot water to the milk immediately as it comes from the cow, in the view of making it yield the cream more fully.

With regard to the degree of heat which is neceſſary for the due ſeparation of the cream, few trials have yet been made; but from what has been done, it is believed by Dr. Anderſon, that when the heat is from 50 to 55 degrees on Fahrenheit's thermometer, the ſeparation of the cream from milk, which is the moſt important operation of the dairy, proceeds with the greateſt regularity, and in the moſt favourable manner. It is, therefore, thought that this will be found to be the temperature that ought to be aimed at: but it is not pretended to decide with preciſion; a conſiderable degree of latitude, in this reſpect, may, perhaps, be allowable; from the beſt obſervations, it ſeems to be highly probable that when the heat exceeds 60 degrees, the operations become difficult and dangerous; and when it falls below the 40th degree, they can ſcarcely be carried forward with any degree of economy or propriety. Till farther experiments, therefore, aſcertain the exact point, it may, he thinks, be taken as a ſafe rule that the heat ſhould be kept up, if poſſible, between the 50th and 55th degree; and, in order to aſcertain this, a thermometer, graduated by Fahrenheit's ſcale, ſhould be hung up perpetually in the milk-houſe, to give notice to the owner of any alterations in the temperature of the air that may affect his intereſt.

It has not yet been aſcertained in any ſatisfactory manner, what is the length of time that the milk ſhould remain in the pans or trays, in order to afford the cream in the largeſt quantity before it is ſeparated. Some ſuppoſe that this ſhould depend upon the particular views of the dairy-man, and the degree of heat that is preſent at the period. In a moderately warm temperature of the air, if very fine butter be intended, it ſhould not be allowed, the Doctor ſays, to ſtand more than ſix or eight hours. For ordinary good butter it may ſafely be let ſtand twelve hours or more; but where the dairy is ſo large as to afford a ſufficient quantity of cream, and where the very beſt butter is intended, (the milk being to be converted to ſome other uſe while yet ſweet,) it may be ſeparated after ſtanding only two, three, or four hours. "In the general management of dairies, milk is, he ſays, never ſkimmed more than once; but in the county of Eſſex, as well as ſome others, it is the common practice to ſkim it three or four times, or till no more cream riſe. In the buſineſs of ſeparating the cream from the milk there are two methods purſued: that moſt generally practiſed is to ſkim it off with a ſkimming-diſh, made either of tin or of wood. The other is adopted only where leads or ciſterns are common, and where the milk is uſed for making ſkim milk or two-meal cheeſes; and, of courſe, before it coagulate, or acquire any degree of acidity. Towards the centre of the ciſtern there is a hole or pipe, which, before the milk be put in, is ſhut with a wooden ſtopper that riſes ſeveral inches above the ſurface of the milk. When the milk is wanted for any of the purpoſes above-mentioned, a veſſel is placed under the pipe, and the ſtopper drawn up ſo far as to allow the milk to run off, but ſo gently, as that the ſurface of the cream may not be broken. The milk being thus gradually drained off, the cream ſinks down, till it at laſt reſts on the ciſtern; when the veſſel containing the milk being removed, and another placed for the purpoſe of receiving the cream, the ſtopper is entirely drawn out, and the cream drops into the veſſel." The firſt of theſe methods, the Doctor ſays, "requires a dexterity of manipulation that can be acquired by practice alone; but it is of great importance to the ſucceſs of the dairy that it be well done; for, if any part of the cream be left, the quantity of butter will be diminiſhed, and if any part of the milk be taken, its quality will be debaſed."

After the cream has been "thus ſeparated from the milk, it ought to be immediately put into a veſſel by itſelf, to be kept till a proper quantity be collected for being made into butter: and no veſſel can be better adapted for that purpoſe than a firm neat-made wooden barrel, in ſize proportioned to the extent of the dairy, open at one end, with a lid exactly fitted, to cloſe it. In the underpart of this veſſel, cloſe to the bottom, ſhould be placed a cock, for drawing off from time to time any thin ſerous part of the milk that may chance to be generated; for ſhould this be allowed to remain, it acts upon the cream in a powerful manner, and greatly diminiſhes the richneſs of the quality of the butter. The inſide of the opening of the barrel ſhould be covered with a bit of cloſe fine wire, or ſilver gauze netting, to keep back the cream, while the ſcum is allowed to paſs; and the barrel on its ſtand ſhould be inclined a little forward in the top, to allow the whole to run off in a perfect manner.

In reſpect to the length of time it may be kept in theſe veſſels with advantage before it is churned, it is very different in different caſes; but about Epping, in Eſſex, according to Mr. Abdey, as ſtated in the Annals of Agriculture, which has been long in high repute for the ſuperior quality of its butter, "the cream is ſeldom kept above three or, at furtheſt, four days," but always till there is a certain degree of acidity in it, either natural or artificial, as without that they cannot inſure a good churning of butter; ſome keep a little old cream for this uſe, others uſe a little rennet, and ſome a little lemon juice. And it was practiſed in a large dairy in Suffolk, which had a high character for making butter of a ſuperior quality, when the butter was to be ſent directly to market, to churn the cream the ſecond or third day; but when it was to be ſalted, to keep it a day or two longer, or till it had acquired a certain degree of acidity. The dairy-woman, who had had a long and extenſive experience, accounted for her conduct in this reſpect, by obſerving that butter made from freſh cream was much better and pleaſanter to the taſte, but that it would not take in the ſalt ſo well, or keep ſo long, as that made from cream that had been longer kept. It has been ſuggeſted by Dr. Anderſon, that thoſe "who have had little experience in the dairy, believe that no butter can be of the fineſt quality, except that which has been made from cream that has not been kept above one day; but this is a very great miſtake. So far indeed is this opinion from being well founded, that it is in very few caſes that even tolerably good butter can be obtained from cream that is not more than one day old. The ſeparation of butter from cream only takes place after the cream has attained a certain degree of acidity. If it be agitated before that acidity has begun to take place, no butter can be obtained, and the agitation muſt be continued till the time that the ſourneſs is produced; after which the butter begins to form. In ſummer, while the climature is warm, the beating may be, without very much difficulty, continued, until the acidity be produced, ſo that butter may be got; but in this caſe the proceſs is long and tedious, and the butter is, for the moſt part, of a ſoft conſiſtence, and tough and gluey to the touch. If this proceſs be attempted during the cold weather in winter, butter can ſcarcely be in any way obtained, unleſs by the application of ſome great

degree of heat, which ſometimes aſſiſts in producing a very inferior kind of butter, that is white, hard, and brittle, with very little taſte, and almoſt unfit for any culinary purpoſe whatever." The intelligent dairy-farmer ſhould not of courſe attempt to imitate this practice, but allow his cream to remain in the veſſel appropriated for keeping it, until it has acquired that proper degree of acidity that fits it for being made into butter with great eaſe, and by a moderate degree of agitation; by which proceſs only very fine butter can be prepared. It is added that the exact length of time cream may be kept, before it attains the preciſe degree of acidity that is neceſſary to form the very beſt butter, and after that period before its quality be ſenſibly diminiſhed, has not yet been well aſcertained by any experiment that can be fully depended upon: "So little nicety," ſays the above writer, "has been obſerved in this reſpect by practical dairy-farmers, even thoſe who have a high reputation for making good butter, that few of them ever think of obſerving any preciſe rule in this reſpect, with regard to the different portions of their cream, ſeeing they in general make into butter all the cream they have collected ſince the former churning, ſo that the new and the old is all beaten up together; and he can find nothing like an uniform rule eſtabliſhed among them, as to the time that ſhould intervene between one churning and another, that being uſually determined by local or accidental circumſtances. He is himſelf inclined to believe, that if the cream be carefully kept, and no ſerous matter allowed to lodge about it, a very great latitude may ſafely be admitted in this reſpect;" and though the exact length of time has not been determined, "it is certain that cream which has been kept three or four days in ſummer, is in excellent condition for being made into butter;" and he is inclined to believe, that from three days to ſeven may be found in general the beſt time for keeping cream before churning; though, if circumſtances make it neceſſary, a conſiderable latitude in this reſpect may be allowed. If the farmer has ſuch a quantity of cream as may be worth his while to churn once every day, there is nothing to prevent him from doing it. He has only to provide a ſeparate veſſel for holding the cream for each day he means it ſhould ſtand before churning; if three days, three veſſels; if four days, four veſſels; and ſo on. Thus he may churn every day cream of three days old, or of four; or any other number of days old that he may incline. In the ſame manner, if it were found that the cream of two, of three, or of a greater number of days gathering, was required to make a proper churning, it might be eaſy ſo to contrive it as to churn every day, as will be obvious to any one who thinks upon the ſubject. In this manner, the operations of dairying may be kept perfectly regular and eaſy.

It is not an unuſual practice in Cheſhire to churn the whole of the milk without ſeparating any part of the cream from it. After milking, it is cooled in quantities according to the heat of the weather in ſummer, in ſeparate veſſels for the purpoſe, and a certain degree of acidity brought on. This is effected previouſly to its being put together, which is the caſe from time to time, in earthern cream mugs or jars. In theſe jars, which contain from four to ſix gallons each, it is ſuffered to ſtand till it is what is there termed *carved*, or clotted in a proper degree for churning, which is judged ſufficiently the caſe when the whole is coagulated and has acquired a ſmall degree of acidity, which commonly, in warm weather, takes place in the courſe of a day or two. And the cream is warmed in the winter by the mugs being ſet by the fire, in order to forward the *carving* or clotting of the milk. If the milk ſhould not have been ſufficiently cooled in warm weather, before it was put to the former meal, or if in the winter ſeaſon the mugs have been ſet too near the fire, the whole maſs becomes curdled, making, as they phraſe it, "go all to whig and whey," and to afterwards heave in the mug. And further, if in ſummer, or when kept in a warm ſituation, the milk is not churned within a day, or a little more, after it is ſufficiently *carved*, a kind of fermentation and heaving likewiſe comes on; in both caſes the butter will be rank and ill-taſted; nor will the milk afford ſo much butter, as when it has been properly managed and churned in due time. In this way they obtain a greater quantity of butter, though of an inferior quality. By careful management, however, eſpeciallv if a portion of the firſt-drawn milk be ſeparated, very good butter may, it is ſuppoſed, be obtained; but the practice, on many accounts, is not to be adviſed.

In the ſummer ſeaſon, or while the cows are fed on graſs, it is not requiſite to give butter that colour which is agreeable to the purchaſer or conſumer, by means of art; but in winter and ſpring months, the dairy people find it neceſſary, in order to pleaſe their cuſtomers, to alter that tallowy appearance, which is natural to butter in theſe ſeaſons, which is effected by means of a little arnotto, which, after being reduced by trituration to as fine a powder as poſſible, is blended and incorporated with the cream before it is put into the churn, in ſuch proportions as, from experience, has been found neceſſary for giving the requiſite appearance or colour to the product.

After thus deſcribing the different preparatory ſteps which are neceſſary to be regarded in the butter dairy, it will be proper to detail the practice which is uſually purſued in making that important article.

Making of Butter.

This is a product of the dairy, in the manufacture of which great nicety and attention are requiſite, as has been ſeen above, in order to have it of the beſt quality. It has been ſtated, that there are two methods purſued with the milk, with the view of procuring the butter from it. In one, the oily part or cream is ſeparated from the milk, and in that ſtate converted into butter, by means of agitation, in a proper veſſel; while in the other, the whole of the milk is ſubjected to the proceſs. The particular advantages of theſe different methods of practice have not been fully ſtated, nor have any comparative experiments, which we know of, been inſtituted with the view of aſcertaining, which of them has the ſuperiority in reſpect to the quantity and quality or flavour of the butter which is obtained. It is a point of management which, however, deſerves attention, and which is capable of being decided without much difficulty or expence in the experiments. The beſt mode has always appeared to us, to be that of uſing the cream in the ſtate of ſeparation from the milk, both in the convenience and the goodneſs of the butter.

Churning.

It is extremely evident that while the oily or butyraceous part of milk is in the ſtate of cream, the particles are not in a ſufficiently concentrated ſtate for producing an uniform ſubſtance, on account of the large portion of interpoſing ſerous fluid; conſequently, in order to produce butter, it is neceſſary to force out this fluid by means of continued agitation, a proceſs which is termed *churning*. In which the cream or milk, after being ſeparated and prepared in the above manner, is put into the churn of the kind which is preferred, as there are ſeveral different ſorts employed in different places and agitated for ſome time, in order to effect the ſeparation of the butter. And "from the practice gene-

rally

rally adopted in the beſt managed dairies of cooling the churn, by filling it for ſome time with cold water before churning in ſummer, and of warming it with ſcalding water when the weather is very cold in winter, and of putting in alſo cold or hot water among the cream in the churn occaſionally, according to the ſeaſon of the year," it is concluded by Mr. Donaldſon, "that cream poſſeſſing a proper temperature, whatever that temperature may be, is, among the moſt exact dairy-farmers, conſidered eſſentially neceſſary in the making of good butter; which being admitted, it muſt follow, that ſome churns may be better ſuited to the purpoſe than others:—As ſuch as admit a free ſupply of atmoſpheric air, and permit that which from the violent agitation has become over heated to eſcape, from their preſerving the medium temperature which, it would appear, cream, in the courſe of making into butter, ought to poſſeſs, than ſuch as are kept conſtantly ſhut up, or, in which the air is only allowed to enter or eſcape occaſionally by means of a ſmall aperture." The author of Practical Agriculture obſerves, that "it is probably on this account that the upright churn is ſtill preferred in ſome dairies."

And it is remarked, that in this proceſs, much greater nicety is required than moſt perſons ſeem to be aware of, as a few haſty irregular ſtrokes may render the whole of the butter of ſcarcely any value, which, but for this circumſtance, would have been of the fineſt quality. The owner of an extenſive dairy ſhould, therefore, be extremely attentive to this circumſtance, and be at great pains to procure a proper perſon for managing this branch of the buſineſs. See CHURNING.

In Cheſhire they moſtly employ churns of the upright kind in their dairies, which are in ſome inſtances improved by having a lever applied to them; in which caſes one end of it (which is ſupported by means of an upright frame) is connected with or attached to the end of the churnſtaff; the other end of it, being by means of a rod, connected with a crank in a toothed wheel, and worked by a pinion fixed upon the axis of a common winch. In this way the operation is capable of being performed with facility by a ſingle perſon. And in a ſingle inſtance Mr. Holland found a water wheel applied ſo as to work the churn; being ſo contrived as that the ſtaff of it can be made, at pleaſure, to give from one to a hundred and eight ſtrokes in a minute. And it is ſtated that the greateſt advantage has been experienced from this method of churning, ſo as to juſtify its introduction in all caſes where the ſituation of the dairy will admit of it. In the dairies of Glouceſterſhire they make uſe of both the hand and barrel churns, according to the quantity of butter which is to be made. See CHURN.

Preparation of the Butter.

When by the proceſs of churning, or keeping the cream conſtantly in a ſtate of motion, the butyraceous particles are ſeparated from the milk, and after being gathered and united to each other, the maſs is taken out of the churn and put into a large wooden bowl, or other convenient veſſel, with ſome cold ſpring-water which is perfectly pure; the dairy-maid preſſes and kneads it well with her hands, or, what is better, a wooden ſpoon with a ſhort handle, afterwards breaking it into as minute diviſions as poſſible; and, by rolling and preſſing it againſt the bottom and ſides of the baſon or other veſſel, expreſſes and forces out any milk that it may contain. Upon this being well performed, the goodneſs of the butter in a great meaſure depends. When it has been thus worked, the milky water is poured off, and an additional quantity of pure clean water put in; and the operations of kneading, breaking, and preſſing, are again renewed, and continued till the water which comes off at laſt appears ſcarcely tinged with milk, which is the only proper criterion by which to determine when the butter has been ſufficiently worked. And it has been obſerved, that a conſiderable degree of ſtrength, as well as of dexterity, is required in this manipulation. The principal thing wanted, is to force out the milk entirely, with as little tawing of the butter as poſſible; for, if the milk be not entirely taken away, the butter will infallibly ſpoil in a ſhort time; and if it be too much worked, the butter will become tough and gluey, which greatly debaſes its quality. Another method of making butter, practiſed in Holland, as ſtated by Mr Carew, in the "Agricultural Report of Middleſex," is this:—After milking the cows, the milk is put into pans till it is quite cold. It is then ſtirred two or three times a-day with a wooden ſpoon, to prevent the cream from ſeparating from the milk; and if it can be ſtirred till the ſpoon will almoſt ſtand in it, it is deemed ſo much the better. When it is found to be ſufficiently thick, it is put into the churn; and beaten for an hour. When the butter begins to form, a pint or more of cold water, according to the quantity of the milk, is poured in, to ſeparate the butter from the milk. When the butter is taken out of the churn, it is waſhed and kneaded till the laſt water is perfectly clear and free from milk. By this method it is ſuppoſed, that a greater quantity of butter is made from an equal quantity of milk; and the butter is ſaid to be firmer and ſweeter, and to keep longer, than that which is made in the ordinary mode which is in uſe in this country. The butter-milk is alſo thought preferable, and a churn is there thought better adapted to the purpoſe than a barrel. But in either method, good butter may be made with due care and attention.

A ſmall quantity of ſalt in moſt caſes is mixed with butter, even which is attended for immediate uſe; and when the butter is ſalted, whether it be with a view to keeping or for immediate ſale, the ſalt is applied as ſoon as the milk has been extracted or removed in the manner deſcribed above. Part of the butter is ſpread on the bottom of another baſon or ſkeel, which has been previouſly waſhed and prepared for the purpoſe; and a quantity of ſalt being ſtrewed over it, an additional layer of butter is then laid on; over this, another ſprinkling of ſalt, and ſo on alternately till the whole be ſalted to the proper degree, according to the uſe for which the butter is intended. When the whole is thus ſalted, the dairy-maid again preſſes, kneads, breaks, and works it in ſuch a manner as to make the ſalt mix intimately with it; and when ſhe thinks ſhe has fully effected this purpoſe, ſhe pours ſome ſpring or other cold water over the whole; and, by again working the butter, waſhes it free from the brine, and from any milky ſubſtance, which, by the ſalting, and the repetition of kneading, preſſing, &c. may have been expreſſed.

When theſe different operations of butter-making have been performed, all that remains neceſſary to be done is to weigh and make it up into the form in which it is moſt ſaleable. The uſual form in which it is expoſed to ſale is in rolls; but it is ſometimes made into circular cakes of about three or four inches diameter, and about an inch thick, and on the top of which figures are impreſſed by means of a wooden print carved for the purpoſe.

In moſt of the Cheſhire dairies the butter made up for ſale is formed into lumps, which are there termed *diſhes*; the weight of one of which is one pound and a half, or twenty-four ounces. In Lancaſhire the butter is uſually formed into pounds of ſixteen or eighteen ounces, in a round flat manner, with the impreſſion of a figure upon the top.

But in many of the midland and ſouthern dairy diſtricts, it is common to make it up, for the London market, into *lumps* of two pounds each.

After the butter, in well-managed dairies, is weighed and made up for market, it is uſually placed in cold water till the period for ſending it to market takes place.

In regard to the quantity of butter produced from a given quantity of milk, it depends on a variety of minute particulars: as the quality of the milk, the age and quality of the paſtures on which the cows are maintained, and whether the milk be allowed to ſtand a ſufficient time to throw up the whole cream which it contains. But, on a medium, four gallons of milk will produce ſixteen ounces of butter; and the quantity which a dairy of cows of any magnitude, in regard to numbers, may be ſuppoſed to yield, may be rated at ſix pounds each *per* week in ſummer, and from four to five in winter, according to the manner of feeding them. In Suffolk they find that four gallons and a half of milk afford a quart of cream, which, when made into butter, weighs one pound and three-quarters. And Mr. Abdey, in the Epping practice, found the avarage quantity of butter made by a cow *per* week, to be four pounds, of ſixteen ounces, and the whole in nine months, one hundred and fifty-ſix pounds; beſides the advantage of ſix ſhillings a piece for three pigs which were kept. His ſtatement, as given in the Annals of Agriculture, is this:

	£.	s.	d.
156 *lbs.* at 10 *d. per lb.* -	6	10	0
Calf, - -	0	18	0
3 pigs, - -	0	18	0
	8	6	0

But at the preſent price.

	£.	s.	d.
156 *lbs.* at 1 *s.* 3 *d. per lb.*	9	15	0
Calf, - -	1	5	0
3 pigs, - -	1	10	0
	12	10	0

In the Lincolnſhire Report on Agriculture, the average quantity of milk which affords a pound of butter is ſtated to be eighteen quarts, where the hand-churn is employed, and fifteen quarts by the horſe one. But in the accurate trials of J. C. Curwen, eſq. M.P., where oil-cake, in a ſmall proportion, was made uſe of in feeding the cows, and a pendulum churn conſtructed by Mr. M'Dougall employed; eight wine quarts of the ſtrippings, and nine quarts and a half of a mixture of the whole milk, were found to give a pound of butter. This ſtriking difference in the quantities is accounted for, partly from the large proportion of heifer's-milk, but more particularly from the uſe of the oil-cake in feeding the cows.

There is an inferior ſort of butter often made from whey, where cheeſe is the principal object of the dairy-farmer. The modes of conducting the proceſs in this caſe are ſtated by Mr. Donaldſon in the following manner: "In ſome dairies the whole whey, when taken from the cheeſe-tub is," he ſays, "put into ſkeels or other veſſels, where it remains about twenty-four hours; when it is creamed, and the whey applied to the uſe of the calves and pigs, the latter of which are ſaid to thrive as well on it after the cream has been taken from it as before. And the cream, when ſkimmed off the whey, is put into a braſs pan and boiled, and afterwards ſet in pans or jars, where it remains till a ſufficient quantity for a churning be procured, which in large dairie happens generally once, but ſometimes twice in the week." In others, "the green whey is put almoſt immediately from the cheeſe-tub into the furnace-pan, where it is ſcalded. When it acquires the proper degree of ſcalding-heat, cold water, or ſome white whey, is occaſionally put in; this cauſes the whey to break, and throw up a thick white ſort of ſcum, ſomewhat reſembling cream, which the dairy-maid keeps conſtantly ſkimming off as it riſes, and which ſhe puts into cream jugs or jars, where it remains till the uſual time of churning. In the dairies where the green whey is ſcalded, the runnings, except a little that is kept for the purpoſe of forcing the green whey when ſcalding to throw up the cream, are uſually ſet in ſkeels or jars, in the ſame manner as the milk from the cows, and the cream when taken off being added to that procured by ſcalding, is churned in the ordinary way." In the Cheſhire dairies, the *thruſtings* or white whey is in ſome caſes ſet in cream mugs to *carve*, and acidulate for churning, either by the warmth of the ſeaſon, or of a room, in the ſame manner as in making milk butter. But in other caſes the green and white whey are both heated together, in which caſe, or when the green whey is heated alone, (where the boiler is of iron, it is previouſly rubbed with butter to prevent the whey from *catching* or acquiring a burnt-like taſte) ſuch a fire is kept as will make the whey as hot as poſſible, without boiling; and as ſoon as that degree of heat has been acquired, the buttery matter, which the whey contains, breaks or ſeparates from it, and riſes to the ſurface. This commonly takes place in the courſe of about an hour; but when the whey is perfectly ſweet, a little ſouring is ſometimes added to produce the breaking effect.

But in the Glouceſterſhire dairies, according to Mr. Rudge, the whey is immediately "removed from the tub or cowl into the receivers, which are made of an oblong ſquare form, ſix or ſeven feet long, three wide, and from four to ſix inches deep, with a tap-hole in ſome part of the bottom to draw it off. The inſide is lined with lead, and this aſſiſts in keeping up a great coolneſs, ſo neceſſary in the hot months; for if it were left to a high ſtate of temperature, it would become ſour in a few hours; but in this way it will ſtand for twenty-four hours, and during that time it is generally ſkimmed twice at leaſt." The cream being churned in the uſual manner for butter, and the whey given to the hogs.

But in two experiments made for the purpoſe of aſcertaining the nature of making butter from whey, Mr. Robertſon found the reſult the ſame, though the proceſs was differently conducted. In one the whey had ſtood four-and-twenty hours after being taken from the curd before it was put to the fire; but in the other it was put on quite warm and freſh immediately from the curd; the quality as well as quantity were alike in both theſe methods.

It is aſſerted that the quantity of butter procured from whey is conſiderable; in two inſtances, where particular attention was beſtowed to aſcertain the fact, it was not leſs than about an ounce and a half from the gallon. In regard to the quality, it is unqueſtionably inferior to that of butter, made from the cream of milk, or from the milk and cream churned together, but not ſo much ſo as ſtated by Mr. Marſhall in his "Rural Economy of Glouceſterſhire," which is one-third. In the Report of the County of Leiceſter, it is indeed obſerved, "that whey butter ſells for nine-pence per pound, when other butter ſells from ten-pence to eleven-pence, and alſo, that eighteen cows will make about ſeventeen pounds, ſixteen ounces each, of whey-butter per week; which is a circumſtance Mr. Donaldſon thinks "that certainly merits the attention of thoſe who are in the practice of making either *one-meal* or *two-meal* cheeſes."

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In the dairy practice of Cheſhire, where it is the cuſtom to churn up the whey-cream three times in the week, the average produce of butter, which is afforded by "one dairy cow," is from eight to ten ounces weekly. And the difference of price from it and that of milk-butter is from a penny to two-pence the pound. But in Glouceſterſhire it is ſtated to be three-pence in the pound inferior to milk-butter in the value at market.

Making of Cheeſe.

This is a practice which requires much care and attention in the dairy-farmer, in order that the proper profit may be derived from it. There are many different ſorts of cheeſe, as has been noticed in ſpeaking generally of the nature of cheeſe. In ſome of the principal diſtricts, where this article of food is made, they divide the kinds into the "*beſt making one meal*," or "*coward*," *two meal* and *ſkim cheeſe*. The firſt of theſe ſorts ſhould be made of the whole meal of milk; but a portion is often ſet by, to be ſkimmed for butter at the next milking, and the milk then added to the new meal, from which a ſimilar quantity is taken as before. This ſort of cheeſe is moſtly made in the county of Glouceſter, and is either thick or thin, the former being uſually termed *double Glouceſter*, having about four to the hundred or ſometimes fewer; and the latter about eight to the hundred weight. See CHEESE.

The ſecond, or two meal kind, is commonly made of one meal or portion of "coward," or clean milk, and one of ſkimmed, but ſometimes two portions of the latter are employed.

The third or ſkim-cheeſe is chiefly made where the main object is butter, and in which the milk is uſed after being two or three times ſkimmed.

While the cows are at hay the beſt-making cheeſe is never attempted.

In this ſort of proceſs, as in moſt of the other operations of dairying, there is a want of neceſſary accuracy and preciſion, as few experiments have been made, and thoſe without much nicety or exactneſs, the whole being in a great meaſure conducted at random by mere cuſtom. The ſame points of management are eſſential in all dairies, but they differ greatly in the minute particulars, on which much depends. The circumſtances that demand attention in a more particular manner are, however, the ſeaſon; the method of milking; the nature of the milk; the preparation of the rennet; the mode of colouring; the breaking and gathering of the curd; the management of the cheeſe in the cheeſe-preſs; the method of ſalting; the management in the cheeſe-room; and ſome miſcellaneous circumſtances concerning its preſervation.

Proper Seaſon.

With reſpect to the firſt, the beſt ſeaſon is during thoſe months when the cows can be fed on the paſtures; that is, from the beginning of May till towards the end of September, or, in favourable ſeaſons, the middle of October. On many of the larger dairy-farms in ſeveral diſtricts, cheeſe is frequently made throughout the year; but that made during the winter months is ſaid to be conſiderably inferior in quality, and much longer in becoming fit for ſale, or for uſe, than that which is made within the above period. In Glouceſterſhire the ſeaſon of making thin cheeſe is moſtly from April to November; but the principal one for making thick is during the months of May, June, and the beginning of July. This is the buſy ſeaſon of the dairy. If made later in the ſummer, they are found not to acquire a ſufficient degree of firmneſs to be marketable the enſuing ſpring. But where the cows are well fed in the winter ſeaſon, in the manner directed above, good cheeſe may undoubtedly be made at that time by proper care in the management.

Times of Milking.

In regard to the ſecond head, or the times of milking the cows, they are different in different cheeſe-diſtricts. In Cheſhire they are, in the ſummer ſeaſon, at ſix o'clock both morning and evening; and in winter, at day-light in the morning, and immediately before dark in the evening. But in Glouceſterſhire, Wiltſhire, Suffolk, and ſome other counties, the people are frequently employed in milking by four o'clock in the morning in ſummer; and the buſineſs in a dairy of forty or fifty cows is nearly completed before the period at which it commences in Cheſhire. The latter would ſeem on many accounts the moſt preferable practice; as when the cows are brought home to the farm-yard, which is the beſt method, where the paſtures are within a ſhort diſtance, they are milked unfettered, and the buſineſs is over before the heat increaſes ſo much as to make the cows reſtleſs and unruly. The farmer himſelf, or ſome careful perſon, ſhould always attend the milking of the cows, for the double purpoſe of ſeeing the work properly done, and carrying the milk in large buckets, into which it has been occaſionally emptied from the pails to the dairy, to be poured through a ſtrainer into coolers for the purpoſe, or the cheeſe-tub, preparatory to applying the rennet. In all well-managed dairies, particular attention ſhould be paid to the thorough milking of the cows; as where this is omitted, the cows are not only apt to go dry, but become more liable to be diſeaſed; beſides, it has been ſhewn, that the laſt part of the milk is very greatly ſuperior in quality to that which is firſt drawn from the bag, and conſequently ſhould be preſerved as much as poſſible.

The expeditious cooling of the milk, which in Cheſhire is effected by putting it into leaden coolers, is found of much utility in retarding the proceſs of fermentation in the ſummer ſeaſon, and thereby preventing the milk from turning into a ſtate of acidity. But in winter it is obviouſly unneceſſary. Theſe coolers are framed ſo as to reſt on legs in the manner of a table, the leaden ciſtern being at the top, and about nine inches in depth, five feet in length, and two feet and a half in width, having a vent-hole in the bottom, to which is fitted a wooden ſpiggot or plug. In ſome caſes they are ſufficiently large to hold a full meal's milk; in which caſes the milk ſtands in them all night, and after the cream is ſkimmed off in the morning, it is drawn out through the vent-hole into braſs-pans, and thus carried to the cheeſe tub. But where there is only one cooler, and that inſufficient to contain a meal's milk, it is the cuſtom to draw it off into pans, as ſoon as the cooler becomes full, which is again filled as the milk is brought to the houſe; that laſt brought in, being ſuffered to ſtand all night in the cooler. In other diſtricts, when the weather is only ſufficiently warm, the milk is ſuppoſed ready for uſe after being ſtrained; but when of too high a temperature, it is left to ſtand till properly cool; and in caſes where it is too cool, a proper quantity is warmed over the fire to raiſe the temperature: the grand buſineſs being, it is obſerved, to raiſe or lower it, to a ſuitable degree of warmth; as when it is too hot, it is liable to break up in knobs; and when too cold, it does not coagulate in a free manner.

It has indeed been ſuggeſted as probable that in very hot ſeaſons the cheeſe might be improved in its quality, and the difficulty of making it be leſſened, by cooling down the milk

as quickly as poſſible, by repeatedly drawing it off, and returning it again to the cooler or ciſtern.

Quality of the Milk employed.

The ſtate and qualities of the milk which is made uſe of in ſome cheeſe-diſtricts, in making different ſorts of cheeſe, has been noticed above. There can be little doubt but that much of the goodneſs of this article, under ordinary management, muſt depend upon the quality of the milk which is employed in making it. There is, however, conſiderable diverſity in the proportion of cream that is withdrawn from the milk employed in the making of cheeſe, in different caſes, and eſpecially according as they are *one* or *two-meal* kinds.

In the making of Cheſhire cheeſe, two meals milk is in common had recourſe to, even in dairies in which two cheeſes are made in the day: and in the beginning and end of the ſeaſon, three, four, and even five or ſix meals milk are reſerved for the ſame cheeſe. It is ſuggeſted as difficult to aſcertain what proportion of the cream is withheld from the milk, before it is put together; as the quantity may be varied, either through ſuppoſed judgment and ſkill in the art, or from motives of a different kind. In the beſt dairy-practice the cuſtom is to take about a pint of cream, where two-meal cheeſes are made, from the night's milk of twenty cows. It is, however, admitted, that with the view of making cheeſe of the beſt quality, the cream ſhould be ſuffered to remain in the milk; but it is an undecided point, whether ſuch cream as has been once ſeparated from it, can again by any means be ſo intimately combined with it, as to undergo no decompoſition in the after-management of the buſineſs. At leaſt there is no impropriety in endeavouring to prevent the ſeparation of two ſubſtances, which are again to be united. If a cheeſe made wholly of the night's milk, on which the cream has riſen, be as rich as one made of new milk, all the other circumſtances being the ſame, it is a proof that milk and cream, after being ſeparated, may, by heating alone, become as it were new milk again The point can, however, only be decided by the teſt of experiment. The practice here is, however, as will be ſeen, to unite the milk and cream; in which caſe the dairy-men ſuppoſe it differs in nothing, ſo far as the making of cheeſe is concerned, from new milk.

In the making of the cheeſe, the milk managed in the manner directed above is carried either in the evening or morning, but more commonly the latter, to the cheeſe-tub: ſometimes in making two-meal cheeſes, a portion of the creamed evening's milk is reſerved, as a half, a third, or more frequently only three or four gallons, to be uſed in this manner: after being made ſcalding hot, by being placed in a braſs pan over a furnace, or in a veſſel of hot water, one half of it is poured into the cheeſe-tub among the cold milk, and the remainder into the pan in which the cream had been placed. Then, on the cream and hot milk being intimately blended, the whole is poured into the cheeſe-tub, the contents of which have now been conſiderably increaſed by a great part, if not the whole, of the morning's milk warm from the cows. In this way the different meals milk conſtitutes, as it were, a fluid of the ſame nature, equal in quality and temperature. This ſort of re-union, or *melting the cream*, as it is termed, is perhaps the beſt method practiſed, though it is ſuppoſed not ſo effectual in affording cheeſe of the beſt quality, as that wholly by means of new milk.

But in the making of the inferior ſorts of cheeſe, as thoſe of the ſkim-milk kind, when the milk has been managed as ſtated above, where there is a tendency to too much acidity, inſtead of placing it over the furnace to afford it that degree of heat which is ſuppoſed neceſſary for facilitating the coagulation, after the application of the rennet as is uſual, it is the practice to put it directly into the cheeſe-tub, and to pour in hot water ſo as to procure the deſired temperature, without the riſk of its breaking while over the fire, and thus to avoid other inconveniences.

To the milk in theſe ſtates the rennet is immediately applied; but in the latter caſe a ſomewhat larger proportion is required, than in caſes of the ſame quantity of milk, where the whole, or a large part of the cream, is contained.

Preparation of the Rennet or Steep.

The coagulation or curdled ſtate of milk is capable of being produced by the uſe of any ſort of acid, but the material moſt commonly employed for the purpoſe, in the cheeſe-dairy, is the *maw-ſkin*, or ſtomach of a young ſucking calf, after it has undergone a ſuitable preparation. In this ſtate it is uſually termed *rennet* or *ſteep*. Theſe ſkins, on being procured from the butcher, uſually contain a curdled ſort of ſubſtance, which, on their being opened, is removed, and with the bag carefully and repeatedly waſhed in cold water, and then replaced in its former ſituation with a conſiderable portion of ſalt, the whole being then packed in an upright pan or jar, and a very ſtrong brine of ſalt and water poured over them. The bags or ſkins are frequently left in this ſtate for a whole year before they are made uſe of; but in other caſes, when they have remained ſome time covered with the brine, they are taken out, and on an additional quantity of ſalt being applied, they are hung up in the dairy, or other convenient place, to dry, and remain in that ſtate till they are made uſe of.

In the Cheſhire cheeſe-dairies, the following is conſidered as an improved method of managing this buſineſs. The whole of the ſkins for the ſeaſon, pickled and dried in the manner above, are put into an open veſſel or veſſels, and three pints of pure ſpring water poured in for each ſkin; they are then ſuffered to ſtand about twenty-four hours: the ſkins are then taken out, and put into other veſſels, adding for each one pint of ſpring water, letting them ſtand twenty-four hours as before. On taking the ſkins out the ſecond time, they ſhould be gently ſtroked down with the hand into the infuſion. They are now done with. The two infuſions, thus prepared, are now to be mixed together, paſſing the whole through a fine linen ſieve, and adding a quantity of ſalt ſomewhat more than is ſufficient to ſaturate the water, or till a portion of it remains at the bottom of the veſſel undiſſolved. The day following, and during the whole ſummer through, the ſcum is to be taken clearly off as it is formed; and as the liquor ſhould not be ſuffered to remain without a portion of undiſſolved ſalt at the bottom, it will be neceſſary to make frequent additions of freſh ſalt, as that which is diſſolved is gradually formed into cryſtals on the ſurface, and taken off with the ſcum as it riſes. In this ſtate the liquor is fit for uſe. There are ſome other modes of preparing rennet in uſe, but they do not differ materially from the above.

From the preparation in the firſt of theſe modes being made at different times, there muſt of neceſſity be a great difference in the ſtrength, and conſequently in the effects which are produced either when made uſe of in the piece, or after being ſteeped in ſome liquid. There is without doubt much more certainty in reſpect to the equality of ſtrength where the ſubſtance is extracted from the whole at once.

The quantity of the firſt ſorts of ſteep which is employed is uſually about the ſize of half a crown to a cheeſe of

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ſixty pounds, where it is cut from the bottom parts of the bags which are good; but when cut from other parts ten times as much is often inſufficient. The cuſtom commonly adopted is, to cut two pieces for each cheeſe; one from the inferior or bottom, and the other from the upper part of the ſkin. The cup in which the ſkin is infuſed, ſhould daily have a good ſcalding. Of the liquid preparation ſomething leſs than a wine half-pint will commonly be found ſufficient for a cheeſe of the ſame ſize as the above. And conſtantly, on taking any of the liquid out for uſe, the whole ſhould be well ſtirred up, in order that its ſtrength may be more equally preſerved.

In Glouceſterſhire, the proportion of rennet employed is one-third of a pint to fifty gallons of milk, which quantity is ſuppoſed to make three cheeſes of from ten to a hundred weight, or of 33 pounds each.

Cheeſe colouring.

The uſe of this ſubſtance has been ſo long common in moſt of the cheeſe diſtricts, that it is probable the article would be almoſt wholly unſaleable without it, eſpecially the beſt kind. This is a practice which, probably, had its origin in the deſign of affording the idea of richneſs; but it is conſtantly found that the leaneſt cheeſe requires the largeſt quantity of colouring matter, to bring it to that appearance which is deſired. And the degree of colour is moſtly regulated by the name under which the cheeſe is intended to be ſold by. The ſubſtance which is employed for this purpoſe ſhould be Spaniſh *arnotto*, but is often a matter of an inferior quality. Where it is of the genuine kind, the weight of a guinea and a half is moſtly ſufficient for a cheeſe of ſixty pounds weight; but in the Glouceſterſhire dairies, they allow an ounce commonly to a hundred weight of cheeſe. In preparing it for being mixed with the milk, different methods are purſued. In the Cheſhire dairies, the quantity ſuppoſed neceſſary is uſually tied up in a linen rag, and put into half a pint of warm water over night, when to be uſed in the following morning; the whole of the infuſion being then blended with the milk in the tub, at the ſame time that the ſteep infuſion is applied, dipping the rag into the milk, and rubbing it againſt the palm of the hand as long as any colour can be made to come from it. But in Glouceſterſhire, it is prepared by carefully rubbing a piece of it upon a ſtone kept for the purpoſe, and then mixing it in a liquid ſtate with the milk. The quantity is here judged of by the ſhade of the colour to be produced, without any fixed rule; and it is put in previouſly to the application of the rennet. As this is an uſeleſs and ridiculous practice, which adds nothing to the qualities of the cheeſe, it ſhould ſurely be ſet aſide.

Setting the Cheeſe-Curd.

It is far from being aſcertained with any degree of accuracy what the temperature of the milk ſhould be, in order to be in the moſt proper ſtate for the application of the rennet. It is, however, generally allowed that the quantity as well as quality or texture of the curd, in ſo far as toughneſs, or the contrary, is concerned, depends in a great meaſure on the length of time the curd is in forming; and that again on the quantity and ſtrength of the coagulation or ſteep employed, the ſtate of the atmoſphere, and the heat of the milk, at the time of being mixed together. In this point, the practice of almoſt every particular dairy differs from that of the other. In thoſe of Cheſhire, the *loweſt* degree of heat which milk ſhould have, when the rennet is applied, is ſuppoſed to be one-half of that of the milk from the cow; the *higheſt*, about twice the natural warmth. From this it is inferred, that by the time a large dairy of cows has been milked, and the milk put together for the purpoſe of artificial coagulation, the dairy manager will not commit any material error in applying the rennet immediately afterwards. This is, however, a rule which is uncertain, and open to much objection from the variation of the ſeaſon, and the frequent great changes which take place in the ſtate of the weather in the ſame ſeaſon. Conſequently, in all dairies which afford cheeſe of a ſuperior quality, the heat of the milk is brought to the regular ſtandard which has been ſuggeſted by experience as the moſt ſuitable, before the rennet is applied. It is likewiſe found, as the reſult of experience, that the milk, produced on poor clays, requires more warming than ſuch as is afforded on lands that are rich; as where this is much heated, the difficulty of the proceſs is increaſed. In ſome Cheſhire dairies they do not, however, heat a drop of the evening's milk, only diſſolving the cream in a braſs pan floated in a furnace of hot water. It is ſuppoſed by Mr. Rudge, from ſome experiments which have been made, that the proper degree of heat is about the middle between ſummer and blood heat, or probably about 90° of Fahrenheit's thermometer may give the average warmth which is neceſſary.

Some highly intereſting and important obſervations and experiments, made with the view of aſcertaining this matter, have been ſtated by Mr. Marſhal in the following manner.

Next, ſays he, to the art of correcting the milk (an art as yet in its infancy), that of coagulating it, ſeems to claim the attention of the experimentaliſt. It is known, from daily experience, that the warmer the milk is, when the rennet is put to it, the ſooner it will coagulate, with a given quantity of rennet of a given ſtrength. It is equally well known, that the cooler the milk, and the longer it is in coagulating, the more tender and delicate the curd becomes: on the contrary, if the milk be too hot, and the coagulation takes place too rapidly, the curd proves tough and harſh. But it ſeems to be a fact equally well eſtabliſhed, that a cheeſe made from milk which has been coolly and ſlowly coagulated, is longer before it becomes marketable, than one made from milk which has undergone a leſs deliberate coagulation; and which, being drier and of a harſher texture, ſooner becomes cheeſey, and fit for the taſter. Therefore, the great art in this ſtage of the proceſs lies in the degree of warmth of the milk when ſet; that is, when the rennet is put to it; or, in the degree of heat retained by the curd when it comes, that is, when the coagulation has ſufficiently taken place, or, in the length of time between the ſetting and coming: which length of time may regulated either by the degree of the warmth of the milk when ſet; or, by the ſtate of warmth in which it is kept during the time of coagulation; or, by the quantity and ſtrength, taken jointly of the rennet.

In order to gain ſome information on this ſubject, he made the following experiments.

In 1781, June 5th, twenty-three gallons of milk, heated to ninety-ſix degrees of Fahrenheit's ſcale, with two tea-cupfuls of weakiſh rennet, came in one hour; the curd delicate and good: 6th, the ſame quantity of milk, of the ſame heat, with the ſame quantity of rennet, came in nearly the ſame time: the curd ſomewhat tough; owing, probably, to the milk having been burnt to the kettle in which it was heated: 7th, twenty-ſeven gallons of milk, heated to ninety-four degrees, with the ſame quantity of rennet, came in about two hours; the curd very good: 8th, twenty-ſix gallons of milk, heated to one hundred and two degrees, with one tea-cupful of rennet, came in two hours and a half;

half; curd very good: 9th, twenty-five gallons of milk, heated to one hundred degrees, with a tea-cupful and a half of rennet, came in about one hour and a half; the curd good, but ſomewhat tough, owing, perhaps, to the milk being kept too warm in the cheeſe-tub, by being covered up cloſe with a thick cloth.

It is noted, that on the ſeventh and eighth the whey retained the heat of about eighty-eight degrees, whereas the whey this morning was ninety-two degrees: ſo that, perhaps, it is not the heat when it is ſet, but the heat when it comes, which gives the quality of the curd: 10th, twenty-five gallons; ninety-ſix degrees; two cups; uncovered; came in two hours and a quarter; whey eighty-ſeven degrees; curd very tender: 11th, twenty-three gallons; one hundred degrees; more than a tea-cup; uncovered; did not come in two hours; owing to the rennet being lower in ſtrength than before; therefore, added a little more rennet, which brought it in about three hours from firſt ſetting; the whey eighty-ſeven degrees; the curd uncommonly delicate: 12th, twenty-four gallons of milk; one hundred degrees; two cups of rennet; uncovered; came in two hours; whey eighty-nine degrees; curd uncommonly tender: 13th, twenty-eight gallons of milk; ninety-two degrees; three cups, (ſay ſtrongly renneted;) covered up with a coarſe linen cloth; came in one hour and a half; whey eighty-ſix degrees; curd very good, and of a very fine colour; though perhaps would have handled tenderer if it had not ſtood ſome time after it came, before it was broken up. Perhaps, ſays he, much depends on its being broken up in the critical minute: 14th, twenty-eight gallons; one hundred degrees; two cupfuls; uncovered; came in one hour and a quarter; whey ninety-four degrees; curd ſomewhat harſh, but of a good colour. The change of colour, therefore, he thinks, owing to the change of paſture.

Here he notes, that the milk ſhould be covered to make it come together; this came, and grew hard at the bottom half an hour before it was ſet at the top: 15th, twenty-eight gallons; milk heated to ninety-five degrees; with two cups of rennet; and covered after it had ſtood three quarters of an hour; came in one hour and a half; whey eighty-nine degrees, (the morning warm;) curd very good and tender: 16th, thirty gallons of milk heated to one hundred and three degrees, but lowered by two pails-full of cold water to ninety-ſix degrees; with two cups and a half of rennet; and kept cloſe covered; came in an hour; whey ninety four degrees; curd pretty good, but not ſufficiently tender: 17th, twenty-eight gallons; ninety-ſeven degrees; two cups and a half; covered, but not cloſe; came in one hour and a half; whey not tried, curd ſomewhat tough.

It is noted that the toughneſs was owing, perhaps, to ſome milk of a new-calved cow being among it. But to try the exact heat of milk immediately from the cow, he immerged a diſh in the pail while milking. After it had lain long enough to receive a degree of heat equal to that of the milk in the pail, emptied it, and immediately milked into it from the teat, (the cow being at the time about half milked;) the heat ninety-five degrees; and likewiſe, that the cheeſes of yeſterday (the 16th of June) preſs remarkably elaſtic, and ſpongy, like a fungus, perhaps owing to the milk's coming too hot; or, perhaps, to two or three of the cows being then a-bulling; or, perhaps, being made thicker than uſual, the preſs was not heavy enough for them; or, perhaps, this ill quality is owing to the cold water being put into the milk.

He afterwards found, that milk of a cow, on the day of amour, retained, after having ſtood ſome time in the pail after milking, ninety-eight degrees of heat. This ſhews that the ſtate, if not the quality of the milk, is altered by the heat of the cow; and a cautious dairy-woman always endeavours to keep ſuch milk out of her cheeſe-tub.

June 18th, thirty gallons; ninety-five degrees; covered; came in an hour and a half; whey ninety-two degrees; curd pretty good: 19th, thirty gallons; ninety-two degrees; two cups; covered; curd very good: 21ſt, thirty gallons; ninety-eight degrees; lowered by half a pail of cold water to ninety-five degrees; the curd good; but the cheeſes, like thoſe of the 16th, preſs hollow and ſpongy. Therefore, it is probable, from theſe two incidents, that lowering the heat of the milk with cold water has an evil effect: 23d, (evening) fifteen gallons of new milk warm from the cow, retaining a heat of ninety-two degrees; with two cups and a half of new weak rennet; and cloſely covered; came in three quarters of an hour; whey eighty-eight degrees; curd very delicate and good: 25th, forty gallons of half ſkim-milk, heated to eighty-ſeven degrees, with three cups of rennet, ſlightly covered, came in three quarters of an hour; whey ſeventy-nine degrees; curd remarkably good of this ſort.

On September 8th, in obſerving the effect of ſome remarkably ſtrong rennet, he found that an ordinary tea-cupful coagulated ſufficiently upwards of forty gallons of milk, heated to only eighty-eight degrees, in thirty-five minutes.

From the whole of theſe experiments it appears, he thinks, that curd of a good quality may be obtained from milk heated from 87 to 103 degrees of Fahrenheit's thermometer, provided the rennet be ſo proportioned, that the time of coagulation be from three quarters of an hour to two hours and a half; and provided the milk be kept properly covered during the proceſs of coagulation. And from theſe, as well as a variety of other trials, which he made in the courſe of the ſummer, it appears to him at preſent, that from 85° to 90° are the proper degrees of heat; that from one to two hours is the proper time of coagulation; and that the milk ought to be covered, ſo as to loſe in the proceſs about five degrees of its original heat. But, ſays he, climature, ſeaſons, the weather, and the paſture, may require that theſe bounds ſhould ſometimes be broken. A few obſervations, made in one ſeaſon, and in one place, how accurately ſoever they may have been taken, are by no means adequate to the entire illuſtration of this very abſtruſe ſubject.

It has been ſtated as a matter of ſurpriſe, by Mr. Donaldſon, that in dairies of conſiderable extent, the uſe of the thermometer is not ſo well underſtood as that of the *ſkimming-diſh*, as by correct trials in this way, in reſpect to the moſt ſuitable temperature for milk, in order to have the rennet applied, the quality of the cheeſe might be greatly improved, and the bad conſequences of cracking, bliſtering, and hoveing which often take place from improprieties in the making, be prevented. An inſtrument termed a lactometer has likewiſe been invented, in the view of rendering aſſiſtance in this way, by Mr. Dicas of Liverpool, by the uſe of which, and the thermometer, it is imagined, by the above writer, that conſiderable improvement would be made in the management of the cheeſe-dairy, eſpecially, if at the ſame time a mean could be eſtabliſhed for determining the ſtrength and quality of the rennet, and the quantity neceſſary for properly coagulating a given quantity of milk. See LACTOMETER.

The frothy ſubſtance which is apt to riſe in pouring the new milk into the cheeſe-tub, in conſequence of the air entangled with it, ſhould conſtantly be ſkimmed off in a careful manner, and be depoſited in the cream-veſſels.

As no general rule has yet been eſtabliſhed, whereby to determine either the quantity of rennet to be applied, or the proper

proper temperature of the milk at the period of application, it can only be ſtated, that each dairy-maid is obliged to exerciſe her own diſcretion, according to the exiſting circumſtances, in regulating her conduct in this reſpect. But although practice is the only means by which ſhe can acquire a proper knowledge of this branch of the buſineſs, yet the conſequences of proper or improper conduct are well known in every cheeſe-dairy. When the coagulation is accelerated or retarded beyond the proper time, which in making a 60 pound cheeſe is reckoned one hour and a half, either by giving too much or too little rennet, or by applying it when the milk is too hot or too cold, not only the quantity of the curd is diminiſhed, but the quality in either caſe materially affected. In the former caſe it is of a tough, gluey texture; in the latter, too tender.

After the colouring and rennet have been applied, the milk-tub is covered by a board or wooden cover, over which is laid a linen cloth; and having ſtood the uſual time, which is about an hour and half, in which it is frequently examined; and where the cream riſes to the ſurface, before the coming takes place, as is often the caſe, the whole is to be ſtirred together, ſo as to well blend the milk and cream again; and this repeated as often as neceſſary, till the coagulation is formed, which may ſometimes be haſtened by gentle ſtrokes on the ſides of the tub; or, where coolneſs is ſuſpected as the cauſe of its not coming properly, heat in ſome way or other may be applied for the purpoſe, and cold in the contrary circumſtances; and even when an additional quantity of rennet is required, it may likewiſe at this period be applied, that is, before the coagulation occurs; but when the dairy maid finds that the coagulation is completed, which is known by gently preſſing the ſurface of the milk with the back of the hand, or by leaving the ſkimming diſh inverted in the ſurface of the milk, where the whey will appear on its removal, ſhe ſets to work with her aſſiſtants to ſeparate the curd from the whey, an operation which is generally called breaking and gathering the curd.

Breaking and gathering the Curd.

Simple as this buſineſs may appear, and uniform as one would expect the method to be, there are few particulars, ſays Mr. Donaldſon, in the whole art of cheeſe-making, wherein ſo great a difference is obſervable in practice. In ſome dairies, the curd, when ſtiff, is at firſt broken or cut in various directions with a common caſe-knife, or cheeſe-knife made for the purpoſe, and uſed with a view of making the whey ſeparate eaſily, and without carrying off with it any richneſs from the curd. After theſe firſt inciſions, ſome time is allowed for the broken curd to ſubſide. The knife is then again uſed, and more freely than before; and while the dairy-maid ſtirs up the unbroken curd from the bottom with the ſkimming-diſh in one hand, ſhe cuts the larger pieces of curd with the knife, which ſhe holds in the other. This method, as well as that by the hand is continued until the whole of the curd is broken down and reduced in an uniform manner into ſmall particles. This buſineſs in general occupies about forty minutes, the curd being then left covered over with a cloth for about half an hour, in order to ſubſide. See CHEESE-KNIFE.

Having thus thoroughly broken the curd, and allowed ſome time for its ſubſiding, ſhe then begins to take off the whey with the ſkimming-diſh. In other dairies not leſs celebrated for good cheeſe, the ſkimming-diſh only is uſed in breaking the curd; this is particularly the caſe where the milk has been ſet cool together, and the curd is of courſe more tender, the edge of it being held perpendicular to the ſurface of the whey in the tub, being dipped gently into it an inch or two, and the whole curd in that way turned. The breaking is then performed in a gentle manner, moſtly by the hand, more time being allowed for the purpoſe.

And in order to facilitate the operation of ſeparating the whey from the curd, ſome of the whey that firſt riſes to the top is ſkimmed off, and being either heated or cooled, according to the ſtate of the weather, and the required conſiſtence of the curd, is again returned into the cheeſe-tub; and after remaining a little time, the whole is laded off in the uſual manner. All the whey that can be extracted without preſſure having been removed, and the cheeſe-tub being raiſed at one ſide, the curd is collected into a maſs, and at firſt preſſed with the back of the ſkimming diſh. When no more whey can be diſcharged by this means, others more violent are adopted; the curd is, in many caſes, cut with the cheeſe-knife, to give vent to the whey, and is then preſſed as hard as poſſible with the hands; in others, a conſiderable weight is frequently applied, by means of a board of a ſemi circular form contrived to fit one half of the cheſe tub's bottom in a looſe manner, being placed upon the curd; the parts which are forced out by the preſſure being again and again cut off, and replaced under the board, and the whey preſſed out, continually removed as it is formed. The whole maſs of the curd is now turned upſide down, put on the other ſide of the tub, then again preſſed, pared, and preſſed as in the former caſe. The board and weight being removed, the curd is cut into pieces eight or nine inches ſquare, which are piled upon each other, and then preſſed with the board and weight, the cutting and piling being repeated till no more whey drains off from it. The curd having been in a great meaſure ſeparated from the whey, it is put into two or three pans, or other veſſels, and the dairy-maid and her aſſiſtant break it with their hands as fine as poſſible; in the courſe of doing which, a proper quantity of ſalt (for the weight or meaſure is ſcarcely in any inſtance aſcertained) is ſcattered over the curd, and intimately mixed therewith. Sometimes the curd is divided into three portions, being broken down and ſalted ſeparately, the middle portion often conſiderably the moſt.

According to the method uſually practiſed in Glouceſterſhire, when the curd is broken to the requiſite fineneſs, it is again returned into the cheeſe-tub, where it is ſcalded, by pouring over the broken curd a pailful of hot-water, or of whey, or of whey and water mixed. After the ſcalding-water or whey is applied, the whole is briſkly ſtirred, and being allowed to ſtand for ſome time for the curd to ſettle at the bottom of the tub, the ſcalding materials are ſkimmed or poured off, and the curd being preſſed as before, ſo that no more whey can be extracted by ſuch means as were formerly uſed, it is put into the vat, and preſſed in the ordinary way.

Vating and preſſing the Cheeſe.

As ſoon as the curd has been properly broken down, rubbed, and ſalted, a cloth is ſpread over the cheeſe-vat, which in Scotland is called a *cheſſel*, and the broken curd being packed into it ſo as to be heaped up in a conical form above it, and covered up with the cloth, by being turned up at the corners, after being preſſed by the hand ſo as to adhere together, a board is laid over the vat, and a weight heavy in proportion to the quantity of curd, placed upon it, by which means the remaining whey is preſſed out. Where the cheeſes uſually made are of a large ſize, as in Cheſhire, the dairyman thruſts a number of iron ſkewers, through holes made in the ſides of the vat for the purpoſe, into the curd in various directions. Theſe being withdrawn, the openings made by them ſerve as ſo many drains for permitting the whey to run off. In ſome dairies they have recourſe to *thruſting* ſcrews, which

which are fixed to the floor above, the power of which can be regulated at pleaſure. In others a lever is uſed to preſs or thruſt the cheeſe, which is a long ſtrong pole, having one end faſtened in the wall, in a direction nearly parallel to the top of the cheeſe, on which a board is placed for the reception of the power of the lever, which is made uſe of at diſcretion. When the whey, in place of running freely, which it does at firſt, only falls in drops, the weight is removed, and the curd re-broken, and, being again put into the vat, is managed in the manner juſt deſcribed, and repeated while, by uſing ſuch means, a drop of whey can be extracted. The curd being now almoſt entirely freed from the whey, it is again placed in the vat, a clean cloth having been previouſly ſpread for the purpoſe of receiving and incloſing it. The curd now takes the form, at leaſt, of cheeſe; and the cover of the vat being on, it is placed in the cheeſe preſs. See CHEESE-PRESS.

It is extremely neceſſary that large dairies ſhould be well provided with vats of different ſizes, as where three or four cheeſes are made at each meal, a great number of vats become abſolutely in uſe, and where there are not at the ſame time a number empty, the operator is confined in his choice, and cannot proportion exactly the vats to the ſizes of the cheeſes, or rather the quantity of curd in the tub, and when a little overplus curd is preſerved from meal to meal, it often happens that a whole cheeſe is ſpoiled. The vats ſhould always be ſo choſen that the quantity of curd may neither over or under fill them, when the cheeſes are fully preſſed.

Before the cheeſe is put in the preſs, it is uſually turned in the vat, and rinſed with warm whey. The cloth now made uſe of being finer and longer than that formerly employed, and is ſo placed, that on one ſide it may be level with the edge of the vat, and on the other wrap over the whole ſurface of the cheeſe, and the edges put within the vat, thus perfectly encloſing the whole cheeſe in the cloth. In this ſtage of the proceſs the cheeſe is ſtill higher than the edge of the vat, but to preſerve it in due form, recourſe is had to a tin-binder, or hoop, about three inches broad, which is put round the cheeſe, on the outſide of the cloth, and the lower edge of the binder preſſed down with the vat, ſo low as that the upper edge of it may be level with the ſurface of the cheeſe. In this ſtate a ſmooth board being placed over it, the preſs is gently let down upon it. There are moſtly preſſes of different weights; ſome dairies putting them under the preſſure of the heavieſt, and others of the lighteſt, the firſt. And occaſionally cheeſe fillets are made uſe of inſtead of the tin-binders, for which a coarſe ſort of broad ſtrong tape is uſed, one end of which is thruſt down with a thin wooden knife between the cheeſe-cloth and vat, and then drawn tightly ſeveral times round the cheeſe, faſtening it with ſtrong pins. As ſoon as the vat with the cheeſe is placed in the preſs, and the weight applied, ſkewers are again thruſt in through the holes in the ſide of the vat and binder, left for the purpoſe: this is done repeatedly during the firſt day the vat is in the preſs. It is performed by ſkewers of ſtrong iron wire, eighteen or twenty inches in length, ſharp at the points, and turned with a bow at the other end. The operation of ſkewering commonly continues till the morning after the cheeſe has been put in the preſs, and the oftener the cheeſe is ſhifted in that time the better, it being generally taken out, and turned in about half an hour, the angles being pared, where thoſe of the vats are not rounded off. There is, however, much difference in this reſpect in different inſtances, but the interval from the time the vat is firſt placed in the preſs till it is again taken out, does not, in ordinary caſes, at moſt exceed two or three hours. When taken out, the naked cheeſe is put into a veſſel with hot whey, or warm water, with the view of hardening its coat or ſkin, and preventing bliſters, where it ſtands for an hour or two; it is then taken out, wiped dry, and after having remained ſome time to cool, it is covered with a clean dry cloth, and the vat being wiped dry, and the cheeſe replaced, it is again put into the preſs. In the evening, ſuppoſing the cheeſe to have been made in the morning, which is the uſual time, it is again taken out of the vat, and another dry cloth being applied, it is turned and replaced; what was formerly the upper becoming now the under-ſide. At this and the former turning the upper ſurface is ſometimes pricked, all over, an inch or two deep, to prevent bliſtering. In this manner it is taken out, wrapped in clean cloths, and returned into the vat twice a day, for two days, when it is finally removed. In the two laſt turnings finer cloths are made uſe of, that no marks or impreſſions may be left on the cheeſe.

Theſe are the methods moſtly followed in the principal dairy diſtricts; but other modes are in practice in other places, as well as in many inſtances in theſe. It is often the cuſtom to bare-vat the cheeſes at the latter end of the preſſing.

Salting of the Cheeſe.

The ſalting of the cheeſe is the next part of the management. The cheeſe, on being for the laſt time removed from the preſs, and taken out of the vat, is carried to the ſalting-houſe, and placed on a fine cloth in the vat, in a ſalting tunnel or tub filled to a conſiderable depth with brine, in which it ſtands for ſeveral days, being regularly turned once at leaſt every day. But a method now more generally uſed is, to cover the upper ſurface of the cheeſe wholly with ſalt, repeating the application at every turning, for about three days, and changing the cloths twice in the time. But in the firſt mode, the vat is then removed from the brine-tub; and the cheeſe being taken out, is placed on the ſalting bench, where it ſtands for eight or ten days, ſalt being carefully rubbed over the whole every day, during that period. This is likewiſe the caſe in the latter method. Where the cheeſe is of a large ſize, it is commonly ſurrounded with a wooden hoop, or fillet of cloth to prevent renting. After it is ſuppoſed to be ſufficiently ſalted, it is waſhed in warm water or whey, and, when well dried with a cloth, is placed on what is called the drying bench, where it remains a like period before it is removed to the keeping houſe or chamber. In other dairies, the new cheeſes are not put in brine, but kept in the vats on the ſalting benches; and after being rubbed with ſalt, and turned in the vats daily for a week or ten days, the vats are removed, and the cheeſes managed in the manner above-mentioned. In ſeveral other dairies, again, the cheeſes are ſalted while the operation of preſſing is performing. At every time they are taken out of the preſs, for the purpoſe of being turned in the vats, they are well rubbed with ſalt, which for ſmall thin cheeſes, ſuch as are commonly made in Wiltſhire and Glouceſterſhire, is found to be ſufficient; and therefore when taken for the laſt time from the preſs, in place of any more ſalt being applied, they are ſet at once upon the drying benches.

The practice of immerging new made cheeſes in brine is now principally adopted where they are of ſo large a ſize that rubbing ſalt on the outſide would not be ſufficient for anſwering the intended purpoſe of preſerving them, &c.

It is found that in Cheſhire twenty eight pounds or half a buſhel of ſalt in the week, is ſufficient on the average through the ſummer for dairies where ſixty pounds cheeſes are made, including the domeſtic conſumption in families of moderate ſizes. And that the greateſt quantity of ſalt uſed for one ſixty pounds cheeſe is about three pounds; but what the actual quantity is which is retained in the cheeſe, has not been aſcertained.

Neceſſary Management in the Cheeſe Room.

The laſt part of the buſineſs of cheeſe-making is the management in the cheeſe-room. When the cheeſes are properly ſalted, and have acquired a competent degree of dryneſs, they are carried from the ſalting place to the cheeſe-room, or ſtore-houſe; where, after being ſmeared with freſh butter, or ſweet whey butter, they are laid on the floor, or on ſhelves erected for the purpoſe. For the firſt ten days, or a fortnight after they are placed in the ſtore-room, they are pretty ſmartly rubbed all over every day, and the ſmearing with butter repeated; however afterwards, a round ſpace, of four or five inches diameter on each ſide, in the middle is left unrubbed; but although after that period it may be only neceſſary to rub them two or three times in the courſe of the week, they ſhould be daily turned, as long as they are kept; the uſual practice is to rub them three times in the week in ſummer, and twice in the winter ſeaſon. And the ſcraping of the rind ſhould be rendered unneceſſary by frequent cleanings. Where the room is warm the coat will eaſily be prevented from riſing.

In Cheſhire the cheeſe-rooms are moſtly placed over the cow-houſes, in order to derive that moderate and neceſſary degree of temperature, which is ſuppoſed *eſſential* to the ripening of cheeſe, from the cattle below. In ſome caſes the floors are rubbed with different green vegetables, as bean-tops, &c., in others dry ſubſtances are uſed; but in Cheſhire, dried coarſe graſs or ruſhes, termed *ſniddle*, is uſed as a litter for the floors, and ſometimes wheat ſtraw, but which is objectionable, from its knots making impreſſions on the cheeſes. And Rouen hay is adviſed as a proper material for the purpoſe.

It may be proper, before we come to introduce ſome miſcellaneous remarks on a few circumſtances in reſpect to cheeſe, to deſcribe the methods of making ſome other kinds of cheeſe.

Method of making Parmeſan Cheeſe.

The mode which is uſually adopted, according to Mr. Price, as ſtated on the authority of ſignior Vitabni, is to put, at ten o'clock in the morning, five *brints* and a half of milk, each brint containing about forty-eight quarts, into a large copper, which turns on a crane, over a ſlow wood-fire, made about two feet below the ſurface of the ground; the milk is ſtirred from time to time; and about eleven o'clock, when juſt lukewarm, or conſiderably under a blood-heat, a ball of rennet, as big as a large walnut, is ſqueezed through a cloth into the milk, which is kept ſtirring. By the help of the crane, the copper is turned from over the fire and let ſtand till a few minutes paſt twelve; at which time the rennet has ſufficiently operated. It is now ſtirred up and left to ſtand a ſhort time. Part of the whey is then taken out, and the copper again turned over a fire ſufficiently briſk to give a ſtrongiſh heat, but below that of boiling. A quarter of an ounce of ſaffron is now put in to give it a little colour, and it is well ſtirred from time to time. The dairy-man frequently feels the curd. When the ſmall, and, as it were, the granulated parts, feel rather firm, which is in about an hour and an half, the copper is taken from the fire, and the curd left to fall to the bottom. Part of the whey is taken out, and the curd brought up in a coarſe cloth hanging together in a tough ſtate. It is then put into a hoop, and about half a hundred weight laid upon it for about an hour; the cloth being then taken off, and the cheeſe placed on a ſhelf in the ſame hoop. At the end of two or from that to three days, it is ſprinkled all over with ſalt; the ſame is repeated every ſecond day, for about forty or forty-five days, after which no further attention is required. While ſalting they generally place two cheeſes one upon another in which ſtate they are ſaid to take the ſalt better than ſingly.

Method of making Stilton Cheeſe.

The proceſs for making this highly valuable ſort of cheeſe is thus ſtated in the Report on Agriculture for Leiceſterſhire: the night's cream is put into the morning's new milk, with the rennet, when the curd is properly come, it is not broken, as is the caſe in the making of other cheeſe, but is taken out with the ſoil-diſh altogether, and placed in a ſieve to drain gradually; and as it drains kept gradually preſſed, till it becomes firm and dry; being then placed in a wooden hoop, and afterwards kept dry on boards, frequently turned, having cloth binders paſſed round it, which are tightened occaſionally as found neceſſary.

Method of making Green Cheeſe.

In the making of a cheeſe of this ſort of about ten or twelve pounds weight, an infuſion made by ſteeping about two handfuls of ſage, and one of marigold leaves, with a little parſley, after being bruiſed, one night in a proper quantity of milk. In the morning the greened milk is ſtrained off, and mixed with about one-third of the whole quantity to be run. The green and the white milks are then *run* ſeparately, keeping the two curds diſtinct, until they are ready for vatting. The mixing of them depends on the fancy of the maker. In ſome caſes the two are connected together, blending them in an even and intimate manner; in others, the green curd is broken down into irregular fragments, or cut out in irregular figures by means of proper tins. In the operation of vatting, the fragments or figures are placed on the outſides. The bottom of the vat is firſt ſet with them, crumbling the white or yellow curd among them. As the vat fills, others are placed at the edges, and the remainder buried fluſh with the top. In the management afterwards, the ſame plan is purſued as thoſe which have been deſcribed for common cheeſe.

Miſcellaneous Circumſtances in the Management of Cheeſe.

The *cracks*, which ſo frequently take place in cheeſe, have been aſcribed to various cauſes; as, lime being employed as a manure, expoſure to a current of air after being taken out of the preſs, eſpecially before they have ſweated in the cheeſe-room. Some of theſe cauſes are, however, extremely doubtful.

The *rankneſs* and *pungency* of cheeſe are commonly attributed to the impurity of the ſteep, to neglect in waſhing out and ſcalding the ſteep cup daily, and to the want of ſalt: but ſome ſuppoſe it, with greater reaſon, to be owing to the imperfect ſeparation of the curds and whey. Heaving and running out at the ſides, as well as ſpungy, eyey, and whey ſpringy cheeſe, are all aſcribed to the ſame cauſe.

The *heaving* of cheeſe is moſt generally ſuppoſed to depend upon the ſweating or fermentation not being perfectly performed. Some, however, ſuppoſe it to depend on the rankneſs of the paſtures; the improper temperature of the cheeſe-room, and various other cauſes, as may be ſeen in the Report on Agriculture for Glouceſterſhire.

The *bliſters* of cheeſe are likewiſe ſuppoſed to proceed from the ſame cauſes. The uſual remedy is opening them, and pouring hot water into the inciſions; then preſſing down the outer rind, putting a little ſalt upon it, with a piece of ſlate and a half pound weight.

The *running out at the ſides*, is ſuppoſed to ariſe from the ſame cauſes as heaving; or the want of due preſſing: the

uſual remedy is that of binding it tightly round with a cheeſe fillet.

The uſual remedies of *ſpongy*, *eyey*, and *whey ſpringy* cheeſe are careful breaking, good thruſting, frequent ſkewering, and a powerful application of the preſs.

In caſes where milk is converted into cheeſe, the produce which is afforded by the cows is ſtated in very different ways, in different diſtricts where this ſort of practice is purſued. In ſome 2½ *cwt.* from each cow, whether good or bad milkers, is ſuppoſed a very good average annual return. In others it is ſtated to be three hundred weight, and from that to three and an half, and even four. Mr. Rudge, indeed, ſtates it to riſe in the Glouceſterſhire dairies ſo high as from three hundred and a half to four hundred and a half weight in the ſeaſon.

On the general ſuppoſition of farmers, that a cow requires the produce of from two and a half to three acres and a half of land for her ſupport the year round, the average quantity of cheeſe by the acre may be ſtated as ſomething more than one hundred and eighteen pounds. But all theſe ſorts of ſtatements are very uncertain, from the great differences of circumſtances.

The following ſtatement is given by Mr. Rudge, as the profit on a dairy of twenty cows in Glouceſterſhire:

Debtor.	£.	s.	d.
Rent of forty acres of land for paſture -	60	0	0
—— of twenty acres for hay -	30	0	0
Making hay at 12*s.* per acre - -	12	0	0
Carrying and ricking - -	3	0	0
Tythe at 2*s.* 6*d.* per pound - -	11	5	0
Poor and highway rates, at 3*s.* - -	13	10	0
Two women to milk, at 3*s.* per week -	7	16	0
Dairy-woman, at 4*s.* 6*d.* per week -	11	14	0
Labourer in winter to fodder - -	4	10	0
Wear and tear of dairy utenſils - -	3	0	0
Salt - - - -	3	0	0
Annotto, at 7*s.* per *lb.* - -	1	15	0
Intereſt of money laid out in ſtock and implements (reckoning each cow at 20*l.*), and chance of loſs - -	40	0	0
Profit - - - -	136	10	0
	338	0	0

Creditor.	£.	s.	d.
Cheeſe, 4 tons, at 4 *cwt.* each cow, and 3*l.* 3*s.* per *cwt.* -	252	0	0
Value of Whey - -	40	0	0
Paſture for colts and ſheep -	10	0	0
Profit of calves - -	21	0	0
—— of butter - -	15	0	0
	338	0	0

It is however here ſuggeſted, that the dairy farmer is probably charged with expences higher than he really incurs, from the work being differently performed, and the ſervants being often engaged in other ſorts of work; and likewiſe from the whey being charged at the ſelling price, and not at that of its value as a food for ſwine.

Much of the profit of well-managed dairies may ariſe from the hogs. It is ſtated by Mr. Rudge, that from eight to ten hogs, of nine or ten ſcore each, are uſually kept to twenty cows. But where hogs are not kept, the whey is valued and ſold at two pounds per annum. See SWINE.

DAIS, in *Botany*, (Δαις, a ſolemn feaſt; perhaps from the profuſion and beauty of the flowers; which profeſſor David Van Royen, who founded and named this genus, held in great eſtimation, and conſidered as the pride of his garden at Leyden, in 1786.) Linn. Gen. 215. Schreb. 292. Willd. Sp. Pl. v. 2. 579. Juſſ. 77. Gært. t. 39. Claſs and order, *decandria monogynia*. Nat. Ord. *Vepreculæ*, Linn. *Thymelææ*, Juſſ.

Gen. Ch. *Cal.* Involucrum of four leaves, containing many ſeſſile flowers; its leaves ſcarioſe, erect. Perianth none. *Cor.* of one petal; funnel-ſhaped, longer than the involucrum; tube thread-ſhaped, rude; border in five (ſometimes but four) deep, lanceolate, obtuſe ſegments. *Stam.* Filaments ten (ſometimes but eight), inſerted into the tube, ſhorter than the limb, alternately longer and ſhorter; anthers ſimple. *Piſt.* Germen oblong-ovate, ſuperior, cloſely inveſted by the baſe of the petal; ſtyle thread-ſhaped, as long as the tube; ſtigma globoſe, curved upward. *Peric.* Berry ovate, of one cell, leathery. Seed ſolitary.

Eſſ. Ch. Involucrum of four leaves. Corolla in four or five ſegments. Berry dry, with one ſeed.

Dais *cotinifolia*, Curt. Mag. t. 147.; the original and moſt intereſting ſpecies, is a ſhrub, ſix or eight feet high, much branched. *Leaves* deciduous, oppoſite, on ſhortiſh ſtalks, obovate, entire, ſmooth, opaque, pale, and ſomewhat glaucous. *Flowers* terminal, of a delicate lilac hue, externally ſilky, forming elegant tufts at the end of each branch. It is a native of the Cape of Good Hope, from whence the Dutch received it long before it was known in England. It thrives with us in the ground of a conſervatory, better than in a pot, and is propagated only by ſeeds obtained from abroad. D. *octandra* (D. *laurifolia*, Jacq. Ic. Rar. t. 77), grows in the Eaſt Indies, and has larger leaves, of a deeper green, and ſmooth flowers, whoſe ſegments are occaſionally five or four, with ten or eight ſtamens. A third ſpecies, D. *diſperma*, found by Forſter in Tongatabu, varies likewiſe in the number of the parts of its flowers.

DAIS, in *Gardening*, comprehends a plant of the ſhrubby, deciduous, ornamental kind; the D. *cotinifolia*, cotinus-leaved dais; in which the leaves are oppoſite, the flowers in a bunch aggregate, terminating and pubeſcent, and the fruit a ſmall nut of an ovate-acuminate form. It is a native of the Cape.

Method of Culture.—This is a plant which is capable of being raiſed by ſowing the ſeed, which may be had from Holland, in pots of light earth, in the ſpring ſeaſon, and plunging them in a good hot-bed: as ſoon as the plants have acquired a ſufficient growth, they muſt be removed into ſeparate pots of a proper ſize, and be placed under the protection of the green-houſe. It is likewiſe a plant which occaſionally ſucceeds by layers and cuttings, if made from the young ſhoots. The great difficulty of raiſing it, however, renders it a ſcarce plant in our green-houſes.

DAISY, in *Botany*. See BELLIS *perennis*; alſo CHRYSANTHEMUM, ASTER, and GLOBULARIA. The name is derived from day and eye, alluding to the eye-like form of the flower, and its expanſion in the day, and in bright weather only, when it preſents its front to the ſun, following his courſe till the afternoon, when the flower cloſes, but opens again for many ſucceſſive mornings.

DAIX, in *Ancient Geography*, a river of Scythia, on this ſide of mount Imaus. It ſprang from mount Noruſſus, and diſcharged itſelf into the Jaxartes.

DAKER HEN, in *Ornithology*, one of the ſynonyms of the rail. See RALLUS *crex*.

DAKIR, in our ſtatutes, is uſed for the twentieth part of a laſt of hides.

According to the ſtatute of 51 Hen. III. "De compoſitione ponderum & menſurarum," a laſt of hides conſiſts of twenty dakirs, and every dakir of ten hides. But by 1 Jac. cap.

cap. 33. one laſt of hides or ſkins is twelve dozen. See Dicker.

DAL, or Dahl, *Dal elbe, Dal elfwe, Dal älf, (the river of the valley)*, in *Geography*, the largeſt and fineſt river of Sweden, riſes in the mountains which ſeparate Sweden from Norway, and conſiſts originally of two ſtreams, which, after having watered the whole province of Dalecarlia, unite in the pariſh of Gagneſs. That branch which waters the eaſtern part of Dalecarlia is called the Oeſter Dal Elfwe, and that which runs through the weſtern part Weſter Dal Elfwe.

After a courſe of about 260 miles, the Dal falls into the Gulph of Bothnia, near Elfkarleby, about ten miles to the eaſt of Gefle. It flows in a broad and tranquil ſtream, until it reaches a ridge of rocks, and a high iſland a quarter of a mile in circumference, where the whole river forms a cataract ſcarcely inferior to that of the Rhine at Schafhauſen. The iſland divides the cataract into two principal falls, of which the eaſtern is the fineſt. The breadth of the river is about a quarter of a mile, and the perpendicular height of the fall between thirty and forty feet. Coxe's Travels, vol. v.

Dal, the ablative caſe of the Italian article; as *dal* or *del ſig. Paeſiello*, by ſignor Paeſiello; *Dal l'Inferno di Dante*, from Dante's Inferno.

DALA, in *Geography*, a river of Switzerland, which from the canton of Berne flows into the republic of the Vallais, paſſing by the baths of Leuk, and running afterwards through an abyſs ſo deep and ſo obſcure, that, notwithſtanding the violence and noiſe of its current, the river is neither ſeen nor heard. Coxe's Switzerland.

Dala *Syſſel*, or *Dale Syſſel*, commonly called *Breyda fiardar daler*, from the bay of Breydafiardur, is, according to Buſching, the moſt delightful, or rather the only pleaſant, tract of country in Iceland. The mountains run in two parallel lines, and the valleys between are watered by a number of little brooks and rivulets.

DALABORG, or Dalebourg, a ſmall and formerly fortified town of Sweden, in the ſouthern part of the province of Dalecarlia, on the weſt ſide of the lake Wener, 50 miles N. of Gothenburg.

DALAI. See Coulon.

DALATIS, in *Ancient Geography*, a country of Aſia, in Cilicia, mentioned by Ptolemy.

DALBERGIA, in *Botany*, (named by Linnæus in honour of two brothers of the name of Dalberg, to whom he was indebted for many Surinam plants.) Linn. Suppl. 53. Schreb. 483. Willd. Sp. Pl. v. 3. 900. Juſſ. 362. (Ecaſtaphyllum, Browne Jam. 299. t. 32. f. 1.) Claſs and order, *diadelphia decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* of one leaf, bell-ſhaped, with five bluntiſh teeth. *Cor.* papilionaceous; ſtandard large, aſcending, ovate inclining to heart-ſhaped, notched, with a linear claw; wings oblong, ſtraight, obtuſe, with a recurved tooth at their upper edges; keel ſcarcely ſhorter than the wings, ſtraight, obtuſe, cloven at the baſe. *Stam.* Filaments two, each in four or five ſegments, in ſome inſtances accompanied by a third ſmall ſimple filament; anthers eight or nine, ſcarcely more, globoſe, two-lobed. *Piſt.* Germen ſtalked, compreſſed, oblong, ſtraight, ſmooth; ſtyle aſcending or reflexed, deciduous; ſtigma capitate. *Peric.* Legume ſtalked, thin, flat, cartilaginous, ovate or oblong, cloſe, not burſting, containing one or more ſeeds. *Seeds* compreſſed, ſomewhat kidney-ſhaped.

Eſſ. Ch. Stamens in two equal ſets. Legume ſtalked, coriaceous, compreſſed, not burſting.

Two ſpecies only of this genus are deſcribed. D. *lanceolaria*, Linn. Suppl. 316. (Noel-valli, Rheede Hort. Mal. v. 6. 39. t. 22.) A native of Malabar and Ceylon, from whence Konig ſent it to Linnæus. It is a tree with long, wand-like branches, clothed with ſoft whitiſh hairs. *Leaves* alternate, pinnate, with numerous, alternate, elliptical, waved, entire leaflets, hairy above. Flowers in axillary hairy bunches. Legume lanceolate, acute, about two inches long, with one ſeed, rarely two, imbedded in its middle part.

D. *monetaria*, Linn. Suppl. 317. is found in wet ſituations in Surinam. The leaves are ternate. Legume orbicular, deciduous, harder than in the former. The wood of this tree or ſhrub is red, and yields a reſin reſembling what is called Dragon's-blood.

DALBY, in *Geography*, a ſmall town of Sweden, in the province of Schonen, or Scania, where Suen king of Denmark built, in the year 1065, a convent, in which two kings are buried: but in 1512 this convent was ſequeſtered to the crown by Chriſtian III. of Denmark, to whom Scania was then ſubject.

DALDÆ, in *Ancient Geography*, an epiſcopal town of Aſia Minor, in Lydia.

DALE, Samuel, M.D.; in *Biography*, but who applied himſelf more to the ſtudy of botany than to the practice of medicine, was born in the year 1659. He firſt ſettled as an apothecary, at Braintree, in Eſſex; but in 1730 he became a licentiate of the college of phyſicians, in London, in which capacity he practiſed medicine at Bocking, where he continued to reſide to the time of his death, which happened in 1739. He was alſo elected a fellow of the royal ſociety. In 1693 he publiſhed "Pharmacologia ſeu manuductio ad materiem medicam," 8vo. London, which has paſſed through many editions. The author lived long enough to publiſh an edition of his work in 4to, in 1737, much enlarged and improved, which has alſo been frequently reprinted. In this he has diſpoſed of the plants in the manner adopted by Ray. In the firſt part of the work the author deſcribes and gives an account of the properties and manner of uſing the plants moſt eſteemed in medicine. In the latter part, in a ſupplement, plants leſs known and uſed, with ſome that had been very lately diſcovered in America, and other foreign countries, are deſcribed. He alſo publiſhed in 1732, in 4to, "Silas Taylor's Hiſtory and Antiquities of Harwich and Dover Court," to which he made conſiderable additions. In this he diſplays an accurate knowledge in the ſeveral branches of natural hiſtory, giving an exact account of the figured foſſils of the cliff, and an intelligent ſynopſis of the animals and vegetables of the neighbouring ſea and coaſt. Gen. Biog.

Dale, in *Geography*, a river of Ireland, flowing from a ſmall lake of the ſame name in the county of Donegal, which runs into the Foyle, a little below Lifford. This river is navigable for boats from the Foyle to the village of Ballindraite.

DALEA, in *Botany*, (after Samuel Dale, a botaniſt of the time of Ray, author of the Pharmacologia.) Linn. Hort. Cliff. 363. Juſſ. 355. Willd. Sp. Pl. v. 3. 1336. (Pſoralea, Linn. Gen. 386. Schreb. 508.) Claſs and order, *diadelphia decandria*, ſect. 1. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* of one leaf, dotted with prominent glands, five-cleft; ſegments awl-ſhaped, permanent. *Cor.* Papilionaceous; ſtandard roundiſh, erect, notched; wings ſmall, obtuſe, united to the filaments, as is alſo the keel, which conſiſts of two obtuſe petals. *Stam.* Filaments five or ten, united into one ſet; anthers roundiſh. *Piſt.* Germen oblong; ſtyle awl-ſhaped, as long as the ſtamens; ſtigma

ſimple. *Peric.* Legume encloſed in the calyx, of one cell. *Seed* ſolitary, kidney-ſhaped.

Eſſ. Ch. Wings and keel united to the ſtamens, which are monadelphous. Legume of one ſeed.

Linnæus, after having eſtabliſhed this genus in his earlier works, referred it ſubſequently to *Pſoralea*, but Juſſieu and Willdenow have juſtly reſtored it. The monadelphous filaments, united to the wings and keel, afford a ſufficient character. Juſſieu thought all the ſpecies were pentandrous; but Willdenow finds only five that are ſo, nine being decandrous, in all fourteen. His *Dalea cliffortiana*, Linn. Hort. Cliff. t. 22. (Pſoralea Dalea, Linn. Sp. Pl. 1076), is a rare South-American ſpecies. Several are found in North America, of which Michaux has made his genus *Petaloſtemum;* others in Mexico, figured in Cavanilles' *Icones*. The leaves of all are pinnate, with a terminal leaflet, and glandular beneath. Flowers for the moſt part of a dull blueiſh hue, in denſe hairy ſpikes. Habit more or leſs ſhrubby.

DALECARLIA, Daland or Thalland, in Latin *Dalia*, and in Swediſh *Dal* or *Dalarna*, in *Geography*, a province of Sweden, in the weſtern part of Gothland, between the Wener lake and the government of Gothenburg, derives its name from the great number of vallies which it contains. It is ten Swediſh miles long, and five and a half broad.

This country is richly diverſified with an alternate ſucceſſion of foreſts, rocks, hills and dales, uplands and plains, paſtures and arable land, lakes and rivers; and the beauty of the landſcapes is particularly heightened by the river Dal. Sillian, its principal lake, is ſeven Swediſh miles in length, but not above a quarter of a mile in breadth.

Dalecarlia is ſubdivided into the north and ſouth part. The former is rocky and mountainous; its chief place is Amal, and its higheſt mountain the Borekne. The ſouth part is a champain country, and has no town but Dalaborg. Towards the ſouth it produces corn; but its chief articles are cattle, fiſh, butter, and cheeſe. It has a number of mines.

The inhabitants, who are called Dalecarlians, are famous in hiſtory for their integrity and firm attachment to their king and country, and for their courage and bravery. They firſt ſupported Guſtavus Vaſa, and enabled him to attempt thoſe efforts which ended in the expulſion of Chriſtian the Second, and in the eſtabliſhment of the houſe of Vaſa on the Swediſh throne. Guſtavus III., who prided himſelf on his deſcent from Guſtavus Vaſa, ordered a wet nurſe for the preſent king of Sweden, his ſon, to be choſen among the women of Dalecarlia; and in the dangers which threatened Sweden, in 1788, the Dalecarlians were foremoſt in offering their ſervices for the defence of their country. The Dalecarlians ſtill retain the manner of living, dreſs, and cuſtoms, of the ancient Swedes.

Dalecarlia may be called the claſſical ground of Sweden, being full of memorials which indicate the veneration of the natives for the memory of Guſtavus Vaſa.

The four principal villages of Dalecarlia are Leckſand, Mora, Rättwik and Tuna. Each of theſe four pariſhes has from 7 to 11,000 inhabitants, and the vicarage of any of theſe, particularly of Leckſand, is more deſirable than many a Swediſh biſhopric in point of revenue.

In the midſt of the valley irrigated by the Dal, is a rock called *Buller Klac*, ſcarcely forty feet high, from the ſummit of which the naked eye diſcovers 35 villages, crowded with an immenſe population.

The language of the Dalecarlians differs ſomewhat from the Swediſh, and it has been aſſerted that it is a kin to the Icelandic. Profeſſor Enbergius ſays: "Dalica et Iſlandica per omnia adeo ſunt ſimiles, ut, quando Iſlandica accentu Dalico legitur, omnes Dalecarlicam eſſe judicent; id quod experimento certior factus." Ihre maintains that it was proved at Upſal in 1692, when divine ſervice was read to the Dalecarlians aſſembled there, in the Icelandic language. Some learned Engliſhmen are of opinion, that the Dalecarlian language is a dialect of the Celtic, like the language of Lower Britanny, Wales, and Ireland; and biſhop Ruden aſſures us, that a Swediſh ambaſſador brought with him to England a Dalecarlian boy, who could converſe with the Highlanders. There is indeed ſome ſimilarity between the Dalecarlian and the Scotch Highland dialect. (Promenade d'un François en Suede par de la Tocnaye, 1801. Coxe's Travels, vol. v.)

On the breaking out of the war, which has lately been declared by Ruſſia and Denmark againſt Sweden, the Dalecarlians have once more diſtinguiſhed themſelves by the moſt ardent attachment to their king and country. The regiment of Dalecarlia formed the van-guard of the army under general Armfeldt, deſtined againſt Norway, and in the latter end of March, 1808, penetrated fifty Engliſh miles into the enemy's country without meeting with any obſtacle.

DALECHAMP, James, in *Biography*, a learned French phyſician and indefatigable botaniſt, was born at Caen in 1513, ſtudied medicine and botany at Montpelier, was admitted doctor in medicine in 1547, and died at Lyons, where he had long practiſed phyſic, in 1588. He publiſhed ſeveral elaborate tranſlations, particularly of the 15 books of Athenæus into Latin, in 1552, in 2 vols. folio, illuſtrated with notes and figures; and ſome of the works of Galen and Paul Egineta into French. In 1556 he publiſhed a tranſlation of "Cœlius Aurelianus de Morbis acutis;" and in 1569, "Chirurgie Francoiſe, avec pluſieurs figures d'inſtrumens," 8vo., which has been ſeveral times reprinted. He principally followed the practice of Parée, from whoſe work he borrowed the figures of the inſtruments; but he has added a tranſlation into French of the ſeventh book of Paræus, with annotations, and ſome curious caſes occurring in his own practice. He was alſo the editor of an edition of Pliny with notes, publiſhed in 1587. His firſt work, according to Haller, was an 8vo. edition of Ruellius's Commentary on Dioſcorides, which appeared at Lyons in 1552, enriched by Dalechamp with 30 ſmall figures of plants, at that time but little known. His principal performance was an univerſal hiſtory of plants, in Latin, with above two thouſand five hundred wooden cuts, beſides repetitions, publiſhed after his death in 2 folio volumes. The publiſher, William Rouillé, ſeems to take upon himſelf the chief credit of collecting and arranging the materials of this great work, though he allows that Dalechamp laid its firſt foundations. Haller ſays, the latter was engaged in it for 30 years; his aim being to collect together all the botanical knowledge of his predeceſſors, and enrich it with his own diſcoveries. He employed John Bauhin, then a young man, and reſident at Lyons, to aſſiſt him; but Bauhin being obliged, on account of his religion, to leave France for Switzerland, like many other good and great men of that and the following century, the work in queſtion was undertaken by Des Moulins, and ſoon afterwards Dalechamp died. It is often quoted by the title of "Hiſtoria Lugdunenſis," and hence the merits of its original projector are overlooked, as well as the faults ariſing from its mode of compilation, which are in many inſtances ſo great as to render it uſeleſs. The ſame figure is occaſionally repeated for very different plants, an accident too common in books with wooden cuts; and the letter-preſs

ter-preſs is an aſſemblage of learning, criticiſm, and conjecture. which adepts only can turn to any certain profit. Many of the figures, however, are original and good, eſpecially among the graſſes, and ſome of the umbelliferæ. The author had a ſingular fancy of enriching, or rather encumbering his cuts with figures of inſects, which have no reference to the plants, and do not exactly reſemble any living thing. He ſeems to have been inſpired with the ſame taſte as a certain countryman of his, who ſays "Statues are the ſoul of a garden," and to whom, therefore, Eden itſelf, without ſquinting gods and goddeſſes, would have been dull and inſipid. Sometimes Dalechamp gives us ſeparate bloſſoms, fruits, or leaves; but they ſeem intended merely for decoration, and never teach any thing more than may be ſeen in the principal figure. How different from the cuts executed under the direction of Conrad Geſner! Throughout the work there are ſcarcely any traces of methodical arangement, much leſs of diſcriminating or aſſociating plants by their flowers or fruits. The ſtyle, indeed, is altogether deſultory. A French tranſlation was publiſhed in 1615, and again in 1653. Haller's Bibl. Bot. Nouv. Dict. Hiſtorique. Dalech. Hiſt. Pl. S.

DALECHAMPIA, in *Botany*, (named by Plumier after Dalechamp,, the French botaniſt.) Linn. Gen. 501. Schreb. 653. Willd. Sp. Pl. v. 4. 515. Juſſ. 392. Plum. Gen. t. 38. Claſs and order, *monoecia monadelphia*. Nat. Ord. *Tricoccæ*, Linn. *Euphorbiæ*, Juſſ.

Gen. Ch. Barren flowers ſeveral, enfolded by a pair of bracteas. *Cal.* Involucrum common, in 4 deep ſegments, which are erect, obtuſe, one of them, under the nectary, twice as large as the reſt; Perianth of 6 ovate reflexed leaves. *Cor.* Petals none; nectary broad, of numerous, obovate, flat leaves, in ſeveral rows. *Stam.* Filaments numerous, united into a tube as long as the calyx; anthers roundiſh, with four furrows.

Fertile flowers three, between the ſame bracteas. *Cal.* Involucrum common, of three leaves, which are upright, roundiſh, permanent, the outermoſt thrice broader than the reſt; perianth of 10 lanceolate, ſerrated, cloſed, permanent leaves. *Cor.* none. *Piſt.* Germen roundiſh, with 3 furrows, ſhorter than the calyx; ſtyle thread-ſhaped, very long, bent towards the barren flowers; ſtigma ſomewhat peltate. *Peric.* Capſule three-lobed, roundiſh, of 3 cells and 3 valves. *Seeds* ſolitary, globular. Jacq.

Eſſ. Ch. Barren flowers, Involucrum in 4 deep ſegments; Perianth of ſix leaves. Cor. none. Fertile, Involucrum of 3 leaves; Perianth of 10. Cor. none. Capſ. three-lobed.

D. *ſcandens*, the original ſpecies, Jacq. Amer. 252. t. 160, Plum. Amer. t. 101, a native of Martinico and Hiſpaniola, is chiefly known by the deſcriptions and figures of Jacquin and Plumier. It has a rough climbing ſtem, with tendrils; three-lobed, ſerrated, hairy leaves; and axillary green flowers on long ſtalks. The bracteas are large, deeply three-cleft, ſerrated, encloſing the flowers and ſeeds. D. *colorata*, found by Mutis in New Granada, has entire leaves and purpliſh bracteas. La Marck, in his Encyclopedie, deſcribed nine more ſpecies, eight of them from South America, one from China. None of theſe plants are at preſent known in the gardens of Europe. Their flowers are deſtitute of beauty.

DALEHR, in *Geography*, a fortreſs of Sweden, built on a rocky iſland, with a garriſon to guard the entrance and receive the duties of veſſels going to Stockholm.

DALEM, a town of Germany, in the circle of Weſtphalia, and biſhopric of Paderborn; ſeven miles E. of Buren.

Dalem, ſee Dalhem.

D'ALEMBERT, in *Biography*, ſee Alembert. This eminent mathematician and philoſopher would certainly merit a diſtinct article among muſical writers, for the clear and geometric arrangement and explanation of the diffuſed and obſcure theoretical writings of Rameau, if, in the article *Baſſe Fondamentale*, we had not already incidentally examined his muſical opinions, before and after his controverſy with the celebrated French opera compoſer and writer on the ſubject of muſic, in the two editions of his "Elements of Muſic, according to the Principles of Rameau."

The ſyſtem of Rameau, founded on the *Baſſe fondamentale*, was rendered ſo clear, pleaſing, and faſhionable, by the firſt edition of d'Alembert's Synopſis, as to be as implicitly believed in France, as Burnet's Theory of the Earth was in England, till examined by Keil, and proved to be founded on unphiloſophical principles. But a few years after, when d'Alembert had more accurately examined the principles of Rameau, and expreſſed his doubts of ſome of them in an article of the Encylopedie, Rameau was ſo irritated as to publiſh a pamphlet in his defence, in which he ſeems to have loſt all reſpect for his commentator; after which d'Alembert openly attacked his ſyſtem, and denied its being capable of demonſtration, which ſtaggered the liſt of French contra-puntiſts, who had thought there never was, nor ever could be, any accurate and good muſic compoſed, but on the principles of the *Baſſe fondamentale* of M. Rameau; which at preſent is as much neglected and forgotten in France, as, in the houſes of the great, ſmoking is in England.

DALEN, Corneille Van, called the Younger, a deſigner and engraver, the ſon of a print-ſeller of Antwerp, where he was born about the year 1626. He was placed under the tuition of Cornelius Viſſcher, whoſe ſtyle he generally adopted, though he ſometimes ſeems to have imitated the manner of Vorſterman, P. Pontius, Bolſwert, and other artiſts. Dalen acquired conſiderable reputation, and is ſaid by Fuſeli to have travelled into England; but this, probably, is only ſuppoſition, ariſing from his having engraved the portraits of ſeveral Engliſhmen. The prints of this artiſt are finely executed, and evince a correct taſte, and his heads in particular are in high eſtimation. He ſometimes marked his plates C. D. not unfrequently adding junior. Amongſt his numerous performances are the following: The four Fathers of the Church, a middling-ſized, upright plate, from Rubens; the Graces embelliſhing a Statue of Nature, a large print, on two plates, from the ſame, much in the manner of Bolſwert; the Virgin preſenting the Breaſt to the Infant Chriſt, middling ſized, from Flinck; Venus and Cupid, middling ſized, from the ſame; Charles II. in armour, a half-ſheet print, much eſteemed; four prodigiouſly fine portraits from Titian, generally conſidered the *chefs d'œuvres* of Van Dalen: 1ſt, Pietro Aretino, holding a book half open; 2d, Gio. Boccacio, holding a book ſhut; 3d, Giorgione da Caſtelfranco, ſeen in front; 4th, Sebaſtiano del Piombo. This latter is by ſome attributed to Tintoretto. Huber.

DALENS, Dirk, a painter, born at Amſterdam in 1659. He was inſtructed by his father, William Dalens, a landſcape-painter of no eminence. At the age of 13 he became acquainted, at Hamburgh, with John Voorhout, in whoſe company he applied himſelf to the pencil with unabated aſſiduity. He afterwards returned to Amſterdam, where he enjoyed conſiderable reputation during the remains of his ſhort life, which terminated at the age of 29, in 1688. A fine landſcape, with ducks and other fowl, painted by this artiſt, after the manner of Hondekoeter, is in the collection of the Elector Palatine. Deſcamps.

DALENAS, or Dalenes, in *Geography*, a ſmall town of Norway, in the dioceſe of Drontheim, with a provoſtſhip, to which belong ten pariſhes, and twenty-nine churches.

DALENBURG,

DALENBURG, a town of Germany, in the circle of Lower Saxony, and principality of Luneburgh Zell, on the Netze; 16 miles E. S. E. of Zell.

DALENE, a ſmall town of Norway, in the dioceſe of Chriſtianſand, with a provoſtſhip of five pariſhes.

DALFFEN, or DALFEN, a town of Holland, in the Overyſſel, ſeated on the Vecht; 8 leagues S. W. of Coverden.

DALFHEIM, a town of Germany, in the circle of the Lower Rhine, and palatinate of the Rhine; 6 miles N. W. of Worms.

DALHEIM, a town of Germany, in the circle of Weſtphalia, and duchy of Juliers; 3 miles N. N. W. of Waſſenberg.

DALHEM, or DALEM, a ſmall town of France, in the department of the Ourte, chief place of a canton, in the diſtrict of Liege, on the river Bervine; 6 miles N. E. of Liege, and 18 N. W. of Limbourg, with which it was annexed to France, in conſequence of the wars of the Revolution, having formerly belonged to the United Provinces of the Netherlands, at preſent the kingdom of Holland. Dalhem has 732 inhabitants, and its canton 19 communes, with a population of 13,622 individuals, upon a territorial extent of 62½ kiliometres. N. lat. 50° 45′. E. long. 8°.

DALIAS, a town of Spain, in the province of Grenada; 6 leagues W.S.W. of Almeria.

DALIN, OLOF VON, in *Biography*, a Swediſh hiſtorian and poet, was born in 1708 at Winberga, in Holland, where his father was clergyman. He was educated at Lund, and in 1735 he publiſhed, without his name, a weekly paper, entitled "the Swediſh Argus." This was ſo much eſteemed, that the author was appointed librarian at Stockholm in 1737; and from thenceforth he acquired great reputation by his literary productions, which obtained a very general circulation through the whole kingdom. In 1739 he began his travels, and in the courſe of the next four years viſited the principal places on the continent, and formed an acquaintance with many men of great learning and celebrity. In 1743 he publiſhed a poem, entitled "Swediſh Liberty," one of the beſt poetical productions that ever appeared in Sweden. He was next engaged to compile a hiſtory of his own country from the earlieſt period to the preſent time, which he accompliſhed in three volumes quarto; and which was afterwards tranſlated into the German language. In 1749 the hereditary prince was put under his care; the duties of preceptor he performed ſo much to the ſatisfaction of his employers, that he was ennobled in the year 1751, when he aſſumed the name of VON Dalin. In 1753 he was appointed a counſellor of the chancery, and in two years after hiſtoriographer to the king. He was next advanced to the dignity of knight of the polar ſtar, and counſellor of the court. This happened in the ſpring of 1763, and in the following Auguſt he died at the palace of Drotlingholm. He was a voluminous but very reſpectable writer, and his ſmaller pieces have been collected and printed in 6 volumes. General Biography.

DALIS, DALIA, or DALAND, in *Geography*. See DALECARLIA.

DALISANDUS, in *Ancient Geography*, a town of Aſia, in Cappadocia. Ptolemy.

DALKEITH, in *Geography*, a conſiderable town, though a ſmall pariſh, in the county of Mid-Lothian, Scotland, is delightfully ſituated on a ſtrip of land, between the rivers North and South Eſk; whoſe banks are richly clothed with trees, and ornamented with handſome ſeats of ſome families of diſtinction. *Dalkeith-houſe*, adjoining the village, the elegant ſeat of the duke of Buccleugh, was erected on the ſite of Dalkeith Caſtle, about the beginning of the laſt century. The thriving and luxuriant plantations around it, enlivened by the waters of two winding rivers, which unite about half a mile below, over one of which is thrown an elegant ſtone bridge, and the various walks laid out with much taſte, tend greatly to heighten the effect of the building. The park is well wooded, and ſtocked with deer. This place is much reſorted to by perſons from Edinburgh, and other parts of Scotland adjacent, for the purpoſe of being gratified with the ſurrounding and delicious ſcenery. A few manufactures have been lately introduced, but the principal trade is in corn; for which article one of the largeſt markets in the country is held here every Thurſday: the whole buſineſs of which is done for ready money. The grammar ſchool of Dalkeith has long been in high repute as an excellent ſeminary; and in this ſome of the brighteſt ornaments of literature Scotland has produced firſt received the rudiments of their education. The population of the pariſh in 1799, amounted to 4336, about 3000 of which reſided in the town. But this has ſince much increaſed.

DALKEY, a ſmall iſland in the Iriſh ſea, forming the ſouthern limit of the bay of Dublin. It contains about 18 acres, having plenty of herbage. The channel between this iſland and the main land is called *Dalkey Sound*, in which there is good anchorage for ſhips. The village of Dalkey, on the main land, is romantically ſituated at the northern baſe of a high mountain, commanding a beautiful view of the bay of Dublin. This village in the reign of queen Elizabeth, and during a great part of the 17th century, before the port of Dublin was improved, was the repoſitory of the goods belonging to the merchants of Dublin. Dalkey iſland is in long. 6° 4′ W. Lat. 43° 19′ N.

DALLAMANO, GUISEPPE, in *Biography*, a painter, born at Reggio, in 1679. This artiſt, though totally illiterate, and by ſome even ſaid to have been an idiot, poſſeſſed extraordinary talents for painting, and was eſpecially an excellent colouriſt. He lived many years in the ſervice of the court of Turin, and died in 1758. Lanzi.

DALLANS, RALPH, an organ-builder of conſiderable merit, and great practice in England, at the time of the Reſtoration. During the ſuppreſſion of the cathedral ſervice, and prohibition of the liturgy, ſcarce a tolerable inſtrument had been left entire in any church of the whole kingdom. Some of them had been ſold to private perſons, ſome robbed of their pipes for the ſake of the metal, and others totally deſtroyed by malignant fanatics. Except Dallans, Loofemore of Exeter, Thamar of Peterborough, and Preſton of York, there was not an organ-builder to be found in England. Theſe were employed with all the workmen that could be procured, in repairing the organs of ſome churches, and conſtructing new ones for others. Dallans was engaged to build a new organ for St. George's chapel, Windſor; which, perhaps, from the haſte with which it was conſtructed, though its appearance was beautiful and magnificent, did not prove ſo excellent as was expected. He alſo erected, among a great variety of others for different places, the organ at New College, Oxford; and an upright organ, with four ſtops, for the public muſic ſchool in that univerſity, eſtabliſhed ſoon after the reſtoration. The price of this laſt inſtrument was only fifty-one pounds ten ſhillings; as appears from a printed account of inſtruments, books, and other neceſſaries, bought for the uſe of the muſic-ſchool with money contributed for that inſtitution.

The time of Dallan's deceaſe was nearly aſcertained by an inſcription on a ſtone in the Old Church of Greenwich, which is thus recorded by Strype:

"Ralph Dallans, organ-maker, deceaſed while he was making this organ; begun by him February 1672. James White, his partner, finiſhed it, and erected this ſtone 1673."

DALLER, or DAHLER, in *Geography*, a ſmall town of Denmark, in that part of Sleſwick which is conſidered as belonging to North Jutland, in the peninſula of Jutland.

DALL-JOSEPHAT, a dale, in Southern Africa, which, together with Waagenmaker's valley, is encloſed between the hilly projections that branch out towards the north or upper end of the valley of Drakenſtein. The beſt oranges, as well as the beſt peaches, and other fruit, are ſaid to be produced in theſe dales; and the wines are among the firſt in quality.

DALLOWICZE, a town of Lithuania, in the palatinate of Minſk; 32 miles N.E. of Minſk.

DALMACHERRY, a town of Hindooſtan, in the Myſore country; 100 miles N.E. of Bangalore, and about the ſame diſtance N.W of Madras. On the ſituation of Dalmacherry and Gooty, depends the whole courſe of the river Pennar, from its ſource to Cuddapa; together with all its branches, and the different poſitions near them. Concerning the poſition of Dalmacherry, ſays major Rennell, there is a diverſity of opinion, its bearing and diſtance not having been mathematically aſcertained. This accurate geographer places it 56½ geographical miles from Arcot, in a N.N.W. direction; which makes the interval between it and Cudapanatum, 46½; and its latitude is 13° 43′ 30″. There are three important paſſes, that lead from this place into the Myſore and Cuddapah countries; and here it was that Doaſt Ally, the nabob of Arcot, was ſurpriſed and defeated by the Mahrattas, in the year 1740.

DALMANUTHA, in *Ancient Geography*, a place of Paleſtine, on the other ſide of Jordan, on the coaſt of the ſea of Galilee.

DALMASIO, LIPPO, in *Biography*, a painter who was native of Bologna, and flouriſhed in the 14th century. He ſtudied under Vitale, and, on account of the beautiful expreſſion which he gave to his heads of the Virgin, was called by his maſter *Lippo delle Madonne*, which name he afterwards preſerved. Pope Gregory XIII. ſo highly valued one of Lippo's Madonnas, that he always kept it near his bed-ſide as an incitement to devotion; and Guido Reni could not conceive how the artiſt could give to theſe heads ſo much majeſty, holineſs, and ſweetneſs of expreſſion, without divine inſpiration. He painted many works in the different churches and palaces of Bologna. In 1408, at an advanced age, he was ſaid to have taken the Carmelite habit. Later authors, however, have diſcovered that he died in the connubial ſtate about the year 1410. Malvaſia. Lanzi.

DALMATÆ, in *Ancient Geography*, a people reckoned by Strabo among the Illyrian nations, and who gave their name to a part of Illyria, which they occupied.

DALMATIA, an extenſive country of Europe, towards the Adriatic ſea, which anciently formed a part of Illyria. It was ſeparated towards the north from Liburnia by the river Titius, and on the ſouth-eaſt it had Naro. According to ancient tradition, it abounded with gold. Martial, in one of his epigrams, called it the land which produced gold. The principal rivers were the Titius, which watered the towns of Burnum and Sardona; the Tilurus, which paſſed near a hill on which was ſeated the town of Equum; and the large river Naro. Its chief towns were Scardona, Arbuda, Burnum, Promona, Tragarium, Sicum, Salones, Aſpalathos, Andetrium, Equum, Epetium, Cnæum, Peguntium, Bataneum, Narona, and Delminium. When the Avari obtained poſſeſſion of this country, it was afterwards denominated by the Chriſtians *Pagania*, becauſe the Avari were idolaters: the Illyrians called it Poganin. Pogania was divided into three diſtricts or zupanies. Mocros, formerly called Bataneum, was the moſt conſiderable town.

DALMATIA, or *Delmatia*, in *Geography*, from its ancient capital *Delmium* or *Delminium*, which the Romans took and deſtroyed in the 597th year of Rome, is a country of Europe between the 42d and 46th degree of north latitude; bounded on the north by Boſnia and Croatia, on the eaſt by Servia and Turkey in Europe, and on the weſt and ſouth by the Adriatic ſea, or gulf of Venice. It is 336 miles long, and 69 miles broad. In the year 1783, the number of its inhabitants was ſuppoſed to be 367,000. It was at that time divided between four different powers; one part belonged to Auſtria, and was ſtyled Hungarian Dalmatia; another belonged to the Italian republic of Venice, and has ſince paſſed under the ſovereignty of Auſtria, along with the Venetian ſtates, but is at preſent in the hands of the French; the third part belonged to the little republic of Raguſa, which part, together with Raguſa itſelf, is likewiſe occupied by French troops; and the fourth belonged to the Ottoman Porte, and was called Turkiſh Dalmatia.

Hungarian Dalmatia lies in the upper part of the Adriatic ſea, and compriſes, beſides the country of the Uſcocks and Morlachia, the diſtrict of Zengh, on the confines of Iſtria, the diſtrict of Ottoſchatz, the county of Lyka or Licca, part of which belongs to Turkey; the weſtern part of the county of Corbau; and the Zwonigrad or Serman diſtrict. Zengh or Segna, and Ottorichatz, are its principal towns.

Venetian Dalmatia was divided into the continent, and the county of Zara. Its inhabitants are conſidered as ſkilful mariners; at leaſt, they are the beſt in the Adriatic. They reſemble the Savonians in their manners, and ſpeak the ſame language. The country is mountainous and rather barren. The principal towns are ſituated on the coaſt. Zara is the capital.

Raguſan Dalmatia, which belonged to the republic of Raguſa, conſiſted only of that city and a territory of about ſixty miles in length, with the towns of Gravoſa and Stagno, and five ſmall iſlands, the principal of which is Melida, Milet or Melada. See RAGUSA.

Turkiſh Dalmatia is ſituated between Boſnia, and Venetian and Raguſan Dalmatia. It extends from Boſnia to Albania. Its chief places are Moſtar or Maſter, Clinovo or Klinova, and Scardona or Skardin.

Dalmatia, after it had been reduced under the Roman yoke, ſhook it off not leſs than five times, and for the ſpace of 220 years gave the Romans much trouble, until the reign of Auguſtus, when, the provinces being divided between him and the ſenate, Dalmatia fell to the latter; but the ſenate voluntarily ceded this province to the emperor, who appointed a quæſtor over it. At the death of Conſtantine the Great, Dalmatia was conſidered as a part of Illyricum. It ſuffered very much from the inroads of the northern barbarians, and was forced to ſubmit to the Goths; but it was reconquered, along with Italy, by the emperor Juſtinian. The Slavi or Slavonians, at laſt, eſtabliſhed themſelves in Dalmatia about the end of Heraclius's reign. The country had then its particular kings, the laſt of whom dying without iſſue, left his kingdom to his conſort, who bequeathed it to her brother Ladiſlaus, king of Hungary. In the fifteenth century, the Venetians conquered the whole kingdom of Dalmatia, and reſtored only a portion of it to the Hungarians, keeping the beſt maritime parts. The Turks afterwards diſpoſſeſſed the Venetians of ſome provinces, and a ſmall maritime territory was allotted to the republic of Raguſa.

The

The Dalmatians uſe the Slavonian language and cuſtoms; and profeſs the Roman Catholic religion. Its rivers, which have no long courſe, are moſtly navigable. The country is interſperſed with mountains; but theſe are not unfruitful, as they produce olives, vines, myrtles, and a great variety of vegetables; and within them, it is ſaid, there are mines of gold and ſilver ore. The air is pure and temperate.

Dalmatia being now the ſcene of bloody conteſts, its fate will perhaps be decided before we arrive at the article *Montenegrins*, which will give us an opportunity to reſume this account. See MONTENEGRINS.

DALMATIAN ISLES, *the*, are ſeveral iſlands in the Adriatic, on the coaſt of Venetian Dalmatia, which formerly belonged to Venice, the principal of which are Oſero, Cherſo, Veglia, Arbe, Pago, Lantano, Paſma, Iſola longa, Mortero, Brazza, Leſina, Liſſa, Curzola nigra, or Corcyra. Many of theſe iſles are fertile in wine, olives, figs, and other fruits.

DALMATIAN *Chain*, is a vaſt chain of mountains which proceeds by the north of Dalmatia towards the Hæmus, and is known by many local appellations, as mount Promina, near Gnin, mount Prologh, mount Clobu. The latter mountains are chiefly calcareous. Pinkerton's Geography, vol. i. p. 388.

DALMATIC, an ancient clerical habit, ſo called, becauſe it was previouſly the ordinary dreſs of the inhabitants of Dalmatia. It covered the whole body, and had large looſe ſleeves; on which account it was thought to be convenient for the miniſtry of the deacons. But it was alſo worn by biſhops, as we learn from the acts of St. Cyprian, the celebrated doctor and martyr of the third century, who being about to ſuffer death, delivered his dalmatic to his deacon, leaving the reſt of his dreſs for the executioners. At preſent it forms part of the under-dreſs of Roman Catholic biſhops, when they officiate pontifically, being made of thin, light ſilk. But it is the outſide and diſtinctive veſtment of their deacons, being richly ornamented with lace, and having a ſort of large open wings attached to it, by way of ſleeves.

DALRYMPLE, SIR DAVID, in *Biography*, a lawyer and hiſtorian of ſome eminence in Scotland, was born in 1726. He was educated at Eton, where he made a rapid progreſs in the learned languages, and formed a predilection for Engliſh manners and cuſtoms. From Eton he went to Utrecht, where he ſtudied the civil law, and remained till the year 1746. He was called to the bar, in his own country, in 1748; but as an advocate he was far from ſhining, though he poſſeſſed much and ſound learning, and was capable of arguing any caſe very forcibly. He was appointed one of the judges of the court of ſeſſion early in the year 1776, and ſoon after, one of the lords commiſſioners of juſticiary; on this occaſion he aſſumed the title of Lord Hailes, the name by which he is generally known among the learned of Europe. He diſtinguiſhed himſelf in this ſituation by ſtrict integrity, patient attention, and uniform decorum of behaviour. In doubtful caſes he always inclined to mercy, and he was free from that bias towards the crown with which many of the judges in the Scotch courts have often been charged. As a public man, his character has been given in few words: he was a ſound lawyer, and an upright judge. In private life, he was eminent as a profound and accurate ſcholar; deeply read in the claſſics, and well acquainted with every department of the belles lettres, and with hiſtorical antiquities, particularly of his own country. Lord Hailes publiſhed many works, but thoſe which chiefly demand our notice, are, 1. "Annals of Scotland, from the Acceſſion of Malcolm Canmore, to the Acceſſion of the Houſe of Stuart," in 2 vols. 4to. This work is ſo well authenticated by references to hiſtorians of good credit, or to deeds and writings of undoubted authority, that it will long remain a laſting monument of the induſtry, learning, and integrity of the worthy author. 2. Lord Hailes came forward, in conjunction with the preſent biſhop of Landaff and others, to repel Mr. Gibbon's attack on Chriſtianity. He publiſhed a volume, entitled "An Inquiry into the Secondary Cauſes which Mr. Gibbon has aſſigned for the rapid Progreſs of Chriſtianity," in which there is a great diſplay of literary and critical acumen, and of zeal for the cauſe of religion, without any of the rancour too often mixed with theological controverſy. This was publiſhed in 1786, and was the laſt work of conſequence that he ſent to the preſs. The infirmities of age came now rapidly on his lordſhip; he nevertheleſs was enabled to attend his duty on the bench till within three days of his death, which happened on the 29th of November 1792. Lord Hailes was author of many pieces connected with his profeſſion, as a lawyer; of ſome biographical ſketches of the natives of Scotland; and of eſſays in many of our periodical works. Encyc. Brit.

DALRYMPLE'S *Point*, in *Geography*, a cape of the iſland of Dominica; 2 miles S. of Charlotte's town.

DALTON, JOHN, in *Biography*, an eminent divine of the church of England, was ſon of the Rev. John Dalton, rector of Dean, near Whitehaven, where he was born, in the year 1709. He was educated at Queen's college, Oxford, and became tutor to lord Beauchamp. During this period, he adapted Milton's Maſk of Comus to the ſtage, by the inſertion of ſeveral ſongs and different paſſages ſelected from Milton's other works, as well as of ſeveral additions of his own, ſuited to the characters and to the manner of the original author. This was favourably received by the public, and Mr. Dalton very induſtriouſly ſought out a grand-daughter of the poet, who was borne down with age and poverty; and procured her a benefit from it, the profits of which amounted to a conſiderable ſum. He went abroad with his pupil, who died in the courſe of his travels. On his return, Mr. Dalton took orders, and obtained the rectory of St. Mary Hill, London. He was afterwards promoted by the king to a prebend of Worceſter, where he died, July, 1763. He was author of a volume of ſermons; of a deſcriptive poem, addreſſed to two ladies on their return from viewing the coal-mines; and remarks on twelve hiſtorical deſigns of Raphael; and the Muſæum Græcum et Egyptiacum. His brother Richard was librarian to the king, and publiſhed drawings, executed by himſelf, of the proceſſion to Mecca.

DALTON, in *Geography*, a ſmall market town of England, in the county of Lancaſter, and that part of it called *Furneſs*. It probably received its name from the Saxons: the term, in their language, ſignifying a place ſituated in a *dale* or *valley*. Thus, in the midſt of a moſt fertile tract of country, it originally derived its hiſtoric conſequence, from its being connected with Furneſs abbey. By a privilege granted to the abbot by king Stephen, Dalton became the capital of Furneſs, flouriſhed under its auſpices, and held that rank till the diſſolution of its monaſtery. Subſequent to that period, it began to decline. Ulverſton, in the vicinity, being more advantageouſly ſituated for trade, ſoon obtained the preference in a commercial view. Dalton conſiſts of one principal ſtreet, opening into the market-place; and ſome of the old houſes having been lately replaced by better buildings, its appearance has been much improved.

The

The church is a ſmall neat building, having an organ, the expence of which was defrayed by voluntary ſubſcription. The tenure of property in this place is peculiar. The place is divided into four portions, or townſhips, and the cuſtomary tenements in each are of equal ſize; pay equal parts of rent to the lord; are not deviſeable by will; and cannot be ſeparated by the proprietor. This peculiarity aroſe out of the feudal ſyſtem, variouſly modified in religious caſes; as every tenant formerly was obliged to furniſh the abbot with a man and horſe for the ſervice of the king.

The only trade of any conſequence, at preſent, is that of making malt. It has a weekly market on Saturdays, and three annual fairs. The moſt ancient is held October 23d, another on June 6th, and a third on April 28th. According to the reports ſent to government, the population of "Dalton in Furnace" is ſtated to be 303, occupying 56 houſes; and that of "Dalton," a hamlet, 1052 perſons, occupying 224 houſes. In this town, at a place called the *Beckſide*, was born, December 15th, 1734, George Romney, a painter of great genius, who obtained conſiderable eminence in his profeſſion: he died, and was interred at this his native place, Nov. 15th, 1802. On an eminence, called *High Haume*, about a mile to the north of the town, is a circular intrenched mound, which appears to have been a fortified beacon: and on the weſt ſide is a rocky eminence, with a ſquare tower upon the ſummit, probably built to guard the approach to the abbey. In this fortreſs the abbots held their ſecular courts, and immured their priſoners. The building contains three floors, and is uſed to hold the courts-leet and baron of the chief lords of the liberty and manor of Furneſs. Theſe are lord Beaulieu and the duke of Buccleugh. Near Dalton, at the diſtance of one mile and a half, are the ruins of the once extenſive and celebrated monaſtery of Furneſs. It was a Ciſtertian abbey, and, in point of wealth and magnificence, was conſidered the ſecond in the kingdom; being inferior to none, either in liberal endowment or extent of privilege, except that of Fountains, in the county of York. The majeſtic ruins of this once proud pile, from the deep retirement of the ſituation, the venerable grandeur of its fine-pointed arches, and the luxuriant trees, which caſt a gloom of ſhade in uniſon with its fallen grandeur, render it a highly pictureſque intereſting ſcene, which is much frequented and admired by the votaries of taſte and lovers of antiquity.

Dalton, a fine townſhip of America, in Berkſhire county, and ſtate of Maſſachuſetts, having Pittsfield on the Weſt, and containing 859 inhabitants. It was incorporated in 1784, and lies 135 miles W. by N. from Boſton, and about 36 miles in the ſame courſe from Northampton, the ſtage road from Boſton to Albany.—Alſo, a townſhip in Grafton county, N. Hampſhire, firſt called Apthorpe, incorporated in 1784, and containing 62 inhabitants; ſituate on the eaſt bank of Connecticut river, oppoſite to Concord, in Eſſex county, Vermont.

DALUA, or Awin Dalua, *i. e. The Double Stream*, ſo called from its two ſources, a river of Ireland, which, riſing in the N.W. corner of the county of Cork near Kerry, paſſes the town of Newmarket, and meets the Allo at Kanturk.

DALUS, in *Antiquity*, a certain meaſure of land; whence comes *dali*. The *dali prati* have been eſteemed ſuch narrow ſlips of paſture, as are left between the ploughed furrows in arable land; which, in ſome parts of England, are called *doles*. The word is applied in Welſh to low meadows by a river ſide. This ſeems alſo to be the original and nature of Deal in Kent, where Cæſar landed and fought the Britons. Cowel.

DAM, a boundary or confinement, as to dam up, or dam out: *infra damnum ſuum*, within the bounds or limits of his own property or juriſdiction. Bract. lib. ii. cap. 37.

Dam denotes a bank of earth or other matter, which pens up water, as a mill-dam; ſometimes the ſheet, or pound of Wales itſelf, is called the *dam*. See Embankment.

Dam, a money of account in the Mogul empire, which is the fortieth part of a rupee, or 2*s*. 6*d*. ſterling, and ſerves for computing the land revenues.

Dam, or *Appinge Dam*, *Damme*, *Dammona*, in *Geography*, a ſmall town of Holland, in the department of Groeningen, on the river Fivel, which, from this place, is called the Damſter Diep, about three miles from the ſea, 15 N E. of Groeningen, and 18 S.W. of Embden. N. lat. 53° 36′.—Alſo, a ſmall town of France, in the department of the Lys, not far from the ſea, and 5 miles N.E. of Bruges. N. lat. 51° 14′.

DAMA, a town of Arabia, in the country of Yemen; 220 miles N.N.E. of Mecca.

Dama, in *Zoology*. See Cervus, Antelope and Nanguer, Lucanus, and Phalæna *nocua*.

DA'MA, in *Ship-Building*, a reſinous ſubſtance uſed in India for paying the bottoms of ſhips. In ſome parts of that country, the planks are rabbeted into each other, the interſtices are filled with cotton, and the whole of the ſhip's bottom being payed with dáma, preſents, as it were, one impenetrable ſurface, as impervious to the water as it is poſſible for any ſubſtance, in the ſlighteſt degree porous, ſhould be.

DAMAC, in *Geography*, a town of the iſland of Java, on the north coaſt, where the Dutch have a factory.

DAMAGE, in *Law*, is generally taken for any hurt, or hindrance that a man receives in his eſtate; but more particularly for a part of what the jurors are to inquire of and bring in, in paſſing verdict for the plaintiff, in a civil action, be it perſonal or real. After verdict given of the principal cauſe, they are aſked their conſciences touching coſts and damages, which contain the hindrances that the plaintiff or demandant hath ſuffered by means of the wrong done him by the defendant or tenant. Damage has two ſignifications; the one proper and general, the other ſtrict and relative. *Proper*, as it is in caſes where damages are founded on the ſtatute of 2 Hen. IV. cap. 1, and 8 Hen. VI. cap. 9, where coſts are included within the word damages. Damage then, in its proper ſignification, is ſaid *à demendo*, when, by diminution, a thing becomes worſe; and in this ſenſe coſts of ſuit are damages to the plaintiff, as by them his ſubſtance is diminiſhed.

Relative is when the plaintiff declares the wrong done him to the damage of ſuch a ſum. This is to be taken relatively, for the wrong which paſſed before the writ brought; and is aſſeſſed by reaſon of the treſpaſs aforeſaid; and cannot extend to coſts of ſuit, which are future and of another nature. 10 Rep. 116, 117. See Costs.

In *perſonal* and *mixed* actions, damages were recovered at common law. But in *real* actions, no damages were recoverable, becauſe none were demanded by the count or writ: whereas, in actions *perſonal* the plaintiff counts *ad damnum* for the injury, and if he recovers no damages, he hath no coſts. (10 Rep. 111. 117.) In a *perſonal* action, the plaintiff ſhall recover damages only for the tort done *before* the action brought; and therein he counts for his damages. In a *real* action, he recovers his damages pending the writ, and therefore never counts for his damages. (10 Rep. 117.) By the ſtatute of Glouc. 6 Ed. I. c. 1. damages are given in real actions, aſſiſes of novel diſſeiſin, mort d'anceſtor, &c., and ſhall be recovered againſt the alienee of a diſſeiſor, as well

as againſt the diſſeiſor himſelf; and the demandant ſhall have of the tenant likewiſe coſts of ſuit; but not expences for trouble and loſs of time. (2 Inſt. 288.) See alſo the ſaid ſtatute (6 Ed. I. c. 1. 3 Hen. VII. c. 10. 2 Inſt. 284. 286. 2 Danv. Abr. 448.) Damages ſhall be recovered in writ of admeaſurement of dower; but not in a writ of admeaſurement of paſture. (2 Danv. 457.) Damages and coſts are due in a writ of annuity; and if the jury find for the plaintiff, and do not aſſeſs damages, it will be error; though he may after verdict releaſe the damages, and take judgment for the annuity. (11 Rep. 56. Dyer, 320. 369.) In battery, impriſonment, and taking of goods, againſt three perſons; one commits the battery, another the impriſonment, and the third takes the goods, all at one time, all are guilty of the whole, and to be charged in damages. 3 Lev. 324. 10 Rep. 66. 69.

In *real* actions, damages are aſſeſſed by writ of inquiry; and when the jury find the iſſue for the plaintiff, they are to aſſeſs the damages. And in actions upon the caſe, &c. where damages are uncertain, it is left to the jury to inquire of them. In debt, when it appears certain to the court what it is, the damages aſſeſſed by the jury are very ſmall, or, in fact, only nominal, as one ſhilling; and the maſter in B. R. taxeth the coſts, which are added thereto, and called damages. (1 Lill. 390.) When judgment is given by default, in action of debt, the court is to aſſeſs the damages, and not the jury: thus alſo, in judgment by *nil dicit*, in action of debt. In caſe of exceſſive damages being given, the court hath ſometimes relieved the defendant by a new writ of inquiry. (2 Danv. 464.) And in caſe of exceſſive damages, on motion, the defendant may have a new trial. (1 Neſſ. Abr. 587.) A jury may, and now frequently do, give intereſt on book-debts, in the name of damages. (Doug. 676.) In action upon the caſe, the jury may find leſs damages than the plaintiff lays in his declaration, but ought not to find more: the plaintiff may releaſe part of the damages, upon entering up his judgment. (10 Rep. 115.) Double, treble damages, &c. are allowed in ſeveral caſes, by a great variety of ſtatutes; as for not ſetting forth tythes; diſtreſſes wrongfully taken; reſcous; though, if it be not found by the jury, that the plaintiff hath ſuſtained ſome damage, in caſes where treble damages, &c. are inflicted by law, no damages can be awarded. 2 Danv. Abr. 449.

Damage-*clear*, *Damna Clericorum*, was a fee aſſeſſed out of all damages exceeding five marks, and recovered to the amount of the tenth part in the court of common pleas, and the twentieth part in the courts of king's bench and exchequer, which the plaintiff was obliged to pay as a gratuity to the prothonotaries and his clerks, for drawing ſpecial writs and pleadings; but is aboliſhed by ſtat. 17 Car. II. cap. 6: and if any officer in the king's courts take any money in the name of damage-clear, or any thing in lieu of it, he ſhall forfeit treble the value.

Damage-*feaſant*, or *faiſant*, is when a ſtranger's beaſts are doing hurt, or ſpoiling the graſs, corn, woods, &c. of another man, without his leave or licence.

In this caſe, the party whom they damage may diſtrain, and impound them, both by night, and by day; though in other caſes, as for rent, ſervices, &c. none may diſtrain in the night. (Stat. 51 Hen. III. ſtat. 4. 1 Inſt. 142) If a man take my cattle and put them into the land of another, the tenant of the land may take theſe cattle damage-feaſant, though I, who am the owner, was not privy to the cattle's being there damage-feaſant; and he may keep them againſt me till ſatisfaction of the damages. (2 Danv. Abr. 364.) But if one comes to diſtrain damage-feaſant, and to ſeize the cattle, and the owner drives them out before they are taken, he cannot diſtrain them damage-feaſant, but is put to his action of treſpaſs; for the cattle ought to be actually upon the land damage-feaſant, at the time of the diſtreſs. (1 Inſt. 161. 9 Rep. 22.) Beaſts of huſbandry, ſheep, horſes joined to a cart, and, as it is ſaid, a horſe with a rider on it, may be diſtrained damage-feaſant, though not for rent. (1 Sid. 422. 440.) But the owner may tender amends, before the cattle are impounded; and then the detainer is unlawful: alſo, if, when impounded, the pound-door is open, the owner may take them out. (5 Rep. 76.) If men are rowing up my water, and endeavouring with nets to catch fiſh in my *ſeveral* piſcary, I may take their oars and nets, and detain them as damage-feaſant, to ſtop their further fiſhing; though I cannot cut their nets. Cro. Car. 228.

DAMALN, in *Geography*, a town of European Turkey, in the Morea; 40 miles S.E. of Napoli di Romania.

DAMAN of *Iſrael*, in *Zoology*. See Dipus.

DAMANHOUR, or Demenhur, in *Geography*, a town of Egypt, ſituated near the canal of Alexandria, and the capital of the province of Bahira; 32 miles E S.E. of Alexandria. This town is large, but ill-built, moſt of the houſes being conſtructed of earth or bad brick. It is the reſidence of the bey, or governor of Bahira, and of a kiaſchef, or particular commandant, and alſo of a garriſon of janizaries; and it is the centre of the trade of the cotton that is gathered in the extenſive and beautiful plains by which it is ſurrounded. It is there picked from the buſhes, beaten, carded, and ſpun; and in theſe different operations conſiſts the chief employment of the greater part of the inhabitants. This town is infeſted by a number of courteſans, who practiſe various arts of ſeduction, and who contribute to deprave the manners of the people, notwithſtanding the agricultural and commercial occupations in which they are employed. This town, which is inhabited by Copts and Mahometans, is the Hermopolis parva of Ptolemy, and is called Damanhour from the deſart. The neighbouring country produces a great deal of flax, corn, and barley, as well as cotton.

DAMANIA, in *Ancient Geography*, a town of Spain, between Lobetum to the weſt, and Edeta to the ſouth-eaſt; ſeated near the left bank of the river Turia.

DAMAPETTA, in *Geography*, a town of Hindooſtan, in the country of Golconda; 45 miles N.W. of Rajamundry, and 140 E. of Hydrabad.

DAMAR, a town of Arabia, in the highlands of Yemen, ſeated on a fertile plain between Jerim and Sana. It is the capital of a province, and is governed by a dola, who reſides in a large caſtle. It has a famous univerſity or college for the Zeidites, commonly containing 500 ſtudents. Damar has no walls; its buildings are good; and it is very large, the number of houſes being about 5000. The Jews live in a detached village; but the Banians are allowed to live in the town among the Muſſulmans. Near Damar is a mountain containing a mine of native ſulphur; and in another hill, ſomewhat further diſtant, are found thoſe fine cornelians which are ſo much eſteemed in Arabia.—Alſo, a town of of Arabia, in the province of Oman, 70 miles N. of Oman.

DAMARAS, the inhabitants of a diſtrict in the colony of the Cape of Good Hope, whoſe country is ſo barren and ſandy that they cannot keep cattle.

DAMASAN, or Damazan, a ſmall town of France, in the department of Lot and Garonne, chief place of a canton in the diſtrict of Marmande, 18 miles W. of Agen. It contains 979 and the canton 7213 inhabitants, in 11 communes, and upon a territorial extent of 172½ kiliometres.

DAMASCENA, in *Ancient Geography*, a country of Aſia, in Cœle-Syria, deriving its name from Damaſcus, which is ſituated in this country.

DAMASCENUS, John, in *Biography*, a learned Chriſtian father in the eighth century, was born at Damaſcus. His father, though a Chriſtian, was alſo counſellor of ſtate to the caliph of the Saracens. He was educated by a monk at Jeruſalem, who had been redeemed by his father from ſlavery, and under whoſe inſtructions he made great progreſs in mathematical and philoſophical learning. He ſucceeded his father in the caliph's court; but his religious zeal rendered him obnoxious to the emperor, whoſe ſervice he was obliged to quit. From the ſplendour of a court he retired to a monaſtery, determining to devote himſelf to ſtudy, and the ſeverity of the cloiſter. He was ordained a prieſt towards the latter end of his life by the patriarch of Jeruſalem, and died about the year 750. He was author of a great variety of pieces in theology, philoſophy, and eccleſiaſtical hiſtory, which exhibit ſtriking proofs of extenſive erudition and eminent talents. The beſt edition of Damaſcenus's works conſiſts of two vols. fol. printed at Paris, in 1712. The Arabians were much indebted to this Chriſtian philoſopher for their deliverance from barbariſm. Among his writings is an explanation of dialectics under the title of "Heads of Philoſophy;" "Diſſertations on the three Parts of the Soul;" "An accurate Delineation of the orthodox Faith." This latter work, ſays Dr. Enfield, is perhaps the firſt attempt that was made to apply the language and arrangements of the peripatetic philoſophy to theology, and to form what has ſince been called a "body of divinity." Hence ſome have conſidered this Chriſtian father as the father of the ſcholaſtics. His example was afterwards followed by a long train of Chriſtian writers. To him, therefore, ought to be aſcribed, in a great meaſure, the miſchiefs which aroſe from the alliance which he introduced between the doctrines of Chriſt and the dogmas of Ariſtotle. Moreri. Brucker by Enfield. *John Damaſcenus* is celebrated by the writers of his life, and by eccleſiaſtical hiſtorians, as the compiler and reformer of chants in the Greek church, in the ſame manner as St. Gregory in the Roman. And Leo Allatius (De Libris Eccleſ. Græcorum) under the title *Octoëchus* (Οκτωήχος, eight Tones), tells us they were compoſed by J. Damaſcenus. Zarlino goes ſtill farther, and informs us (Inſtit. Harm. 4ta. parte. cap. viii.) that in the firſt ages of Chriſtianity the ancient Greek notation by letters having been thrown aſide, John Damaſcenus invented new characters, which he accommodated to the Greek eccleſiaſtical tones; and that theſe characters did not, like ours, merely expreſs ſingle ſounds, but all the intervals uſed in melody: as a ſemitone, tone, third minor, third major, &c. aſcending and deſcending, with their different duration. This reſembles, in many particulars, the notation of the eccleſiaſtical books of the Romiſh church, before the time-table and characters in preſent uſe were invented, or, at leaſt, generally received.

DAMASCIUS, a gentile philoſopher, was born at Damaſcus, and flouriſhed in the ſixth century. He ſtudied at Athens and Alexandria under the ableſt maſters of the age in which he lived. Theon was his maſter in rhetoric, and him he ſucceeded in his office, as he did alſo Iſidorus as teacher of philoſophy at Athens. From Athens he went to Alexandria, and preſided in the philoſophical ſchool in that city; but he was obliged to withdraw, on account of the perſecutions which were exerciſed at that period by the emperor Juſtinian againſt the gentile philoſophers. Damaſcius fled to Perſia, and after this we have no certain accounts of what happened to him. He was author of the "Lives of Iſidorus and others." He wrote alſo "Commentaries on Plato;" and a treatiſe "concerning things extraordinary and ſurprizing." All his works are marked with the characters of the eclectic ſchool, obſcurity, fanaticiſm, and impoſture. Moreri. Brucker by Enfield.

DAMASCUS, in *Geography*, a celebrated town of Aſia, once the metropolis of Syria, and, in the time of Strabo, a moſt conſpicuous city. The emperor Julian, ſurnamed the Apoſtate, ſtyles it "the eye of all the Eaſt, the ſacred and moſt magnificent Damaſcus;" and commends it on account of its temples, fountains, rivers, and alſo the richneſs and fertility of its ſoil. It was ſituated, at the diſtance of 50 miles from the ſea, from which it was ſeparated by lofty mountains, on two rivers, *viz.* Amanah or Abara, which paſſed through it, and Parphar, called by the Greeks Chryſorrhæa, which ran on the outſide of its walls. Some ancient writers have aſcribed its origin to one Damaſcus, who built it, and from whom it derived its name; but the more generally received opinion is, that it was founded by Uz, the eldeſt ſon of Aram. (Bochart, Geog. Sacr. l. ii. c. 8. Oper. t. i. p. 80). However this be, Damaſcus ſubſiſted in the time of Abraham, and may be reckoned one of the moſt ancient cities now in being. Some have ſaid, that Abraham reigned in this city immediately after its founder Damaſcus. According to Joſephus, Adad was the firſt perſon who aſſumed the title of king of Damaſcus; and he was vanquiſhed by David. It was captured and ruined by Tiglath-Pileſſer, king of Aſſyria, who carried away captive its inhabitants to Kin, on the other ſide of the Euphrates, B. C. 740; thus fulfilling the predictions of the prophet Iſaiah (xvii. 1—3.) and Amos (i. 4, 5.) It was alſo taken by Sennacherib, and by the generals of Alexander the Great. Metellus and Lælius ſeized it during the war of Pompey with Tigranes the Great, B. C. 65; and it remained under the dominion of the Romans, until the Saracens took poſſeſſion of it about A.D. 634. Under Auguſtus, Obodas, father of Aretas, king of Arabia, was ruler of Damaſcus; and Aretas was governor when St. Paul was there. It continued for a long time ſubject to the emperors, and was one of the five arſenals which they had in the eaſt. After ſeveral revolutions and viciſſitudes, (for an account of which ſee Syria,) Damaſcus was beſieged and taken, A.D. 1400, by Tamerlane, who put all the inhabitants to the ſword. When the Egyptian Mamelukes gained poſſeſſion of Syria, they repaired Damaſcus. Selim, emperor of the Turks, took poſſeſſion of Syria, A.D. 1516, after the battle of Aleppo, in which the Mamelukes were defeated; and it ſtill remains a province of the Turkiſh dominions. It was from the territory of this city, that the prunes of Damaſcus, called by the Romans "pruna Damaſcena," derived their name.

Damaſcus is now the capital of a pachalic. (See the next article.) The Arabs call it *El-ſham*, and the oriental name of *Demeſhk* is known only to geographers. It is ſituated on an extenſive plain, occupied by gardens to the length of more than 3 leagues, and the breadth of more than 1½ league. Its walls are of a circular form, and the ſuburbs large and irregular. It is open to the ſouth and eaſt, and ſhut in towards the weſt and north by mountains, which limit the view at no great diſtance. The rivulets which flow from the adjacent mountains render the territory of Damaſcus the beſt watered and moſt delicious province of all Syria; the Arabs ſpeak of it with enthuſiaſm; and think they can never ſufficiently extol the freſhneſs and verdure of its orchards, the abundance and variety of its fruits, its numerous

merous ſtreams, and the clearneſs of its rills and fountains. This is the only part of Syria in which are detached pleaſure-houſes in the open country.

The ſoil, though poor, gravelly, of a reddiſh colour, and therefore ill adapted to corn, is more ſuitable to fruits, which are here excellently flavoured. No city contains ſo many canals and fountains; each houſe has one; and all theſe waters are furniſhed by three rivulets, or branches of the ſame river, called Barrady or Barradé, which, after fertilizing the gardens for a courſe of 3 leagues, flow into a hollow of the deſert to the ſouth eaſt, where they form a moraſs called "Behairat-el-Merdi," or the lake of the meadow. Damaſcus, though poſſeſſing various advantages, is ſtill deficient in point of ſalubrity. The white waters of the Barradé are cold and hard; and the natives are ſubject to obſtructions; the whiteneſs of their ſkin is rather the paleneſs of ſickneſs than the hue of health; and the immoderate uſe of fruit, particularly of apricots, however excellent in their kind, occaſions, every ſummer and autumn, intermittent fevers and dyſenteries. It is ſaid, however, that the air or water of Damaſcus, or both, operates powerfully againſt the leproſy. Damaſcus is much longer than it is broad. Its walls, which are neither ancient nor lofty, are ſtrong. They have nine gates. M. Niebuhr, who has given a plan of the city, eſtimates it at 3250 toiſes, or ſomewhat leſs than 1½ league in circumference. Comparing theſe dimenſions with thoſe of Aleppo, Volney ſuppoſes that Damaſcus may contain 80,000 inhabitants. Browne, in his Travels in Africa, computes them at 200,000. The houſes fronting the ſtreets, which are generally broad, are very indifferent; but towards the gardens they preſent a handſome appearance. The market-places are well conſtructed, and ornamented with a rich colonade of variegated marble. The city is divided into 23 diſtricts, each under its diſtinct magiſtrate: that allotted to the Chriſtians is mean, and much inferior to the other parts of the town. The greater part of the inhabitants conſiſts of Arabs and Turks; the number of Chriſtians is eſtimated at above 15,000, two-thirds of whom, ſays Volney, are ſchiſmatics. The Turks never ſpeak of the people of Damaſcus, without obſerving that they are the moſt miſchievous in the whole empire; and the Arabs have this proverb, "Shami, ſhoumi," the man of Damaſcus, wicked. Such is the prejudice ariſing from difference of religion, that the Chriſtians are generally hated by the fanatic and inſolent Mahometans, and repreſented as more vile and knaviſh than they are any where elſe. Accordingly they have been accuſtomed to deteſt the Franks, ſo that it is not poſſible to appear at Damaſcus in an European dreſs. This malignant ſpirit, however, is of late ſomewhat meliorated. The hatred which the people of Damaſcus bear to the Chriſtians is maintained and increaſed by their communication with Mecca. Their city, they ſay, is a holy place, ſince it is one of the gates of the Caaba; for Damaſcus is the rendezvous for all the pilgrims from the north of Aſia, as Cairo is for thoſe from Africa. This circumſtance has given to Damaſcus the title of "Mahomet's heel." See CARAVAN. Hence Damaſcus is the ſeat of a conſiderable trade; and its manufactures afford ſupport to a great number of Mahometans and Chriſtians: theſe conſiſt of ſilk and cotton, mixed or ſeparate, but chiefly mingled together, in the form of what they call *cottoni* or *alléja*. The former requires 125 drams of ſilk; and the latter is lighter, and compoſed of half the quantity. Much ſoap is alſo fabricated at Damaſcus, and carried from hence to other parts of Syria and to Egypt.

In the manufacture of ſoap, they uſe oil of olives, putting to an hundred weight 25 pounds of kali, and 5 pounds of pulverized chalk. The latter articles are boiled till the water be ſufficiently impregnated; the oil is then poured in; and the whole boils for three days over a fire compoſed of ſtones of olives. Such of the European articles as are uſed by the orientals are drawn from Seidé, Beirût, and Tripoli, to and from all which places, there are regular caravans, iron, lead, tin, cochineal, broad-cloth. From Perſia and the Eaſt, the caravans of Bagdad convey ſhawls, muſlins, and the rich fabrics of Surat, a part of which is conſumed in the city, and a part paſſes on to other places in Syria, and to European Turkey. To maritime commerce the Damaſcenes were formerly very adverſe; and it is only within theſe few years that they could be prevailed on to ſend goods by ſea to Conſtantinople. The population and commerce of Damaſcus are on the increaſe, in conſequence of the juſtice and equity of the preſent pacha or baſhaw, Abdallah. The rent of houſes, though low, is ſenſibly increaſing by reaſon of the influx of ſtrangers, and the ſuburbs are ſpreading by new buildings. For an account of the ancient DAMASCUS *ſteel*, ſee that article.

A ſtriking contraſt is obſerved to exiſt between the inhabitants of Damaſcus and thoſe of Aleppo. The latter are vain and ſeditious; the former, on the contrary, ſober, induſtrious, and unoſtentatious. The females and children have commonly regular features and a fair complexion; the dreſs of the women is nearly the ſame as at Conſtantinople, *viz.* white muſlin veils, except the proſtitutes, who, as uſual all over the Eaſt, expoſe their faces. The charitable eſtabliſhments in Damaſcus are numerous; among which may be noted that conſtructed by ſultan Selim for the reception of ſtrangers; though his munificence has been ſince diverted into other channels. The building conſiſts of a very large quadrangle, lined with a colonade. It is entirely roofed in ſmall domes, covered with lead. The moſque is grand; the entrance ſupported by four large columns of red granite: it is covered with a cupola, and has two minarets. Adjacent to it is a large garden. The apartments are numerous; and the whole eſtabliſhment grand and magnificent.

The large ſquare courts of the city are beautified with fragrant trees, and marble fountains, and compaſſed round with ſplendid apartments. In theſe apartments the ceilings and traves are uſually painted and gilded; and their duans, which are a ſort of low ſtages, ſituated in the pleaſanteſt part of the room, elevated about 16 or 18 inches above the floor, on which the Turks eat, ſleep, ſmoke, receive viſits, ſay their prayers, &c. are adorned on the ſides with a variety of marble mixed in Moſaic knots and mazes, ſpread with carpets, and furniſhed all round with bolſters and cuſhions in the very higheſt degree of luxury. In this city, ſays Maundrell, is ſhewn the church of John the Baptiſt, now converted into a famous moſque; the houſe of Ananias, which is only a ſmall grotto, or cellar; and the houſe of Judas, with whom St. Paul lodged, in which is an old tomb, ſuppoſed to be the burying place of Ananias, which is held in ſuch veneration, that a lamp is continually burning over it. To this account we may add, that the fruit-tree called the Damaſcene, and the flower called the damaſk-roſe, were tranſplanted from the gardens belonging to this city; and that the ſilks and linen, known by the name of damaſks, were, probably, the invention of its inhabitants. Volney's Travels in Egypt and Syria, vol. ii. De Pages's Travels, vol. ii. Browne's Travels in Africa, p. 396, &c.

DAMASCUS, *Pachalic of*, is one of the four pachalics of Syria, comprehending nearly the whole eaſtern part of that country. It extends to the north from Marra on the road to Aleppo, as far as Hebroun or Hebron, in the ſouth-eaſt part of Paleſtine. It is bounded to the weſt by the moun-

tains

tains of the Anſarians, thoſe of Anti-Lebanon, and the upper part of the Jordan; then croſſing that river in the country of Biſan, it includes Nablous, Jeruſalem, and Hebroun, and enters the deſert to the eaſt, into which it advances more or leſs, as the country is capable of cultivation; but in general it does not extend to any conſiderable diſtance from the latter mountains, except where it approaches Tadmor or Palmyra, towards which it ſtretches full five days' journey. In this vaſt extent of country, the ſoil and its productions are very various; but the plains of the Hauran, and thoſe on the banks of the Orontes, are the moſt fertile; they produce wheat, barley, doura or durra, ſeſamum, and cotton. The ſoil of the country of Damaſcus, and the Upper Bekaa, is gravelly and poor, better adapted to fruits and tobacco than to any thing elſe. On the mountains are cultivated, olive, mulberry, and fruit trees, and in ſome places vines, from which the Greeks make wine, and the Mahometans dried raiſins. The pacha enjoys privileges more conſiderable than thoſe of any other pachalic; for beſides the farm of all the cuſtoms and impoſts, and an abſolute authority, he is alſo conductor of the ſacred caravan of Mecca, under the highly reſpected title of "Emir Hadj." The Mahometans regard this office with ſuch reverence, that a pacha, who acquits himſelf well in it, becomes inviolable even by the ſultan, nor is it permitted to ſhed his blood. But the divan has contrived to ſatisfy his vengeance, without infringing this privilege, by ordering thoſe who incur his diſpleaſure to be pounded in a mortar, or ſmothered in a ſack, of which there have been various inſtances. The tribute of the pacha to the ſultan is no more than 45 purſes, *i. e.* 2343 *l.*; but he is charged with all the expences of the Hodj, eſtimated at 6000 purſes, or 312,500 *l.* They conſiſt of proviſions of corn, barley, rice, &c. and the hire of camels, which muſt be provided for the eſcort, and a great number of pilgrims. Beſides this, 800 purſes muſt be paid to the Arab tribes, who dwell near the road, to ſecure a free paſſage. The pacha reimburſes himſelf by the miri, or duty upon lands, either by collecting it himſelf, or farming it out. The pacha is alſo heir of all the pilgrims who die on the journey; and, beſides, he has the profits from lending money upon intereſt to merchants and farmers, and taking from them whatever he thinks proper in the way of *baſſe* or extortion. His military eſtabliſhment conſiſts of 6 or 700 janizaries, as many Barbary Arabs, who are naked and plunderers, and 8 or 900 dellibaſhes, or horſemen. Theſe ſerve as an eſcort for the caravan, and for reſtraining the Arabs, and likewiſe to enable him to collect the miri from his own ſubjects. The pachalic of Damaſcus, though more expoſed than any other to the incurſions of the Bedouin Arabs, is the leaſt ravaged of any in Syria: and the reaſon is, that this pachalic is uſually held for life. Volney's Travels, vol. ii.

DAMASCUS *ſteel*, a very fine kind of ſteel, made in ſome parts of the Levant, and particularly at Damaſcus, remarkable for its excellent temper; and uſed chiefly in the making of ſword blades.

Some authors aſſure us it comes from the kingdom of Golconda in the Eaſt Indies; where the method of tempering with alum, which the Europeans have never been able to imitate, was firſt invented.

About the beginning of the 14th century, Timûr Leng, on his conqueſt of Syria, conveyed all the celebrated manufactures of ſteel from Damaſcus into Perſia. Since that period, its works in ſteel have been little memorable. They were formerly of the higheſt reputation in Europe and the Eaſt. The famous ſabres appear to have been conſtructed by a method now loſt, of alternate layers, about two or three lines thick, of iron and ſteel: they never broke, though bent in the moſt violent manner, and yet retained the utmoſt power of edge, ſo that common irons or even ſteel, would divide, under their force.

DAMASENSA, in *Geography*, a town of Africa, in the country of Jagra, ſituated on a river of the ſame name, which runs into the river Gambia.

DAMASI MONTES, or DOBASSI MONTES, in *Ancient Geography*, mountains of India, which, according to Ptolemy, extended along the 32d or 33d degree of latitude. It is thought that they were the mountains which bounded the eſtates of the Great Mogul and thoſe of the king of Ava to the north.

DAMASK, French *Damas*, in the *Manufacture of Cloth*, is a tweeled fabric, with flowers, or other ornaments, raiſed upon it, generally of very extenſive patterns.

It has been conjectured, from the ſimilarity of the name, that this branch of the art of weaving originated at Damaſcus. Whether this etymology be correct or not, damaſk has been long woven in ſilk, both in France and Italy. We find in many of our own popular ballads and legends, that a damaſk gown or bed is frequently noticed as an article of magnificence.

The damaſk manufacture of the continent was chiefly of ſilk for garments and ornamental furniture, ſuch as bed-hangings, table-linen, and the like. The ſilk damaſk was frequently woven with a great variety of colours, and produced a very beautiful effect. It is not exactly aſcertained at what period the art of weaving this ſpecies of cloth was introduced into Britain; but it is probable that it was brought over in queen Elizabeth's reign, by the Dutch and Flemiſh weavers, who fled from the perſecutions of the duke of Alva, and his maſter Philip II. of Spain. The ſilk damaſk, from the high price of the raw material, and the great labour of mounting and working the looms, was very expenſive, and, among the middling ranks of people, articles of this kind were only worn upon occaſions of ceremony, and at all other times carefully preſerved, and frequently tranſmitted for ſeveral ſucceſſive generations in the ſame family. The more modern practice of purchaſing articles of dreſs at moderate rates, and changing them frequently according to the variations of taſte or faſhion, has almoſt entirely exploded the uſe of ſilk damaſk, at leaſt in Britain. This branch of ornamental manufacture is now almoſt entirely confined to the fabrication of table-linen, which is manufactured to great extent, and in great variety. The chief ſeat of this manufacture is probably the town and neighbourhood of Dunfermline, in Fifeſhire, where it is conſidered as the ſtaple, and has proved a very profitable branch of traffic to the manufacturer, and given employment to many induſtrious people.

The material uſed there is chiefly linen; but many have been recently woven of cotton, ſince the introduction of that article into the manufacture of cloth has become ſo prevalent. The cotton damaſks are conſiderably cheaper than thoſe of linen; but are not conſidered either ſo elegant or durable. The cotton, alſo, unleſs frequently bleached, does not preſerve the purity of the white colour nearly ſo well as the linen.

The tweeling of the more common kinds of damaſk is generally performed with five leaves of front mounting, excluſive of the harneſs of the draw loom. The fineſt and moſt extenſively ornamented damaſks are woven with eight leaves. The patterns of the damaſk, which are frequently very extenſive, are called *deſigns*, and are drawn upon paper lined into ſmall ſquares to direct the weaver in mounting his loom, ſo as to produce the deſign required.

For

For a particular deſcription of the proceſs of manufacturing damaſk, ſee the articles DESIGN, and DRAW-LOOM.

DAMASKEENING, the art, or act, of adorning iron, ſteel, &c. by making inciſions therein, and filling them up with gold or ſilver wire; chiefly uſed in enriching ſword-blades, guards and gripes, locks of piſtols, &c.

Its name ſhews the place of its origin, or, at leaſt, the place where it has been practiſed in the greateſt perfection, *viz.* the city of Damaſcus in Syria; though M. Felibien attributes the perfection of the art to his countryman Curſinet, who wrought under the reign of king Henry IV.

Damaſkeening is partly moſaic work, partly engraving, and partly carving; as moſaic work it conſiſts of pieces inlaid; as engraving, the metal is indented, or cut in creux; and as carving, gold and ſilver are wrought therein in *relievo*.

There are two ways of damaſkeening; in the firſt, which is the moſt beautiful, the artiſts cut into the metal with a graver, and other tools proper for engraving on ſteel; and afterwards fill up the inciſions, or notches, with a pretty thick ſilver or gold wire. In the other, which is only ſuperficial, they content themſelves to make hatches, or ſtrokes acroſs the iron, &c. with a cutting-knife, ſuch as is uſed in making of ſmall files. As to the firſt, it is neceſſary the gravings, or inciſions, be made in the dove-tail form; that the gold or ſilver wire, which is thruſt forcibly into them, may adhere the more ſtrongly. As to the ſecond, which is the more uſual, the method is this: having heated the ſteel till it changes to a violet, or blue colour, they hatch it over and acroſs with the knife; then draw the enſign, or ornament, intended, on this hatching, with a fine braſs point, or bodkin. This done, they take fine gold wire, and conducting or chaſing it according to the figures already deſigned, they ſink it carefully into the hatches of the metal with a copper tool.

DAMASONIUM, in *Botany*. See ALISMA and STRATIOTES.

DAMASQUITTE, a kind of ſtuff made at Venice, of which there are two ſorts; one with gold, the other with ſilk; the pieces are eighteen ells long.

DAMASSIN, a kind of damaſk, with gold and ſilver flowers, made in warp and woof, or wrought, and not raw ſilk.

DAMASUS I., POPE, in *Biography*, ſuppoſed to be a Spaniard by birth, obtained the high rank of biſhop of Rome in the year 366. In competition for this office he had for a rival Urſinus, to whom a large body of the people and clergy was attached. The conteſt on this occaſion involved the city in a civil war, in which much miſchief was done, and much cruelty perpetrated. Both were proclaimed lawful biſhops, and ſucceſſors to St. Peter at the ſame time; each was, however, too jealous of his rival to admit the poſſibility of a two-fold power. Damaſus at length proved triumphant; Urſinus and his adherents were baniſhed, having firſt ſuffered the penalties of impriſonment and confiſcation. Damaſus was more attached to the pomp, parade, and luxury of the temporal ſtate, than to the decorum and diſcipline which he owed to his rank as biſhop of ſouls. He ſeemed to be totally regardleſs of the morals of the people entruſted to his care; but againſt hereſy, as it was called, he diſplayed the vigilance and zeal of a bitter perſecutor. In five different councils held at Rome between the years 368 and 381, he procured decrees againſt the Arians, and other ſects who had departed from the eſtabliſhed faith; and prevailed on the imperial court to enact penal laws againſt them, which were executed with the utmoſt rigour. Damaſus extended the power and authority of the biſhops of Rome, and laid the foundation of the cuſtom of conferring upon certain biſhops the title of vicars to the pope, by which they were enabled to perform ſeveral authoritative acts, which they could not by the mere virtue of epiſcopal power: hence the rights of biſhops and ſynods became gradually and entirely dependent on the authority of the pope. Damaſus died at Rome in the year 384. His works are partly in proſe, and partly in verſe; they were printed at Rome in 1639, and at Paris in 1672, but they ſeem to have little claim to any ſpecific notice. They are treated of at large by Moreri, to whom we refer for a further account.

DAMASUS II., *Pope*, in the eleventh century, was a native of Bavaria. He is repreſented to have been a perſon of learning, and exemplary piety. He was poſſeſſor of the biſhoprics of Brixen and Aquileia in ſucceſſion, before he attained to the ſee of Rome, which happened upon the death of Clement II. To this dignity he was raiſed by the emperor Henry III., who ſent him to Rome to maintain the imperial right of nomination to the popedom, in oppoſition to the claims of Benedict IX., who had ſeized on it, but who quitted his pretenſions in favour of one who had ſo powerful a protector. Damaſus enjoyed his office only a few days, dying at Preneſte in 1048, ſuppoſed to have been poiſoned. Moreri.

DAMATCORENSIS, in *Ancient Geography*, an epiſcopal city of Proconſular Africa.

DAMATER, or DEMETER, in *Mythology*, the ſurname of Ceres. Vocabatur Ceres, Δημητης, quaſi Γημητης. *i. e.* Terra mater. Serv. in Virgil Æneid. iii. She derived this name from her having firſt taught men the art of cultivating the earth.

DAMATRIUS, in *Ancient Chronology*, the Bœotian name of the Athenian month *Pyanepſion*, which was the fifth of their year, and correſponded to the latter part of our October and beginning of November. See PYANEPSION and MONTH.

DAMAZAN, in *Geography*. See DAMASAN.

DAMBACH, a town of France, in the department of the Lower Rhine; 6½ leagues S.S.E. of Straſburg.—Alſo, a town of Germany, in the arch-duchy of Auſtria; 8 miles E.S.E. of Freuſtadt.

DAMBANNA, a town of Africa, in the kingdom of Kontu.

DAMBEK, or DAMKE, a town of Germany, in the circle of Upper Saxony, and Old Mark of Brandenburg; 4 miles S. of Saltwedel.

DAMBI, a country of Africa, in the kingdom of Kongo, which, together with other inferior provinces, followed the example of the duchy of Ovando, and ſhook off the yoke of the kings of Kongo, to put themſelves under the protection of the Portugueſe, induced by the hopes, and perhaps the promiſes of being leſs oppreſſed, and of enjoying greater liberty under theſe than they did under their own monarchs.

DAMBLAIN, a town of France, in the department of the Voſges and diſtrict of La Marche; 5 miles E. of La Marche.

DAMBROUCZA, a town of Poland, in the palatinate of Lemberg; 8 miles N.E. of Lemberg.

DAME was formerly a title of honour, and is ſtill uſed in the Engliſh law to denote a lady; but in common acceptation it ſignifies the miſtreſs of a family of the lower rank in the country.

DAME, (from *domna*, the abbreviation of *Domina,*) the title of nuns of the Benedictine and certain other ancient orders. See DOMNUS and NUN.

DAME'S-*Violet*. See HESPERIS.

DAMEL, or KAYO, in *Geography*, a country of Africa, on the coaſt of the Atlantic, between the rivers Senegal and Gambia.

DAMELEN, a town of Germany, in the circle of Upper Saxony, and Middle Mark of Brandenburg; 6 miles W. of Belitz.

DAMELOFRE, a kind of bilander uſed in Holland, for conveying merchandize from one canal to another, and contrived for commodious paſſage under the bridges.

DAMENSII, in *Ancient Geography*, a people of Africa, occupying the interior of the region called Syrtica.

DAMERAUCOUR, in *Geography*, a ſmall town of France, in the department of the Somme, 6 miles S. of Foix.

DAMERISCOTTA *Bay*, *River*, and *Pond*, in America, in the ſtate of Maine. The *bay* communicates with Townſend harbour, or Booth-bay; the *river*, which is navigable 15 miles, and on which are ſeveral mills, is ſhort, is parallel with Sheepſcot river, E. of it, divides the town of Booth-bay from Briſtol, and riſes in Dameriſcotta *pond*, which is about 10 miles long and 2 wide, and ſpreads between Newcaſtle and Waldoborough.

DAMERSHEIM, a town of Germany, in the circle of Bavaria, and principality of Neuburg; 10 miles N.W. of Neuburg.

DAMERY, a ſmall town of France in the department of the Marne, between Ay and Chatillon on the river Marne, 3 miles W. of Epernay, remarkable for its excellent red Champaign, known by the name of Oeil de Perdrix.

DAMGARTEN, or DAMGARD, and anciently *Damgur*, *Damgor*, *Damagora*, a ſmall town of Germany, in that part of Pomerania, which, having belonged to Sweden, is at preſent in poſſeſſion of the French. It is ſituated on an eminence not far from the river Reckenitz, 21 miles W. of Stralſund. N. lat. 54° 20′.

DAMIA, in *Mythology*, a pagan divinity, or the good goddeſs, ſaid by Varro to be the wife of Faunus, and by Macrobius to be Cybele, and ſo chaſte, that ſhe never ſaw nor heard any other man than her own huſband. Her ſacrifice, which was privately offered on the firſt day of May, in houſes, having their doors and windows ſhut, was called Damium. No man, nor picture of a male, was ſuffered to be preſent, nor woman to reveal what paſſed. They ſpent nights and days in this feſtival, magnificently apparelled; danced, ſung, and took what liberties they pleaſed. Δαμιον, it is ſaid, is a word of the Doric dialect, and is put for δημιον, *i.e.* δημοδιον. *public*. Some have taken this expreſſion for an antiphraſis, as if it ſignified that nothing was leſs public than this feſtival; but we learn from Cicero, (Haruſp. Reſp. c. 17.) that this ſacrifice was offered to the good goddeſs for the public. Cicero ſays, that the places appointed for this ſolemnity were the houſes of the firſt magiſtrates, and that this privilege belonged to the conſuls and prieſts only.

DAMIAN, ST., in *Geography*, a ſmall town of France in the department of the Sture, which formerly was a part of Piedmont in Italy. It contains 1498 inhabitants, and is the chief place of a canton in the diſtrict of Coni. The canton itſelf has 14 communes, with a population of 11,276 individuals.

DAMIANA, or DAMINA, in *Ancient Geography*, a town of Spain, in the country of the Edetani.

DAMIANI, in *Biography*, an opera ſinger, with a *ſoprano* voice, of conſiderable merit. His voice is ſweet and flexible, but not powerful. His taſte modern, but his fancy not very fertile in cadences and embelliſhments. He came to England, in 1800, to ſing at the Haymarket, but from ſome difference between him and the manager, he tore his article and threw it in the fire, and only performed at a concert eſtabliſhed on the merit of his talents by the worthy Raimondi, on a ſuppoſition that the public not being able to hear him at the opera, would be curious, and eagerly ſubſcribe to a concert where he was to perform, but though a good ſinger, his talents and fame were not of that tranſcendent kind which incline lovers of muſic to think it neceſſary to hear him in order to qualify themſelves for converſation; and Damiani, who was highly paid for his performance, though he increaſed his fortune by the engagement, did not augment his fame.

DAMIANISTS, in *Eccleſiaſtical Hiſtory*, a branch of the ancient Acephalous Severites; who agreed with the Catholics in admitting the fourth council; but diſowned any diſtinction of perſons in the Godhead, and profeſſed one ſingle nature incapable of any difference; and yet they called God, the Father, Son, and Holy Ghoſt. On which account the Severitæ Petritæ, another branch of Acephali, uſed to call them Sabellianiſts, and ſometimes Tetraditæ. Thus much we learn from Nicephorus Calliſtus, lib. xviii. cap. 49.

They took their name from *Damianus*, a biſhop of Alexandria, who was originally their leader, in the ſixth century.

DAMIANO, PETER, in *Biography*, was born at Ravenna in the beginning of the eleventh century. His deſcent was highly reſpectable, and he enjoyed the advantages of a good education, which he improved with ſo much diligence, as to render himſelf capable of offices of diſtinguiſhed truſt, and importance. In the year 1057 he was created cardinal, by pope Stephen IX. much againſt his own wiſhes, which led him, it is ſaid, to prefer a private and a ſtudious life to public honours. If he really deſired privacy, he was unfortunate in being appointed to ſeveral good livings and appointments in the church. Under the pontificate of Nicholas II. he was ſent papal legate to Milan, to reform the clerical abuſes in that dioceſe, and for other objects of ſtate policy. Theſe duties he performed to the ſatisfaction of his employers. Upon his return to Rome he became diſguſted with the profligacy of manners which prevailed among all ranks of the people, and with a becoming zeal for the intereſts of religion, expoſtulated againſt the ambitious interference of the pontiffs in the temporal concerns of princes, the univerſal relaxation of order and diſcipline, and the enormous vices practiſed by the monks and clergy. Finding that his remonſtrances produced no good effect, he reſolved to withdraw from a ſociety, whoſe manners he in vain attempted to reform; and having reſigned his ſeveral preferments into the hands of pope Alexander II., he retired to a monaſtery in 1061. Here he was not permitted to remain; his integrity and ability rendered him fit for ſervices of active life, and he was ſent, in 1062, papal legate to France. In the following years he was ſent on miſſions to Florence, and different parts of Germany. He died in the year 1073, highly reſpected by his contemporaries; his works, which were numerous, entitle him to be ranked among the beſt writers of the times in which he flouriſhed.

DAMIANO, *Saint*, in *Geography*, a ſmall town of France, in the department of the Tanaro, which formerly was a part of Piedmont in Italy. It is the chief place of a canton, in the diſtrict of Aſti, 9 miles N. of Alba, and has a population of 6109 individuals. The canton contains 5 communes and 11,347 inhabitants.

DAMIANOVITZ, a town of Croatia, 64 miles S. of Varaſdin, and 52 E. S. E. of Carlſtadt.

DAMIATTE, a ſmall town of France, in the department of the Tarn, 12 miles W. of Caſtres.

DAMICOTTA, a town of Hindooſtan, in the Coimbetore country; 30 miles N. of Coimbetore, and 60 S. of Seringapatam. N. lat. 11° 28′. E. long. 41° 25′.

DAMIER, in *Conchyliology*, the name given by French naturaliſts

naturaliſts to that elegant ſpecies of voluta, the ſpots of which ſtand in a checquered order, and reſemble the marks of a draught or cheſs board, that being the common ſignification of the word *damier*. See VOLUTA.

DAMIETTA, or DAMIATT, in *Geography*, a ſea-port town of Egypt, which forms a vaſt creſcent at the mouth of the eaſtern branch of the Nile. Steph. Byz. informs us that, under the government of the Greeks of the lower empire, it was called "Thamiatis," and that it was then very inconſiderable. But in proportion as Peluſium declined, it acquired increaſing importance; and at length the total ruin of this ancient town occaſioned the commerce of the eaſtern ports of the Delta to be transferred to Damietta. When the emperors of Conſtantinople took poſſeſſion of it a ſecond time, about the year 238 of the Hegira, A. D. 852, the caliphs perceived the importance of a harbour ſo favourably ſituated; and in the year of the Hegira 244, A. D. 858, the emperor Elmetouakkel ſurrounded it with ſtrong walls. Notwithſtanding this defence, Roger, king of Sicily, took it from the Mahometans in the year of the Hegira 550, A. D. 1155; but ſoon after Salah Eddin, who mounted the throne of Egypt, expelled the Europeans from this city; and when they returned to beſiege it, about 15 years after, this able ſultan baffled all their efforts, and obliged them to retreat, though their land army was ſupported by a fleet of 1200 ſail. In the year 615 of the Hegira, A. D. 1218, under the reign of Eladel, the cruſaders attacked it with a conſiderable force; and having carried by ſtorm the tower on the weſtern ſhore of the Nile, where they had encamped, and broken the ſtrong iron chain, which reached from one ſide to the other, they opened the entrance of the river for their fleet. Nejm Eddin, the ſultan's ſon, made a vigorous reſiſtance, threw a bridge over the river, which the Franks demoliſhed, and choaked up the mouth of the river, which he rendered almoſt impaſſable, by ſinking ſeveral large boats. After alternate ſucceſſes and defeats, many bloody conflicts, and a ſiege of 17 months, the Chriſtian princes took Damietta by ſtorm. However, their tenure was of ſhort duration; for being completely inveſted near the canal of Achmoun, $\frac{1}{4}$ of a league N. of Manſoura, where St. Lewis finiſhed his exploits, by the waters of the Nile and by the Egyptian army, they purchaſed their lives and liberty by the ſurrender of their conqueſt. Thirty-one years after this defeat, St. Lewis carried Damietta without ſtriking a ſtroke. Having thrown himſelf into the waves, in complete armour, to march upon the enemy intrenched upon its banks, he thus ſtruck a panic into their army, ſo that they took flight, and ſhamefully abandoned a fortreſs filled with ſlaves, and capable of a long reſiſtance. The Arabs ſoon recovered it, but tired of defending it, they totally deſtroyed it, and rebuilt it further up in the country. "Damietta being deſtroyed, (ſays Abulfeda) a ſmall town was built at ſome diſtance, called *Menchié*, which is become a conſiderable place. In our days (100 years after its foundation) we ſee ſeveral ſquares, market-places, and public baths. The aneient city was razed to the ground in the year 648 of the Hegira," (A. D. 1250); or, as ſome Arabian hiſtorians ſay, 4 years before this epocha. "The caliph Elmetouakkel, of the family of the Abaſſides, built the walls. The misfortunes it had occaſioned to the Mahometans, and the wars to which it had given riſe, drove them to that extremity. It ſeemed, in fact, as if this fortreſs, in a peculiar manner, invited the Franks, who alternately laid ſiege to the walls." When the French threatened Egypt a ſecond time, it was reſolved to deſtroy Damietta; and it was ſo completely razed to the ground, that there remained no veſtige of it, except the great moſque. Its ruins are diſcernible at the village of Eſbé, on the eaſtern bank of the Nile, a ſhort league from the ſea, which diſtance has been gained by the Delta in the courſe of 600 years. Eleven years after this time the mouth of the Nile was choked up by a bar, which is called Bogaz, ſo as to prevent the enemy's fleets from getting up the river, and to render acceſs as dangerous as that of Roſetta. It is now impaſſable, even for boats, during ſeveral months of the year, and ſhipwrecks frequently occur here. From this epocha its entrance is prohibited to all veſſels, which are now obliged to anchor in the road. The town of Damietta, now ſubſiſting, was built after the deſtruction of the ancient city; and it is ſituated a little above it on the ſame ſide, or about $1\frac{1}{2}$ league diſtant from the village of Eſbé, where the traces of the former are diſcoverable. The modern Damietta, firſt called *Menchié*, as Abulfeda tells us, has preſerved the memory of its origin in a ſquare ſtill called by that name. Writers in general have confounded theſe two towns, and aſcribed to the one the attributes of the other. This is the caſe with father Sicard, Pocock, Proſper Alpinus, Maillet, Shaw, and even Niebuhr. The towers, which have led writers to take the modern for the ancient Damietta, were built by the Mamelukes for the defence of the new town. As they were uſeleſs, they have demoliſhed one, and employed its materials in the conſtruction of a ſmall fort, which is at the mouth of the river. This place, ſays Savary, who paſſed 14 months in it, is large, and not leſs agreeable, than Roſetta, is rounded in a ſemicircle on the eaſtern bank of the Nile, $2\frac{1}{2}$ leagues from the mouth of it. The eye, placed at one of the extremities of the creſcent, takes in its whole extent. It is reckoned to contain 80,000 inhabitants. It has ſeveral ſquares, the moſt conſiderable of which has retained the name of *Menchié*. The bazars are filled with merchants. "Okals" or "khans," as ſpacious as thoſe of Boulak, collecting under their porticos the ſtuffs of India, the ſilks of mount Lebanon, ſal ammoniac, and pyramids of rice, proclaim that it is a commercial town. The houſes, eſpecially thoſe on the banks of the river, are very lofty. They have, in general, handſome ſaloons built on the tops of their terraces, which are cheerful belvideres, open to every wind, where the Turk, effeminately reclining on a ſopha, paſſes his life in ſmoking, in looking on the ſea, which bounds the horizon on one ſide, on the great lake that extends itſelf on the other, and on the Nile, which, running between them, traverſes a rich country. Several large moſques, adorned with lofty minarets, are diſperſed over the town. The public baths, lined with marble, are diſtributed in the ſame manner as thoſe of Grand Cairo. The linen with which you are ſerved is clean, and the water very pure. The heat, and the treatment in them, ſo far from injuring the health, ſerve to ſtrengthen, and even to improve it, if uſed with moderation.

The port of Damietta is continually filled with a multitude of boats and ſmall veſſels. Theſe called "Scherm" ſerve to convey the merchandize on board the ſhips in the road, and to unload them: the others carry on the coaſting trade. This town carries on a great trade with Syria, Cyprus, and Marſeilles. The rice, called "Mezelaoui," of the fineſt quality in Egypt, is cultivated in the neighbouring plains. The exports of it, ſays Savary, amount annually to about 6 millions of livres. The other articles of the produce of the country are linens, ſal ammoniac, corn, &c. A ruinous policy for the country prohibits the exportation of this laſt article; but the law is evaded, and it paſſes under the name of rice. The Chriſtians of Aleppo and Damaſcus, ſettled in this town, have for ſeveral ages

carried on its principal commerce. No Chriſtian merchant, or European, muſt, ſays Niebuhr, reſide here; although there be in Damietta a conſiderable number of Maronites and Armenians, who communicate with the church of Rome. A conſul, and French merchants, once reſided at Damietta. But the inhabitants, obſerving that theſe ſtrangers made too free with their women, roſe up in a fury, and maſſacred them all. Since that period the king of France forbade his ſubjects not only to ſettle in this city, but even to frequent it. The inhabitants of Damietta are generally reckoned more unfriendly to the Chriſtians than any of the other inhabitants of Egypt. The memory of the Cruſades, perhaps, keeps up this inveterate averſion. In the neighbourhood of this city are many rice fields: but towards the ſhore, the ground is covered with ſand, and conſequently barren. As the Bogaz prevents ſhips from entering the Nile, their cargoes are conveyed on board by the boats of the country; and this circumſtance affords opportunity for much fraud and diſſenſion. The badneſs of the port of Damietta is ſtill more detrimental to the commerce of the city. The road where the veſſels lie being expoſed to every wind, the ſlighteſt gale obliges the captains to cut their cables, and take ſhelter at Cyprus, or to ſtand off to ſea. But did not the indolence and deſpotiſm of the Turks prevent it, it would be eaſy, by cutting a canal of half a league, to open a paſſage for ſhips into the Nile, where there is deep water; and thus Damietta would be rendered a noble harbour.

The tongue of land on which Damietta is ſituated, ſtraightened on one ſide by the river, and on the other by the weſtern extremity of the lake Menzalê, is only from two to ſix miles wide from eaſt to weſt. It is interſected by innumerable rivulets in every direction, which render it the moſt fertile ſpot in Egypt. The ſoil produces, *communibus annis*, 80 buſhels of rice for one; the other produce is in the ſame proportion. Nature here preſents flowers, fruits, and harveſts, at every ſeaſon of the year. Winter never deprives it of theſe advantages; nor are its beauties ever impaired by ſummer. Deſtructive heats as well as chilling colds are equally unknown in this happy ſpot. The thermometer varies only from 9 to 24 degrees above the freezing point. Damietta is indebted for this charming temperature to the immenſe quantity of water, with which it is ſurrounded. The rivulets round the fields of rice are lined with ſeveral kinds of reeds, ſome of which riſe to a great height. The reed *Calamus* is here found in abundance, and is uſed for writing by the orientals. Here are alſo foreſts of papyrus, of which the ancient Egyptians made their paper: the lotus alſo, called by the Arabs nuphar, exalts its lofty ſtalk above the waters, and diffuſes from its flowers a moſt agreeable odour along the marſhes and canals in the interior parts of the country.

There are many villages round Damietta, in moſt of which are manufactures, where the moſt beautiful linens of the country are fabricated: and, in particular, the fineſt napkins, fringed with ſilk, are made here. Theſe ſmall towns, generally ſurrounded with little woods, or trees promiſcuouſly planted, form a pictureſque and whimſical aſſemblage. The elegant caſſia-tree, with its cluſters of yellow flowers, is ſeen by the ſide of the ſycamore and tamarind; the date-tree lifts its head with enormous branches above the grove: the orange and lemon-trees cover the labourer's cabin with their golden fruit; the banana-tree, the pomegranate, and the fig-tree, with their different productions, throw a vaſt variety into theſe landſcapes. At a mile from the town to the ſouth-weſt is a grove of orange-trees, which ſerves as a walk for the inhabitants: at the end of the walk is a canal filled with papyrus. Damietta is diſtant 84 miles N.N.E. from Cairo. N. lat. 31° 25′ 44″. E. long. 31° 49′ 45″. Savary's Letters on Egypt, vol. i. Niebuhr's Travels in Arabia, &c. vol. i.

DAMINI, Pietro, in *Biography*, a painter, born at Caſtelfranco, in the year 1591. At an early period he received inſtructions from Gio. Batiſta Novelli, the ſcholar of Jacopo Palma, and a good colouriſt; but being deſirous of making himſelf maſter, as well of the theory as the practical part of his art, he aſſiduouſly ſtudied ſuch prints and pictures as he could obtain acceſs to, and improved himſelf by reading the works of Lomazzo and Albert Durer. Such was his reputation, that at the age of 20, he was employed upon a public work at Padua, where he eſtabliſhed himſelf. Many of his works are to be found in that city as well as in Venice, Vicenza, and the place of his nativity. Singularly beautiful is the altar-picture of Beato Simone Stock, in the church of S. Maria, at Caſtelfranco, and another which is ſurrounded by 12 ſmall pictures of ſtories from the Old and New Teſtament, which are executed with extraordinary taſte.

Even in his ſhort life, this artiſt ſeveral times changed his manner, in the attempt to obtain the perfection of the art. Sometimes he appears to have copied nature as he found her; at other times, as in his fine picture of the crucifixion in the church del Santo at Padua, he aſpired to the repreſentation of ideal beauty. He was carried off by the plague, in 1631, at a period when ſuch high expectations were formed of him, that it was even thought by ſome he would have equalled the great Titian. Lanzi.

Damini, Giorgio, the brother of Pietro, was alſo a native of Caſtelfranco. He excelled in portrait and pictures of ſmall figures, and his reputation was increaſing, when, with his brother, he died of the plague in 1631, leaving a ſiſter, named Damina, who alſo painted portrait. Lanzi.

DAMINS, in *Geography*, a town of Switzerland, in the Grey League; 10 miles N.N.E. of Ilantz.

DAMISCHE Sea, a large lake of Germany, or expanſion of the Oder, in the circle of Upper Saxony, northward of the town of Damm; 8 miles long and about $1\frac{1}{2}$ wide.

DAMIUPOLIS, in *Ancient Geography*, a town ſituated in the environs of Sebaſtopolis.

DAMM, in *Geography*, a ſmall town of Pruſſia, in Pomerania, near the lake of the ſame name; 3 miles E. of Stettin. N. lat. 53° 4′.

DAMMA, in *Ancient Geography*, a town of Serica, placed by Ptolemy above Piada.

DAMMANA, a town of Aſia in Arachoſia. Ptolemy.

DAMMARIE, in *Geography*, a ſmall town of France in the deparment of Eure and Loire, 9 miles S. of Chartres.—Alſo, a ſmall town of France in the department of the Meuſe, diſtrict of Bar ſur Ornain, and canton of Ligny.

DAMMARTIN, in Latin, *Dominium Martini*, a ſmall town of France, in the department of Seine and Marne, chief place of a canton in the diſtrict of Meaux, 27 miles N.E. of Paris, and 15 N.W. of Meaux. It has 1918, and the canton 11,129 inhabitants, 23 communes, and a territorial extent of 220 kiliometres.

Dammartin *ſur Tevre*, a ſmall town of France in the department of the Marne, diſtrict of Sainte Menehould, with a population of 312 individuals. It is the chief place of a canton, which contains 27 communes and 8134 inhabitants, upon a territorial extent of 380 kiliometres.

DAMME. See Dam.

DAMMER, a town in Sileſia, in the principality of Oels; 4 miles S.E. of Militſch.

DAMMIM, or Daminim, in *Ancient Geography*, a town

of Paleſtine, in the tribe of Juda, between Socho and Azeca; mentioned in the book of Kings.

DAMNA, a town of Scythia, on the other ſide of the Imaus. Ptolemy.—Alſo, a town of Paleſtine, in the tribe of Zebulun, allotted to the Levites of this tribe, who were of the family of Merari, mentioned in the book of Joſhua, and alſo by Euſebius and Jerome.

DAMNA, in *Geography*, a town of Arabia Deſerta; 80 miles S. of Damaſcus.

DAMNATA TERRA, ſynonymous with CAPUT *Mortuum*, which ſee.

DAMNÆ, in *Ancient Geography*, a people of Aſia, placed by Ptolemy in Serica.

DAMNII, in *Ancient Geography*, one of the 22 Britiſh nations, which, according to Ptolemy, inhabited that part of Britain, that lay on the ſouth of the wall of Antoninus, between the Friths of Forth and Clyde. They were, according to Camden and Baxter, the ancient inhabitants of Clydeſdale, Renfrew, Lenox, and Stirlingſhire. Their name, ſometimes written Dumnii, might perhaps be derived from the Britiſh word *Dun*, which ſignifies a hill or mountain; a great part of their country being hilly or mountainous. This was one of thoſe Britiſh nations, formerly unknown to the Romans, which were diſcovered by Agricola, in the third year of his government when he penetrated to the river Tay. It was in the country of the Damnii that Agricola built thoſe forts, into which he put his army in winter for the preſervation of his conqueſts: as it was in the ſame country, and probably in the ſame tract, that the famous wall was built in the reign of Antoninus Pius, to protect the Roman territories from the incurſions of the Caledonians. On account of this wall, and the many forts and caſtles upon it, this country was more frequented by the Romans than any other to the north of Severus's wall; and more remains of that illuſtrious people have been diſcovered in it than in any other part of Scotland. Their towns were Colonia, Vanduara, Coria, or Curia, Alauna, Lindum and Victoria.

DAMNONII, DANMONII, *Dumnonii, Dunmani*, or *Domnii*, a people of Great Britain, who inhabited the S.W. parts of Britain; or that tract of country now called Cornwall and Devonſhire, and probably part of Somerſetſhire; bounded on the S. by the Britiſh ocean, on the W. by St. George's channel, on the N. by the Severn ſea, and on the E. by the country of the Durotriges. Some other Britiſh tribes were alſo ſeated within theſe limits, as the Coſſini and Oſtedamnii, which were probably particular claſſes of the Damnonii; and, according to Mr. Baxter, were the keepers of their flocks and herds. As the ſeveral tribes of the Damnonii ſubmitted without much reſiſtance to the Romans, and never joined in any revolt againſt them, theſe people were under no neceſſity of building many forts, or keeping many garriſons in their country. Hence it happens that few Roman antiquities have been found in that country, and that they are ſeldom mentioned by Roman writers. Ptolemy mentions a few places on the ſea-coaſts and in the inland parts of this diſtrict, which were known to, and frequented by the Romans. The moſt conſiderable of theſe places are the famous promontories of Bolerium and Ocripum, now the Land's-End and the Lizard, and the towns of Iſca Damnoniorum and Tamare, now Exeter and Saltaſh. As the Damnonii ſubmitted quietly to the Romans, they might be allowed to live without moleſtation under their own princes and laws. In the moſt perfect ſtate of the Roman government in Britain, the country of the Damnonii made a part of the province called Flavia Cæſarienſis, and was governed by the preſident of that province. After the departure of the Romans, kingly government was immediately revived amongſt the Damnonii in the perſon of Vortigern, who was perhaps deſcended from the race of their ancient princes, as his name ſignifies in the Britiſh language a chieftain, or the head of a family.

DAMO, in *Biography*, daughter of Pythagoras the philoſopher, flouriſhed about 500 years before the preſent era. She was one of the favourite diſciples of her father, and was initiated by him in the ſecrets of his philoſophy. To her the ancient ſage entruſted all his writings, when he felt himſelf approaching his latter end; enjoining her never to make them public: this command ſhe ſtrictly obeyed, though tempted by large offers at a time when ſhe was ſtruggling with the evils of poverty. She led a ſingle life, in obedience to her father's wiſhes, and exhorted other young women, whoſe education ſhe took charge of, to do the ſame. See PYTHAGORAS.

DAMON, a Pythagorean philoſopher, who flouriſhed about 400 years before Chriſt, and who is celebrated for the friendſhip that ſubſiſted between him and Pythias, a philoſopher of the ſame ſect. One of theſe friends was condemned to death by Dionyſius, king of Syracuſe. He wiſhed for a reſpite for a few days, and liberty to depart from priſon to ſettle his affairs, on condition that the other ſhould take his place, and ſuffer in his ſtead, provided the condemned perſon did not return. The morning of the fatal day was come, and the youth had not ſurrendered: the attachment and confidence of his ſurety were now reproached by thoſe about him; but he felt no anxiety on his own account; he was ſure his friend would not and could not violate his promiſe, and he was juſtified in his belief by the actual ſurrender of his friend at the appointed hour. Dionyſius, ſtruck with the magnanimity of the one, and the fidelity of the other, freely forgave the offender, and entreated that he might be admitted to the participation of ſuch ſincere and diſintereſted friendſhip.

DAMON, an ancient Grecian muſician. Muſic, in general, was in ſuch favour, and the ſtudy of it was thought ſo eſſential a part of education, at Athens, in the time of Pericles and Socrates, that Plato and Plutarch have thought it neceſſary to inform us of whom thoſe two great perſonages received inſtructions in that art. Damon, the Athenian, was the muſic maſter of both. The philoſopher calls him his friend, in a dialogue of Plato, where Nicias, one of the interlocutors, informs the company, that Socrates had recommended, as a muſic maſter to his ſon, Damon, the diſciple of Agathocles, who not only excelled in his own profeſſion, but poſſeſſed every quality that could be wiſhed in a man to whom the care of youth was to be confided.

Damon had chiefly cultivated that part of muſic, which concerns time or cadence; for which he is highly commended by Plato, who ſeems to have regarded rhythm as the moſt eſſential part of muſic, and that upon which the morals of a people depended, more than upon melody, or, as the ancients called it, harmony. He is alſo mentioned by Ariſtides Quintilianus, as having excelled in characterizing his melodies, by a judicious choice of ſuch ſounds and intervals as were beſt adapted to the effects he intended to produce.

Pericles, the moſt accompliſhed character in antiquity, was not only a conſummate judge, but a great encourager of all the arts. And in his life, writen by Plutarch, we are told that the muſes bore a principal ſhare in all the public ſpectacles with which he entertained the people. He not only regulated and augmented the poetical and muſical conteſts

at the Panathenæan feſtivals, but built the odeum, or muſic-room, in which poets and muſicians daily exerciſed themſelves in their art, and rehearſed new compoſitions, before they were exhibited in the theatre.

Damon, William, an Engliſh muſician, who flouriſhed in the reign of queen Elizabeth, and who ſeems to have been the firſt who compoſed parts to the old German melodies that were ſung by John Huſs, and the Bohemian brethren to the metrical pſalms. *Damon's* title to his publication is the following. "**The Pſalmes of** David **in Engliſh meter, with notes of foure partes ſet unto them by** Guilielmo Damon, **to the uſe of the godly Chriſtians, for recreating themſelves, inſtede of fond and unſeemely ballades**, 1579."

Theſe parts not being well received by the public, he publiſhed others in 1585, and dedicated them to the lord treaſurer, Burleigh. We are in poſſeſſion of a *Miſerere*, in five parts compoſed by William Damon; obtained from Dr. Pepuſch's collection, about the year 1746. The harmony is clear and good, and the ſubject extremely ſimple and uniform, the parts conſtantly ſing a tetracord in *motto contrario*: as $\begin{cases} G\ F\ E\ D. \\ A\ B\ C\ \sharp\ D \end{cases}$

DAMOT, in *Geography*, a province of Abyſſinia, on the S.E. of the kingdom of Gojam; bounded by the Temei on the eaſt, by the Gult on the weſt, by the Nile on the ſouth, and by the high mountains of Amid Amid on the north. It is about 40 miles in length from north to ſouth, and ſomewhat more than 20 in breadth from eaſt to weſt. But this whole peninſula, ſurrounded with the river, is called Gojam, in general terms, from a line drawn though the ſouth end of the lake to Miné, the paſſage of the Nile in the way to Narea. See Gojam.

DAMP, *adjective* (from the Dutch *dampe)*, denotes a perceptible degree of moiſture in any thing; ſuch as in damp air, damp walls, damp apartments, damp linen, &c. The methods of aſcertaining the actual exiſtence or degree of dampneſs in any thing, an examination of the effects which it is likely to produce, and the various ways of removing it, are the objects of philoſophy, of medicine, and of civil economy; but as thoſe objects will be particularly noticed in various other articles of this Cyclopedia, ſuch as *evaporation*, *miſts*, *fogs*, *hygrometry*, *dew*, &c.; we ſhall in this place only give a compendious and ſuperficial idea of the whole. Almoſt all natural bodies, excepting metallic ſubſtances, moſt hard ſtones, vitrifications, and a few more, contain at all times a certain quantity of water; yet they are conſidered as being dry, when that quantity of water is not more than that which the affinity of the particles of the bodies to water can retain. But ſhould that affinity (*viz.* that degree of attraction between the particles of thoſe bodies and water) be diminiſhed by any adequate cauſe, or ſhould the quantity of water exceed that which the peculiar affinity of each body can retain, then the bodies are ſaid to be damp, and they will appear to be ſo, either by the mere touch of the human hand, or by the indications of hygrometers, and other inſtruments. Thus, common atmoſpherical air always contains a quantity of water which is perfectly diſſolved in the air, and is retained by every particle of the latter, in virtue of their mutual attraction of affinity. But that affinity is diminiſhed by cold, and is increaſed by heat; therefore, if a quantity of air be cooled by any adequate means, its affinity to water will of courſe be diminiſhed, and part of the water it contained will be ſeparated; forming a vapour which in ſome meaſure affects the tranſparency of the air, and is ready to attach itſelf to any other body which may be preſented to it in a ſtate fit for the abſorption of vapour. The air in that ſtate is ſaid to be damp, and an hygrometer placed in it will ſhew it to be ſo, by its uſual movement towards moiſture.

On the other hand, if cold air, which appears to be damp from the indications of hygrometers, or from moiſtening ſalts, &c.; be rendered much hotter, its affinity to water will thereby be increaſed, and the appearances of dampneſs will vaniſh.

Beſides the above-mentioned affinity, there is another power which enables bodies of every kind to retain water: and this is a ſort of ſuperficial adheſion. (See Capillary *Attraction.*) It acts moſt powerfully when a given quantity of water is expoſed to the action of a proportionately great quantity of ſurface; hence, all porous bodies have the power of retaining water to a certain degree, and under certain circumſtances. Therefore, in a variety of bodies both thoſe powers contribute to retain water at the ſame time, and ſuch moſt probably is the caſe with air itſelf.

Sometimes bodies contain water proportionate to their degree of affinity, yet other bodies will rob them of a portion of that water; and ſuch is the caſe with dry fixed alkalies, or freſh quick-lime, which will ſeparate water from air apparently very dry. This, however, only proves that certain bodies have a greater affinity to water than air or certain other bodies have.

In certain circumſtances a greater quantity of moiſture is crowded upon bodies than they can retain; hence they feel damp. Thus, the air which lies contiguous to water generally contains more moiſture than the air which is more remote; but the latter by degrees abſorbs the ſuperfluous moiſture of the former, and thereby enables it to imbibe more of the vapours which riſe from the contiguous water; and thus the proceſs of evaporation goes on. But if the free circulation or communication of the air be interrupted, then the air which is confined over the water will hold a conſiderable quantity of ſuperfluous moiſture, and will thereby become damp. Now ſuch is the caſe with the air of caves, cellars, holds of ſhips, &c. when any water is contained in thoſe places. From the above ſtatement it evidently appears that heating and ventilation are the two moſt powerful means of removing dampneſs. The action of heat diminiſhes the attraction of ſolids to water, and increaſes the affinity between air and the ſame fluid. Ventilation, when the air is dryer than other bodies, removes dampneſs by diſſipating the moiſture through the atmoſphere.

From the reſult of all the experiments that have hitherto been inſtituted, it appears, that a cubic foot of air ſaturated with water, contains two grains of water at the temperature of 32° Fah. (*viz.* at the point of melting ice); it contains four grains at the temperature of 48°, ſix grains at the temperature of 60°, and eight grains at the temperature of 68°.

A remarkable circumſtance attends the mixture of aqueous vapour with air, which is, that air thus ſaturated with vapour is lighter than an equal bulk of dryer air; and this ariſes from the denſity of the vapour thus mixed, which is leſs than the denſity of the air, in the proportion of three to four, according to Sauſſure.

The explanation of ſeveral natural phenomena may be eaſily derived from the above-mentioned facts, attending, however, to other concomitant circumſtances. Thus, in a calm day, when the air is ſerene, a cold wind ſprings up from the north or from the eaſt, the cold air mixes with the warmer, their capacity for containing water is diminiſhed, a

hazineſs enſues, and the air becomes damp; yet ſometimes the cold air is dryer on account of particular circumſtances, and though a hazineſs may at firſt appear, a perfect tranſparency will be reſtored ſoon after.

It frequently happens, that the vapour which is ſeparated from the air by the action of cold, remains ſuſpended in the ſhape of a miſt or cloud; yet at other times it deſcends immediately, and attaches itſelf to terreſtrial bodies in the form of dew. But in theſe phenomena the action of electricity ſeems to be in great meaſure concerned. We ſhall have occaſion to examine the nature of thoſe phenomena more at large in other parts of this work.

The effects of damp air, damp clothing, and damp apartments, are variouſly modified by the climate, by the temperature, and by the cuſtoms of the inhabitants, of every particular country.

DAMP, *noun ſubſtantive*, (from the Saxon *damp*, a vapour or exhalation,) means a fog, or moiſt air, or moiſture; but it is principally uſed in the plural, *damps*, to denote certain noxious vapours or exhalations iſſuing from the earth.

Theſe exhalations frequently occur in mines, coal-pits, wells, and other ſuch like excavations; but ſometimes they are alſo to be met with near the ſurface of the earth, eſpecially in the vicinity of volcanoes. The noxious quality of ſuch exhalations, and the numerous fatal effects which they have produced, have obliged mankind to collect the various accounts of the phenomena, to inveſtigate their origin, and to contrive methods of preventing their dire effects. But the accounts have been moſtly furniſhed by miners, whoſe ignorance, whoſe fears, and whoſe ſufferings, have generally involved the truth in a conſiderable proportion of exaggeration; yet, from a careful compariſon of thoſe very accounts, from the reſult of experiments inſtituted by ſcientific perſons, and from the knowledge of the ſubject of elaſtic fluids, which has, of late years, been wonderfully promoted; the nature of thoſe damps is at preſent pretty well aſcertained, and their effects may be ſufficiently accounted for; excepting, indeed, two or three ſtrange ſtories, which are in need either of hiſtorical confirmation, or of a much deeper philoſophical inveſtigation.

The general effect of the damps is a contamination of the common, or reſpirable, atmoſpherical air; by the admixture, not indeed of moiſture, as one might be led to underſtand by the name of damps, but of other elaſtic fluids, which are abſolutely unfit for animal reſpiration. *Carbonic acid gas*, (formerly called *fixed air*,) *azotic gas*, (formerly called *phlogiſticated air*,) and *hydrogen gas*, or *inflammable air*, are the three elaſtic fluids which generally, if not always, produce the damps: we ſhall, therefore, briefly premiſe the principal properties of theſe gaſes; in order that the nature of the damps may be underſtood without much circumlocution.

Carbonic acid gas is abſolutely unfit for reſpiration or for combuſtion; inſomuch, that an animal confined in it, will be deprived of life rather ſooner than if he were confined under water. A lighted candle or torch brought within a quantity of this gas, is extinguiſhed as readily as if it were dipped in water. This gas is heavier than common air, in the proportion of three to two; hence, when it iſſues out of the earth in hollow or ſheltered places, it remains for a conſiderable time in a ſtratum cloſe to the bottom of the place. Carbonic acid gas conſiſts of 72 parts of oxygen, and 28 parts of charcoal.

Azotic gas is likewiſe unfit for reſpiration and for combuſtion. Its ſpecific gravity is very little below that of common air. It is that gas which forms about three-fourths of the atmoſpherical fluid, the other quarter conſiſting principally of oxygen air. It is produced, or rather left by itſelf, whenever the oxygen of the atmoſpherical air is abſorbed, as is the caſe in combuſtion, reſpiration, and various other proceſſes.

Hydrogen gas is, by itſelf, utterly unfit for animal reſpiration; but when mixed with common air, it may be breathed with impunity. In its pureſt ſtate, hydrogen gas weighs rather leſs than the twelfth part of an equal bulk of common air; but as it is capable of holding in ſolution water, ſulphur, phoſphorus, carbon, &c. ſo its ſpecific gravity generally exceeds that which has been juſt ſtated; it is always, however, much lighter than common air; hence, when it occurs in mines, it is either actually iſſuing out of crevices, or it is lodged under the roofs of thoſe excavations. This gas is highly inflammable, ſo that it may be fired by the flame of a candle, or a very ſmall electric ſpark, or even by a red-hot iron; but, like other combuſtibles, it will burn only in contact with common, or oxygen, air; hence, if a lighted candle be preſented to a certain quantity of hydrogen gas, this will burn either ſilently and progreſſively, or ſuddenly, and with an exploſion, according as the common air is contiguous to one ſide of it, or is more or leſs intimately mixed with it. The greateſt exploſion takes place, when four parts of hydrogen gas are mixed with ſix of common air; the tint of the flame varies according to the ſubſtance diſſolved in the gas. This gas is produced principally in the decompoſition of water; for water conſiſts of oxygen and hydrogen gas; from which circumſtance this gas has obtained its name. After the above compendious ſtatement of the nature and properties of the gaſes which produce the damps, we may proceed to deſcribe the phenomena.

Two ſorts of damps have been principally deſcribed: one has been called the *choke-damp*, from its ſuffocating quality; the other has been called the *fire-damp*, from its diſpoſition to take fire, and to burn either gently, or with an exploſion.

The choke-damps generally occur in old mines, called *waſtes* by the miners; being ſuch as formerly had been worked, but afterwards remained neglected. Theſe damps are likewiſe frequently met with in old wells, deep cellars, and other ſubterranean places wherein the air has long remained undiſturbed. They are formed by an accumulation of carbonic acid gas, which iſſues from the ground, and being much heavier than common air, remains next to the bottom, or ground, in a ſtratum of various depth, and more or leſs mixed with common air, or with azotic gas. The effects which have been produced by this ſort of damp are more than ſufficient to manifeſt the nature of the gas to which it is owing.

The perſons who happen to deſcend within this damp, inſtantly loſe their reſpiration, and fall down ſenſeleſs; nor can their death be prevented, unleſs they are quickly removed into the open atmoſpherical air; but even this method frequently proves ineffectual. Several caſes are recorded, where one perſon having been ſuffocated, a ſecond went down with a view to ſave him; but he alſo fell, and ſometimes even a third perſon met with the ſame fate. Perſons that have thus loſt their lives, on examination, have been found to exhibit all the marks of animals that have been ſuffocated in carbonic acid gas. One of the ſureſt methods of aſcertaining the preſence of this kind of damp in a well, mine, &c. is to ſend down a lighted candle; for if the candle continues to burn, you may conclude that a human being is perfectly ſafe in it; but if the candle goes out, then the

the preſence of the damp may be conſidered as certain; yet the human being may breathe, though not with perfect freedom, in air ſo far vitiated as not to be capable of ſupporting combuſtion. The miners diſtinguiſh this laſt ſtate of the air from that which is completely noxious, by the appearance of the candle; *viz.* if the flame and the redneſs or coaly part of the wick vaniſh at the ſame time, they conclude that the air is utterly unfit for reſpiration; but if the redneſs of the wick continues ſometime longer after the extinction of the flame, then they think it not very dangerous to deſcend into the place.

On account of the ſuperior gravity of the carbonic acid gas, and of its affinity to water, a greater quantity of vapour frequently remains ſuſpended in the choke-damp, than in common air; hence this damp is ſometimes viſible like a fog or miſt, and this is particularly the caſe in a cavern near Pyrmont.

It frequently happens that the ſtratum of carbonic acid gas is not higher than two or three feet; ſo that a man will be perfectly ſafe in it as long as he remains in a ſtanding poſition; but ſhould he attempt to lie down or to ſit, he would run the riſk of being ſuffocated.

The ſudden iſſue of this damp out of the earth, eſpecially when any digging has been performed, has ſometimes inſtantly killed the workmen.

In all ſuch caſes, ventilation (in whatever manner it may be practiſed) is the beſt method of diſſipating the damp. But ſhould a man be obliged to go down into a place thus infected, either for the purpoſe of ſaving another man, or for ſome other particular purpoſe, he would do well to fill a bladder with common air, and by means of a ſhort tube faſtened to the neck of the bladder, and held in his mouth, to breath that air; for a bladder thus filled will laſt him ſome minutes, during which time a great deal might be done. He might alſo take with him two or more bladders filled with common air, and furniſhed with ſtop-cocks, or merely with tubes ſtopped with corks.

Cautious miners ought always to have ſuch bladders, or ſuch like bags, filled with common air, by them; for they coſt little or nothing, and will effectually ſave their lives occaſionally.

When digging is to be performed in any place where the leaſt ſuſpicion of a ſudden iſſue of the choke-damp is entertained, it will be proper to keep a candle or lamp burning cloſe to the ground; for if any noxious gas happens to come forth, the going out of the flame will afford ſufficient warning to the workmen.

The ſudden iſſue of the choke-damp from the earth frequently occurs in the neigbourhood of volcanoes, upon old lavas, and old accumulation of aſhes or other volcanic productions. Numerous caſes of this ſort take place in the vicinity of mount Veſuvius, in Naples, where the noxious vapours, (called *mofete* by the inhabitants,) ſuddenly enter houſes, cellars, &c. to the great annoyance of the inhabitants, who, as well as other animals, are ſometimes killed by them. See ſir William Hamilton's various accounts of the mount Veſuvius and its eruptions, in the Philoſophical Tranſactions, for 30 or 40 years paſt. Some of the ſcientific perſons of the above-mentioned country have occaſionally endeavoured to aſcertain the nature of the gas which produces thoſe mofete; and from their experiments it appears, that the greateſt part of the gas is carbonic acid, but more or leſs mixed with azotic gas, and frequently accompanied with ſulphureous and arſenical vapours. A remarkable inſtance of a continual ſtream of carbonic acid gas iſſuing from the earth, occurs near the city of Naples. At about five or ſix miles from that city, near the foot of a hill, there is a famous cave called *grotta del cane* in the Italian language. This grotto is about fourteen feet long, and nearly ſeven feet high at the entrance. On the bottom of it, which is nearly on the ſame level with the adjacent external ground, there is at all times a ſtratum of carbonic acid gas or choke-damp, which is continually coming out of the earth, through the fiſſures which are pretty apparent on the ground; and where the production of ſuch gas has been remarked from time immemorial. Animals of different ſpecies, as well as human beings who ſheltered themſelves in this grotto, were at times found dead in it, in conſequence of which a door was placed to the aperture of it, which is now only opened occaſionally. The experiments uſually ſhewn to the curious who viſit this grotto, are, that of bringing a lighted torch or lighted piece of paper near the bottom or floor; the flame of which is extinguiſhed as ſoon as it comes within about 14 inches of the ground; and ſecondly that of confining a dog with its head cloſe to the ground for about a minute. The reſpiration of the animal is inſtantly affected, and its ſtrength fails, ſo as to remain apparently dead; but on being expoſed to the ambient air out of the grotto, if it be not too far gone, the poor animal will gradually recover its reſpiration and its ſtrength. It is from this uſual experiment that this grotto has obtained its name: *cane* being the Italian for a dog.

Joannes Caramuelis, in his Mathefis Nova, printed in the year 1670, relates ſome experiments made by himſelf and others upon the noxious elaſtic fluid of this grotto, which are very remarkable, conſidering the time in which they were made. He obſerves, that the ſmoke of a candle, extinguiſhed near the bottom of this grotto, is entirely retained within the ſtratum of gas; and that if part of that ſmoke happened to be driven out of the grotto, it deſcended like water falling from the edge of a tub. Had he been acquainted with the nature of carbonic acid gas, he would have eaſily underſtood that the ſmoke was retained on account of the great attraction between that gas and the aqueous particles; and that it deſcended, when driven out of the grotto, on account of the great ſpecific gravity of the carbonic acid gas with which it was combined. The ſame ingenious perſon relates another experiment, which tends to prove the acid quality of the gas concerned, which quality has long after been fully aſcertained. He and his companions placed the head of an alembic on the bottom of the grotto; and as this inſtrument was colder than the air of the grotto, which generally is pretty warm, it collected a few drops of a watery fluid, which, to the taſte of his companions, ſeemed to be acidulous. In the preſent ſtate of knowledge this experiment is eaſily explained; it being evident that the head of the alembic condenſed the watery particles from the air of the grotto, and theſe became acidulous in conſequence of their becoming impregnated with the carbonic acid gas. The ground in the neighbourhood of grotto del cane ſhews manifeſt ſigns of ſubterranean fires or fermentation, as it abounds with ſulphur, hot ſprings, emanations of ſmoke, &c.

Fire-damp, though conſiderably heavier than pure hydrogen gas, is yet much lighter than atmoſpheric air. Hence where a tolerable ventilation is kept up, it ſeldom accumulates to a dangerous amount in the ſhafts, or vertical pits, that are open to the air; but in the horizontal galleries, where it occupies the upper part, forming a ſtratum, lying immediately in contact with the roof. It generally makes its firſt appearance in the cracks and crevices of the coal,

particularly where it is moiſt and abounding in pyrites. While it is thus oozing out, it often burns with a quiet light blue lambent flame, which, on the contact of a candle, explodes with a hiſſing noiſe, and, for a time, is extinguiſhed or forced into an adjacent crevice. In proportion as the water is drained off, the production of this gas diminiſhes, ſo that the dryeſt mines are the leaſt infeſted with it. Heat contributes much to its generation; hence it is generally more abundant during the ſummer than the winter months. If it is not cleared out of the mine, in proportion as it is produced, it ſoon begins to accumulate in the upper part of the galleries, on which account it is a caution well worth remembering, by thoſe who viſit a coal-pit, to hold their candles as low down as poſſible. The gas thus continues to increaſe without producing any material inconvenience to the miners, till, at length, it comes in contact with ſome lighted candle: the flame is immediately increaſed to five or ſix times its uſual ſize, and in a ſecond or two afterwards, the whole body of gas takes fire: a volume of flame and black ſmoke darts from the gallery into the vertical ſhafts, whence it riſes into the air with a loud ſtunning exploſion, throwing up, to a conſiderable height, men, large beams of timber, and every thing elſe that happens to be in its way. As ſoon as the exploſion has taken place, the external air ruſhes violently into the mine to fill up the vacuum, and the reſidual inflammable gas again takes fire, and burns quietly for a few minutes, till it is extinguiſhed.

When an accident of this kind happens, there are three diſtinct dangers to which the miners within its influence are expoſed. In the firſt place, thoſe who are in the gallery where the inflammation commences are ſcorched by the fire, and are alſo liable to ſuffer ſeverely from the ruſhing in of the air to ſupply the vacuum cauſed by the exploſion. Secondly, thoſe who happen to be in the ſhaft, or near the mouth of the gallery, are either blown up out of the pit, or are killed by being violently forced againſt its ſides. In the latter of theſe ſituations there is no poſſibility of eſcape; but thoſe who are not exploded, often ſave their lives by throwing themſelves on their faces on the ground, and covering themſelves, as well as they can, with ſmall coal, &c. till the danger is paſt. No particular odour is perceivable before the inflammation, but afterwards a ſtrong and ſuffocating ſmell of burning ſulphur becomes very obvious.

We ſhall now give a ſummary of the facts that were collected from the miners by Mr. Jeſſop, as given in the Philoſophical Tranſactions, N° 119.

1. "Thoſe who are in the place where the vapour is fired, ſuddenly find themſelves ſurrounded with flames, but hear little or no noiſe; though thoſe who are in places adjacent, or above ground, hear a very great one. 2. Thoſe who are ſurrounded by the inflamed vapour feel themſelves ſcorched or burnt, but are not moved out of their places; though ſuch as unhappily ſtand in the way of it, are commonly killed by the violence of the ſhock, and are often thrown with great force out of the mouth of the pit; nor are the heavieſt machines found able to reſiſt the impetuoſity of the blaſt. 3. No ſmell is perceived before the fire, but a very ſtrong one of brimſtone is afterwards felt. 4. The vapour lies towards the roof, and is not perceived if the candles are held low; but when theſe are held higher, the damp deſcends like a black miſt, and catches hold of the flame, lengthening it to two or three hands full; and this appearance ceaſes when the candles are held nearer the ground. 5. The flame continues in the vault for ſeveral minutes after the crack. 6. Its colour is blue, ſomething inclining to green, and very bright. 7. On the exploſion of the vapour, a dark ſmoke, like that produced from firing gun-powder, is perceived. 8. Damps are generally obſerved to come about the latter end of May, and to continue during the heat of ſummer. They return ſeveral times during the ſummer ſeaſon, but obſerve no certain rule."

The fire-damps generally occur in coal-mines; and in the Philoſophical Tranſactions, N° 136, we find ſeveral accounts and obſervations made in digging ſuch mines; and from theſe we ſhall compendiouſly extract the moſt uſeful particulars.

"After they had gone, the account ſays, a conſiderable way under ground, and were ſcanted of wind, the fire-damps did begin by little and little to breed, and to appear in crevices and ſlits of the coal where water had been before the opening of the coal, with a ſmall blueiſh flame, working and moving continually; but not out of its firſt ſeat, unleſs the workmen held their candles to it; and then being weak, the blaze of the candle would drive it with a ſudden fiz away to another crevice, where it would ſoon after appear blazing and moving as formerly.

"This mine was neglected for a certain time; and upon a morning, the firſt collier that went down with his candle in his hand, the damp preſently darted out ſo violently at his candle, that it ſtruck the man quite down, ſinged his hair and clothes, and diſabled him for a while. After the ceſſation of work for ſome days, in going down the firſt time, the fire-damps have often exploded with terrible effects."

The bad effects of the fire-damps may, in a great meaſure, if not entirely, be prevented by vigilance, and by a proper conformation of the excavations. In digging a mine, due attention ought to be paid to the roof of it, which ought to be ſhaped ſo as in ſome meaſure to reſemble an inverted funnel, *viz.* having the higheſt part of it near to the ſhaft or ſhank; for, by this means, the hydrogen gas, or fire-damp, would aſcend into the atmoſphere as ſoon as it is generated; nor could it be lodged any where in ſo great a quantity as to produce any dangerous effects. In mines already formed, and eſpecially when they have not been worked for a certain time, it is always proper to let down two or three lighted candles by means of a rope; and if theſe produce no inflammation, then a man with a candle ought to be ſent down, who, after advancing a few ſteps into the mine, ought to lay himſelf down, and ought to lift up a lighted candle on the top of a pole as high as he can; for the inflammable gas which always occupies the upper part of the mine, may, in that caſe, be exploded with hardly any danger to the man.

When miners are actually working in a mine, the accumulation of the inflammable gas may be eaſily prevented, *viz.* by firing it off immediately as it iſſues out of the various crevices.

Ventilation is the beſt method of removing damps out of mines, and at the ſame time of giving wholeſome air to the labourers; but this is hardly practicable in ſuch mines as are furniſhed with one ſhaft or aperture. It is, therefore, always to be wiſhed that mines of any extent ſhould be furniſhed with two or more ſhafts in proportion to their extent. The ventilation then may be promoted by lighting a fire under one of thoſe ſhafts; for by this means the air of that ſhaft being rarefied, will be forced to aſcend, and of conſequence an influx of pure atmoſpherical air will enter the mine through the other ſhaft or ſhafts. Several mechanical methods have alſo been uſed for the ventilation of mines. The nature of the gas which produces the fire-damp, as well as that which produces the choke-damp, has been frequently

quently ſubjected to philoſophical experiments, with a view to aſcertain both its origin and its qualities. Sir James Lowther collected the gas of the fire-damps in bladders, and thus brought it up to London, where, upon trial, he found, that on being let out of the bladders, it would take fire at the flame of a candle. But ſome recent experiments of Dr. William Henry, on a ſimilar ſort of gas, were performed with greater care; and their reſults, which we ſhall ſubjoin, are much more ſatisfactory.

"About the cloſe, Dr. Henry ſays, of 1806, I received from the Rev. W. Turner of Newcaſtle-on-Tyne, two bladders filled with the fire-damp, which had been procured from a coal-mine in the neighbourhood of that town. It was caught by luting a common funnel over the mouth of a *blower* (*viz.* one of thoſe holes or crevices in the coal, from which the fire-damp iſſues, ſometimes with conſiderable force,) and tying a compreſſed bladder on the pipe of the funnel, after the gas had iſſued from it for ſome time. My experiments were made on the gas, about ſeven days after its being firſt collected. At that time the bladders were perfectly dry, and ſhewed no ſigns of putrefaction."

The general reſults of theſe experiments, (as ſtated in a memoir which was read in January 1807, before the Medical Society of Edinburgh,) are the following. The gas was found, by the teſt of nitric oxyd, uſed in Mr. Dalton's method, to contain about $\frac{2}{3}$ its bulk of common air. It had a diſagreeable ſmell. When ſet on fire, as it iſſued from the orifice of a ſmall pipe, it burned with a dark blue flame; and a long conical glaſs veſſel, held over the flame, was ſoon bedewed with moiſture. Mixed with common air, it did not detonate on the approach of a lighted taper, at leaſt in any proportion that was tried. The utmoſt effect was a deep blue flame, which ſpread quickly through the veſſel, but was not accompanied with any noiſe. With oxygen gas, however, it exploded, and gave a loud report. On agitation with lime water, it loſt about $\frac{1}{60}$th of its bulk. The niceſt teſts did not diſcover any admixture of ſulphurated hydrogen. One hundred parts by meaſure appeared, therefore, to conſiſt of

63.34 atmoſpherical air
1.66 carbonic acid
35.00 inflammable gas

100.00

"The nature of the inflammable gas was next aſcertained by detonation with oxygen gas. Reducing the reſults to a general average, and excluding the common air, the really inflammable part of the gas required for combuſtion about twice its bulk of oxygen; and gave its own volume of carbonic acid. Hence the inflammable portion of the gas was *carburetted hydrogen*. From the experiments of Mr. Dalton on the gas from ſtagnant water, and my own obtained by diſtilling pit-coal, the fire-damp appears to differ very little from both theſe gaſſes.

"It was deſirable, however, to repeat the analyſis of fire-damp, leſs adulterated with common air; and for this purpoſe a quantity was collected (as it iſſued through water on the floor of a mine) in an inverted bottle, which was well corked, and tied over with a bladder. Happening to paſs through Newcaſtle laſt ſpring, I carried this gas with me to Edinburgh; and, having no opportunity of making experiments upon it there, my friend Dr. Thomſon was ſo good as to undertake its analyſis, and to furniſh me with the following reſults.

"From the action of nitrous gas and lime-water, the gas appeared by Dr. Thomſon's experiments, to contain in 100 meaſures,

63.0 inflammable gas
6.5 oxygen
25.5 azote
5.0 carbonic acid

100.0."

Notwithſtanding all the above-mentioned facts, experiments, and obſervations, the real origin of the gaſſes which produce the damps is by no means thoroughly underſtood. Indeed the origin of the carbonic acid which produces the choke-damp may pretty well be accounted for, conſidering the immenſe quantity of that gas which is combined with calcareous ſtones and other minerals; alſo that the action of heat eaſily extricates that gas from the above-mentioned minerals; ſo that whenever any fermentation, or any heat ariſing from various cauſes, happens to act upon ſuch minerals, the extrication of carbonic acid is a natural conſequence. But the origin of the hydrogen gas is not equally clear. It was formerly a prevailing opinion, that the inflammable gas was furniſhed by the decompoſition of water on ſtrata of pyrites, eſpecially thoſe of a martial nature; conſidering that the ſolution of iron, and of pyrites itſelf, in various menſtrua, produces abundance of that gas. But if the hydrogen were produced by the action of pyrites upon water, a quantity of ſulphur would be naturally contained in the gas, which does not appear to be the caſe from the above-mentioned experiments of Drs. Henry and Thomſon, who expreſsly mention their not having found any ſulphuretted hydrogen in the fire-damp which they examined.

If we conſider the various ſucceſſive ſtrata of different materials which almoſt every excavation, and eſpecially coal and metallic mines, exhibit to our view, a much more rational mode of accounting for the production of the inflammable gas perhaps would be, by attributing the decompoſition of water, and the conſequent extrication of the gas, to the agency of electricity, agreeably to the phenomena of that branch of it which is at preſent moſt advantageouſly cultivated under the name of *Galvanic* ELECTRICITY; which ſee.

Having thus ſtated every thing which ſeemed to be of importance with reſpect to the damps, which have infeſted from time immemorial, and do actually continue to infeſt mines of almoſt every kind; we ſhall cloſe this article with a ſhort account of two other, much leſs authentic, or much leſs known, kinds of damp. The account (which is contained in the Philoſophical Tranſactions, as given by the ſame Mr. Jeſſop, whom we mentioned above) is as follows:

"They call the third ſort the *peaſe-bloom damp*, becauſe, as they ſay, it ſmells like peaſe-bloom. They tell me it always comes in the ſummer-time; and thoſe grooves are not free which are never troubled with any other ſort of damps. I never heard that it was mortal; the ſcent, perhaps, freeing them from the danger of a ſurpriſe; but by reaſon of it many good grooves lie idle at the beſt and moſt profitable time of the year, when the ſubterraneous waters are the loweſt. They fancy it proceeds from the multitude of red-trefoil flowers, by them called *honey-ſuckles*, with which the lime-ſtone meadows in the Peak do much abound. The fourth damp is the ſtrangeſt and moſt peſtilential of any, if all be true which is ſaid concerning it. Thoſe who pretend to have ſeen it (for it is viſible) deſcribe it thus. In the higheſt part of the roof of thoſe paſſages which branch

out

out from the main groove, they often ſee a round thing hanging, about the bigneſs of a foot-ball, covered with a ſkin of the thickneſs and colour of a cob-web. This, they ſay, if it is broke by any accident, as the ſplinter of a ſtone, or the like, diſperſeth itſelf immediately, and ſuffocates all the company. Therefore, to prevent caſualties, as ſoon as they have eſpied it, they have a way, by the help of a ſtick and long rope, of breaking it at a diſtance; which done, they purify the place well with fire, before they dare enter it again. I dare not avouch the truth of this ſtory in all its circumſtances, becauſe the proof of it is impoſſible, ſince they ſay it kills all that are likely to bear witneſs to the particulars; neither do I deny but ſuch a thing may have been ſeen hanging on the roof, ſince I have heard many affirm it."

DAMPIER, WILLIAM, in *Biography*, an eminent navigator, was deſcended from a reſpectable family in Somerſetſhire. He was born in the year 1652. Having the misfortune to loſe his parents early, he was bound apprentice to the captain of a Newfoundland trader, at the age of 17. His firſt voyage was to France; and in the following year he went to Newfoundland. The ſeverity of the climate, and the attendant hardſhips of the voyage, made him almoſt reſolve that he would abandon for ever the difficulties of a maritime life. An opportunity, however, ſoon offering itſelf, he went out as common ſailor to the Eaſt Indies. In this ſituation he made a voyage to Bantam, and was fully ſatisfied with the experience which he obtained by the event. In 1673 he ſerved in the Dutch war, under ſir Edward Sprague, and was in two engagements. Sickneſs obliged him to land, and he ſpent ſome months with his brother; after which he went to Jamaica, as under manager in a plantation. From the Weſt Indies he went to Campeachy, and engaged with the logwood-cutters as a common workman. When he was tired of this buſineſs he returned to Jamaica, and thence to England. In 1679 he ſailed again for the Weſt Indies, meaning alſo to reviſit Campeachy; but he was perſuaded to join ſome pirates of different nations, who plundered any people over whom they could take advantage. With theſe Dampier croſſed the iſthmus of Darien in 1680, and ſpent that year in roving about the Peruvian coaſt, making attempts upon the ſeveral towns, ſome of which proved ſucceſsful, and in others they were repulſed with conſiderable loſs. In 1681 he recroſſed the iſthmus, and joined another fleet of theſe pirates which was cruiſing on the Spaniſh main: theſe purſued the ſame buſineſs, being prepared for any mode of acquiring gain that might offer. In one inſtance they took three veſſels with 1000 negroes on board; theſe Dampier would have taken and employed in the gold-mines, but his fellow-adventurers overruled the project. His next attempt was to capture the rich plate fleet which was conveying the treaſure of Peru to Panama; but in this they were diſappointed. In this predatory courſe Dampier continued till 1688, when he perſuaded his captain to leave him at Nicobar, where he thought, by conforming to the manners of the natives, and learning their language, he might be able to carry on an advantageous trade in ambergris. With him ſeven others were ſet on ſhore. They attempted to navigate a ſmall boat to Achin in Sumatra. At firſt every thing ſeemed favourable to the project. On the fourth day, when they had made but ſmall progreſs in their voyage, the wind roſe, the heavens lowered, and every appearance ſeemed to threaten them with an inextricable and overwhelming danger. They agreed to furl their ſails, and give themſelves to the fury of the element, which they had no means to avoid, nor power to contend with. Preparations being made, they waited the impending ſtorm with anxious and gloomy apprehenſions. The event was more tremendous than they had even anticipated. The ſea ran mountains high, and breaking over their canoe, every moment threatened to overwhelm her in the deep. Dreadful as the ſituation was by day, it ſeemed ſtill more terrible as the darkneſs approached. All the dangers to which Dampier had been expoſed, were not to be compared to this: "The ſky," ſays he, "looked very black, being wrapped in ſable clouds; the wind blew hard, and the ſea was laſhed into foam around us. A dark night was coming on, and no land to ſhelter us, and our little bark in danger of being ſwallowed up by every wave. What gave a deeper tinge to our diſtreſs, was the reflection, that none of us were prepared to enter on another ſtate of exiſtence with the confidence of hope. I had encountered many imminent dangers before this; but compared with the preſent, the worſt of them was only a play-game. I muſt confeſs that I was in great perturbation of mind: other diſtreſſes came out upon me with ſuch dreadful ſolemnity. A ſudden ſkirmiſh or engagement was nothing, when the blood was warm, and invigorated the heart by the glow of expectation; but here I had a lingering view of impending fate, with little or no hopes of avoiding it. My courage, which had hitherto kept me up, now failed me; and I made very ſad reflections on my former life, and looked back with horror and deteſtation on actions which before I could not reliſh, but at the remembrance of which I now trembled. I had long repented of my roving life; but never with ſuch ſincere contrition before." The whole of their ſufferings is deſcribed by Dampier with admirable force; nevertheleſs, they ſurmounted them all, and landed ſafely at Sumatra. Long continued ſickneſs was, however, the conſequence of their want of reſt, and of neceſſary food, from the effects of which ſome of the party never recovered. Dampier himſelf was not free from the attendant complaints for a twelvemonth and more. After this he made ſeveral voyages to Tonquin, Malacca, and other parts of the Eaſt Indies. In 1691 he returned home, having completed the circumnavigation of the globe. As his property, he brought home a native of one of the ſpice iſlands, who was the ſon of an Indian chief, and was called here the Painted Prince, on account of his being ſo curiouſly tattowed. This youth was purchaſed in the way of trade, was ſhewn in England as a ſtrange ſight, and at length died of the ſmall-pox at Oxford. We know nothing of the manner in which Dampier ſpent his time during the next ſeven or eight years; but in 1699 he was appointed to the command of the Roebuck, a ſloop of twelve guns, with fifty men. He ſailed firſt for the Brazils, and thence he made to the weſtern coaſt of New Holland, where he arrived on the firſt of Auguſt. He next ſailed to Timor, and thence to the coaſt of New Guinea. This he found terminated by an iſland, which he ſailed round, and named New Britain. He returned to Timor in May, and proceeding by the Cape of Good Hope, arrived off the iſle of Aſcenſion, in February 1701. Here his veſſel became leaky, and foundered; but he and his crew reached the iſland, where they remained till they were brought away by an Eaſt India ſhip. He afterwards accompanied captain Woodes Rogers in a voyage round the world. The time of Dampier's death is not known. The account of his voyages has been very frequently reprinted; and the ſubſtance of them has been incorporated in a hundred different compilations. His own volumes contain many curious, valuable, and important obſervations, in a plain but manly ſtyle, and bearing all the marks of fidelity. His remarks diſplay much nautical, and ſome philoſophical knowledge.

A portrait

A portrait of Dampier is preſerved in the Trinity Houſe.
Dampier's Voyages.

DAMPIER'S *Straits*, in *Geography*, lie between the N.E. point of New Guinea, and the S.W. point of New Britain; S. lat. 6° 15′. E. long. from Paris 146°.

DAMPIERRE, a ſmall town of France, in the department of the Upper Saône, chief place of a canton, in the diſtrict of Gray. It has 1344 and the canton 12,123 inhabitants, diſperſed in 33 communes upon a territorial extent of 255 kiliometres.—Alſo, a ſmall town of France, in the department of the Jura, diſtrict of Dôle, with a population of 465 individuals, and chief place of a canton which, in 15 communes and upon 127½ kiliometres, contains 5905 inhabitants.—Alſo, a ſmall town of France, in the department of the Lower Charente, 9 miles N. of Saint Jean d'Angely.—Alſo, a ſmall town of France, in the department of the Côte d'or, 18 miles N.E. of Dijon.—Alſo, a ſmall town of France, with a fine caſtle, in the department of Seine and Oiſe, 3 miles W. of Chevreuſe.

DAMRABAD, a town of Perſia, in the province of Segeſtan; 180 miles S.W. of Zareng.

DAMSEE, a lake of Germany, in the circle of Upper Saxony, and Ucker Mark of Brandenburg; 9 miles N.W. of Prenzlow.

DAMSEL, DAMOISEL, or DAMOISEAU, an appellation anciently given to all young people of genteel or noble extraction of either ſex, *e. gr.* to the ſons and daughters of knights, barons, and even of kings.

Thus, in hiſtory, we read of the damſel Pepin, damſel Louis le Gros, damſel Richard, prince of Wales.

Paſquier will have the word a diminutive of dam, an ancient name for lord; as in ſome authors we read Dam Dieu for lord God; dam chevalier, &c. Though in its feminine ſenſe he takes it to come from dame.—Others derive the word from domicellus, or *domnicellus*, a diminutive of domnus, quaſi parvus dominus: accordingly, Du Cange obſerves, that it has been ſometimes written domenger.

They who hold the ſignory of Commercy, M. de la Roque tells us, anciently held it in the title of damoiſeau: and M. de Marca aſſures us, that the nobleſſe of Bern is ſtill divided into three bodies, or claſſes; the barons, the cavers, and the damſels, domicellos, called in that country domengers.

The kings of Denmark and Sweden have the ſame title, as appears from Pontanus's Hiſt. of Denmark, lib. vii. and viii. and Henry of Upſal's Hiſt. of Suec. lib. iii.

From the ſons of kings, the appellation paſſed to thoſe of great lords and barons; and, at length, to thoſe of gentlemen who were not yet knights.

DAMSEL, at preſent, is applied to all maids, or girls, not yet married; provided they be not of the loweſt claſs of people.

DAMSEL is ſometimes alſo applied to a kind of utenſil put in beds, to warm old men's feet.

It conſiſts of a hot iron incloſed in a hollow cylinder, which is wrapped round with linen cloth, and keeps its warmth a long time. Some call it a nun.

DAMSON TREE, in *Botany*. See CHRYSOPHYLLUM and PRUNUS.

DAMSONS. See PRUNES.

DAMSONG, in *Geography*, a town of Aſia, in the country of Bootan; 54 miles S.W. of Taffaſudon. N. lat. 27° 11′. E. long. 88° 24′.

DAMSTER, a river of Germany, which runs into the Ems at Delfzyl.

DAMVILLE, a ſmall town of France, in the department of the Eure, in the diſtrict of Evreux; 12 miles S. of Evreux, famous for its good cyder. It has 720 inhabitants, and is the chief place of a canton, which reckons a population of 7187 individuals, and 27 communes, upon a territorial extent of 190 kiliometres.

DAMVILLERS, or DAMVILLIERS, a ſmall town of France, in the department of the Meuſe, and chief place of a canton, in the diſtrict of Montmedy; 18 miles N.E. of Verdun, and 36 S.W. of Luxembourg. N. lat. 49° 22′. It has 809 inhabitants, and the canton contains a population of 9117 individuals, and 24 communes, upon a territorial extent of 240 kiliometres. Damvillers had been fortified by Charles V. in 1528; but having been ceded to France at the peace of the Pyrenées, Louis XIV. demoliſhed its fortifications in 1673.

DAN, *Tribe of*, in *Ancient Geography*, lay S.W. of the tribe of Judah, between it and the Mediterranean, contiguous to that of Simeon. It was bounded on the N. by Ephraim, on the W. by the Philiſtines and the Mediterranean, on the S. by Simeon, and on the E. by Judah and Benjamin. Its greateſt length, from north to ſouth, did not exceed 40 miles; on the north ſide it was very narrow, and not above 25 broad on the ſouth. Its ſoil was fertile, and its inhabitants induſtrious and brave; ſome of them, diſdaining confinement within their own limits, advanced, ſo far as the city of Laiſh, in the utmoſt verge north of Paleſtine, after new ſettlements. The country abounded with corn, wine, oil, fruits, and all other neceſſaries. In this diſtrict was the valley called Nahal Eſcol, &c. of the grapes; whence, the ſpies ſent by Moſes brought excellent ſpecimens of its fertility to the camp of the Iſraelites. Dan had within its ſmall extent ſeveral cities of note; the chief of which were Joppa, Jamnia, Caſphin, Thimnah, Beth-Shemeſh, Ajalon, Lachiſh, Modin, Elteke, Laki, Gibbethen, and Zora or Sora.

DAN, a city in the northern part of Paleſtine, in the tribe of Naphtali, which had formerly been called Laiſh or Laſhem; but being taken by a colony of Danites, they gave it the name of their own tribe. This city became infamous for the calf ſet up by Jeroboam, which was reſorted to by all the revolted tribes on this ſide; and as it ſtood on the utmoſt verge of Judæa, as Beer-ſheba did on the oppoſite; this circumſtance gave riſe to the common proverb, "from Dan to Beer-ſheba." When the Romans took it, they gave it the name of Paneas, and beſtowed it on Philip, the ſon of Herod, who called it Cæſarea Philippi. But ſome writers place Dan at the foot of mount Libanus, on the banks of the Jordan, at the diſtance of 4 miles from Paneas, on the ſide of Tyre.

DAN, *Camp of*, lay in Paleſtine, between Saraa and Eſtahol, in the tribe of Dan. In this camp Sampſon was interred.

DAN, in *Geography*, a conſiderable river of America, in North Carolina, which unites with the Staunton, and forms the Roanoke. The famous Burſted hill is ſituated on the bank of the Dan in Virginia, near the borders of N. Carolina. This hill appears to have been an ancient volcano, as large rocks of lava, of great weight, lie on its ſummit, and the crater is partly filled and covered with large trees. N. lat. 36° 34′. W. long. 78° 50′.

DANA, a new town of America, in the ſtate of Maſſachuſetts, and county of Worceſter, formed from the corners of Greenwich, in the county of Hampſhire, and Hardwick and Peterſham, in Worceſter county.

DANA, or *Dagana*, in *Ancient Geography*, a maritime town of Aſia, in the iſland of Taprobana, according to Ptolemy; who adds, that it was dedicated to the moon.—Alſo, a large,

rich, and populous town of Cappadocia, where Cyrus ſojourned three days.

DANABA, a town of Aſia, in Syria, placed by Ptolemy in the Palmyrene territory, S.W. of Palmyra.

DANÆ, or DANATI, a town of Aſia, in the Pontus Polemoniacus, ſituated near the ſprings of the river Iris, in the 41ſt degree of latitude, according to Ptolemy.

DANAE, or *Danace*, Δανακη, or Δανακκη, in *Antiquity*, a coin current among the barbarians, being ſomewhat more than the obolus. This they put into the mouths of dead people, to pay for their paſſage over the river Acheron.

DANAE, in *Fabulous Hiſtory*, the only daughter of Acriſius, who, having learnt from the oracle, that his grandſon would bereave him of his crown and life, ſhut her up in a brazen tower, and would give ear to no propoſal of marriage for her. In the mean time, Prætus, his brother, being deſperately in love with his niece, corrupted the fidelity of her keepers by means of money, and having obtained acceſs to her, ſhe became the mother of Perſeus. This fable is comprehended by Ovid in a ſingle line (Met. l. vi.); "Perſea quam pluvio Danaé conceperat auro." Horace has given it a moral application, in order to demonſtrate the power of gold over mankind:

> "Aurum per medios ire ſatellites
> Novit, &c."

In order to palliate the diſgrace of this intrigue, it was given out, that Jupiter, enamoured of Danae, had transformed himſelf into a ſhower of gold; but it was more probable, that Prætus, if we may believe Voſſius, (De Orig. et Progr. Idol. l. i.) took upon him the ſurname of Jupiter. Pauſanias (in Corinth.) mentions the tower, or rather apartment of braſs, in which Danae had been ſhut up, and aſſures us, that it ſubſiſted till the time of Perilaus, the tyrant of Argos, who demoliſhed it; adding, that even in his time, ſome remains of the ſubterraneous palace, containing Danae's chamber, were to be ſeen. Danae, being delivered of Perſeus, was expoſed, by Acriſius, with her ſon, to the dangers of the ſea, but, at length, hoſpitably received by the king of Seriphus, one of the Cyclades iſlands, who educated young Perſeus. After ſeveral adventures, Perſeus went with his mother into Greece, diſpoſſeſſed Prætus of his territories, and re-eſtabliſhed his grandfather, Acriſius, who had been dethroned, in his dominions; but as he was endeavouring to ſhew his dexterity in playing at quoits, he flung his quoit by accident at Acriſius and ſlew him. Pauſan. in Corinth.

DANÆA, in *Botany*, a moſt curious genus of dorſiferous ferns, was firſt ſeparated by Dr. Smith from the *Aſplenium* of Linnæus, to which it has as little affinity as any two plants of the ſame natural order can have to each other, and was named by him in honour of his friend profeſſor Dana of Turin, the pupil and ſucceſſor of the celebrated Allioni, who had already dedicated a plant to Mr. Dana, which proves to be no other than *Liguſticum cornubienſe*. Sm. in Mem. de l'Acad. de Turin, v. 5. 420, t. 9. f. 11. Tracts, 260, t. 1. f. 11. Swartz, Filic. 167. Claſs and order, *cryptogamia filices*; ſect. *Exannulatæ*. Nat. Ord. *Filices dorſiferæ*

Eſſ. Ch. *Capſules* of one cell, burſting by a pore at the ſummit, accumulated together in two parallel rows.

A double row of crowded capſules is arranged along each vein of the fructifying leaflets, forming all together an oblong, turgid, ſomewhat cylindrical body, perforated with two rows of pores along its upper ſurface, which are the orifices of the capſules. Theſe are not, as Dr. Swartz ſuppoſed, always open, but continue cloſed till the ſeeds are ripe, which are extremely minute and abundant, reſembling the fineſt duſt. The ſame great cryptogamiſt errs, as we preſume to think, in conſidering theſe rows or congeries of capſules as ſingle capſules of many cells. That the idea we have given of them above, not without much conſideration, is moſt correct, appears from their perfectly indeterminate number of theſe little capſules, which is limited chiefly by the ſhape or dimenſions of the leaf, and the rows being ſometimes, though rarely, from accidental circumſtances, interrupted.

Sp. 1. D. *nodoſa*. Sm. Tracts, 260. Swartz Fil. 167. Cavan. Leccion. 281. (Aſplenium nodoſum; Linn. Sp. Pl. 1539. Lingua cervina nodoſa major. Plum. Fil. 90. t. 108.) Stalk ſcarcely winged; leaflets linear-oblong, ſeſſile, pointed, nearly entire, covered with capſules to the edge. Radical ſcales acute. A native of Martinico and Hiſpaniola, in damp ſhady woods near rivers, according to Plumier who firſt deſcribed it. It is a large and handſome fern. *Root* creeping, thick and knotty, producing two alternate rows of *fronds*, accompanied at their baſe with acute undivided ſcales. Each *frond* is about four feet high, ſimply pinnate. The *ſtalk* ſmoothiſh, juicy, knotty, cylindrical with a channel in front, ſcarcely if at all winged, even in the upper part. *Leaflets* oppoſite from each knot, ſeſſile, ſix or eight inches long, oblong, almoſt linear, entire, wavy, with a taper point, ſmooth on both ſides, with one rib, and innumerable, fine, ſtraight, tranſverſe, parallel veins, moſtly in pairs. *Capſules* cloſely covering the leaflets of ſome ſmaller fronds, from whoſe veins they originate, of a lightiſh brown when ripe, each row extending from the main rib very nearly to the margin, with rudiments of a membranous partition between the rows.

2. D. *elliptica*. (Filix major, in pinnas tantum diviſa, raras, latiores, oblongas, ſtriatas, ex adverſo ſitas, et non crenatas. Sloane Jamaic. v. 1. 85. t. 41. f. 1.) Stalk ſcarcely winged; leaflets elliptic-oblong, ſtalked, pointed, nearly entire, bare of fructification near the margin. Obſerved by Sloane in Jamaica, from whence the younger Linnæus obtained a ſpecimen. The *fronds* are but half as tall as in the former, and their leaflets half as long, though ſomewhat broader and elliptical. The latter, moreover, ſtand on ſhort partial footſtalks. The rows of *capſules* ſcarcely extend ſo near to the edge of the leaflet on which they grow, but are more remarkably ſeparated from each other, at leaſt in a half-ripe ſtate, by a double prominent undulated membrane. The frond in our ſpecimen is clothed with minute *jungermanniæ*, evincing its moiſt and ſhady place of growth.

3. D. *alata*. Sm. Tracts, 261. Sw. Fil. 167. (Lingua cervina nodoſa minor. Plum. Fil. 91. t. 109.) Stalk winged towards the top; leaflets ſerrated, bare of fructification near the margin. Radical ſcales obtuſe and jagged. A native of Martinico. *Fronds* about two or three feet high, ſcaly. *Leaflets* numerous, from one to two inches long, on ſhort ſtalks, oblong, criſped and ſerrated, ſcarcely pointed. Rows of *capſules* ſhorter and broader in proportion than in either of the former, with double, ſtraight, intervening membranes, and not extending to the margins of the leaflets, ſometimes by a conſiderable diſtance.

4. D. *ſimplicifolia*. Rudge Pl. Guian. 24. t. 36. Frond ſimple, elliptic-lanceolate, entire. Communicated by T. F. Forſter, Eſq. F.L.S., who received it from Guiana. This differs from all the reſt in its ſimple *fronds*, which are ſix or eight inches long, lanceolate, inclining to elliptic, acute, entire, ſmooth, ſomewhat oblique, each ſtanding on a reddiſh ſcaly *ſtalk*, above its own length. The fertile fronds are covered with crowded ſlender double lines of ſmall *capſules*,

ſules, ſcarcely extending to the margin, with double broadiſh intervening membranes.

Perhaps theſe membranes are a true cover or *involucrum* in this genus. They do not originate from any vein, for each double row of capſules is inſerted into that part.

We have a fern from the iſland of St. Kitt's, with a winged ſtalk, and alternate crenate leaflets, whoſe whole aſpect declares its cloſe affinity to theſe *Danææ*, but without fructification we dare not aſſociate it with them. S.

DANAIDES, in the *Ancient Mythology*, the daughters of Danais, or Danaus, eleventh king of Argos, and brother of Ægyptus.

They were fifty in number, and were eſpouſed to the fifty ſons of their uncle Ægyptus.

Danaus fearing the accompliſhment of an oracle, which had foretold that he ſhould be expelled his kingdom by a ſon-in-law, perſuaded his daughters to murder, each of them, her huſband, the firſt night; which they performed, all but Hypermneſtra, who ſpared her huſband Lynceus.

In vengeance for this crime of the forty-nine Danaides, the poets have condemned them to hell, to be continually employed in filling a caſk perforated at bottom. Euſebius and ſome others ſuggeſt, that what had given riſe to this fiction was, that they had laboured in digging wells in Argos, where ſome of them had been continually employed in drawing water by pumps, which is a painful exerciſe: whence thoſe who were condemned to this labour took occaſion to ſay, that the gods, to puniſh theſe princeſſes, had ſentenced them in hell to fill a veſſel full of holes. The learned Bryant, conceiving that the words νηυς and ναυς are derived from Nau and Noah, obſerves, that the name of Danaus relates not to a man, but is in reality "da Näus," and ſignifies literally "the ſhip." The era of Danaus is, therefore, the era of the ſhip; being the preciſe time when ſome model of this ſacred veſſel was introduced, and the rites alſo and myſteries with which it was attended. The 50 daughters of Danaus were 50 prieſteſſes of the Argo, who bore the ſacred veſſel on feſtivals. In Egypt there was a temple, called Ca Nobus, erected to the god of ſeas; to whom the element of water in general was ſacred. Throughout the whole hiſtory of Danaus and his daughters, ſays Bryant, there will be found alluſions to the rites of this god. The Danaides are ſaid to have been ſent in queſt of water; to have brought water to Argos; to have invented υδριαι, or veſſels for water; and laſtly, they were ſuppoſed to have been doomed in the ſhades below to draw water in buckets, which were full of holes. Every circumſtance of this hiſtory, Mr. Bryant imagines, is deduced from Egypt. The natives of that country were very aſſiduous in conveying water from one place to another. They had likewiſe particular jars, which were ſacred to the god, whom the Greeks called Canobus; and were formed with a repreſentation of him. Theſe canobic veſſels were ſometimes made of porous ſtone; at other times of earth manufactured in ſuch a manner as to have ſmall holes in the bottom; through which they uſed to filter the water of the Nile, when it was either turbid or ſaline. This practice of filling veſſels which could not hold the water put into them, ſeemed ſuch a paradox to the Grecians, that when they came to conſign ſome of their prieſts and deities to the infernal manſions, they made this the particular puniſhment of the Danaides, on account of their cruelty. Anal. Anc. Mythol. vol. ii.

The Danaides are ſometimes alſo called Belides, from their father, who was the ſon of the Egyptian Belius. Hyginus has preſerved the names of forty-ſeven of them.

DANAPRIS, in *Ancient Geography*, a river of Sarmatia, the ſame with Boryſthenes.

DANARAKIE, in *Geography*, a town of Perſia, in the province of Irak; 60 miles E. of Iſpahan.

DANASLU, in *Ancient Geography*, a name given by Jornandes to a river of Sarmatia; the Tyras of the ancients, and the Nieſter or Dnieſter of the moderns. It is called Danaſtus by Ammianus Marcellinus.

DANATA, a name given by Ptolemy to a town of Serica, between Abrogana and Oroſana.

DANBURY, in *Geography*, a town of America, in the ſtate of New Hampſhire, and county of Grafton; containing 165 inhabitants.—Alſo, a poſt-town in the county of Fairfield, in Connecticut; ſettled in 1687, and containing 2 churches, a court-houſe, and about 60 dwelling-houſes. On its ſmall ſtreams are iron-works, and ſeveral mills. It lies about 70 miles N.E. of New York city, and 33 N.W. by W. of New Haven. It has 3180 inhabitants.

DANBY, a poſt-town in Rutland county, Vermont, E. of Pawlet, containing 1487 inhabitants; 32 miles N. of Bennington.

DANCALI, a ſmall kingdom of Africa, on the coaſt of the Red Sea, reaching to the frontiers of Abyſſinia. It is bounded on the eaſt at Azab, by part of the kingdom of Adel, and the Myrrh country. This is a low, ſandy diſtrict, lying on the Red Sea, juſt where the coaſt, after bearing a little to the eaſt of north from Suez to Dancali, makes an elbow, and ſtretches nearly eaſt, as far as the Straits of Babelmandel. It has the mines of foſſile-ſalt immediately on the N. and N. W., a deſert part of the province of Dawaro to the S., and the ſea on the N. It has no port, excepting a ſpacious bay, with tolerable anchorage, called "the bay of Bilur," in lat. 13° 3′. and corruptly, the bay of Bayloul. The king is a Mahometan, as are all his ſubjects, who are called "Taltal;" they are all black, and ſome of them woolly-headed; a circumſtance which ariſes from a mixture with the Abyſſinians, whoſe hair is long. There are only two ſmall rivers of freſh water in the whole kingdom; and theſe, in the hot ſeaſon, are not viſible above the ground, but are ſwallowed up in the ſand, ſo that they are to be dug for when water is wanted. In the rainy ſeaſon they are ſwollen by rain falling from the ſides of the mountains, and from the high lands of Abyſſinia, and then only run with a current into the ſea. The reſt of the water in the country is ſalt or brackiſh, and unfit for uſe. Whenever theſe fail, they are obliged to ſeek, far off in the rainy frontiers of Abyſſinia, water for themſelves, and paſture for their miſerable goats and ſheep. When the Indian trade flouriſhed, this prince's revenue aroſe chiefly from furniſhing camels for the tranſport of merchandize to all parts of Africa. Their commerce is now confined to the carrying of bricks of ſolid or foſſile-ſalt, dug from pits in their own country, which, in Abyſſinia, paſs inſtead of ſilver currency; theſe they deliver at the neareſt market in the high land, at a very moderate profit, after having carried them from the ſea-ſide through the dry and burning deſerts of their own country, at the great riſk of being murdered by Galla. Bruce's Travels into Abyſſinia, vol. ii. and iii.

DANCE, an agreeable motion of the body, adjuſted by art, to the meaſures of a piece of muſic, either ſung or played.

The word is French, *dance*, formed of the German *danz*, or *tantz*, which ſignifies the ſame thing. Bochart derives it from the Arabic *tanza*, and Guichart from the Hebrew דוץ *douts*, which have all the ſame ſignification. Salmaſius derives the French, dancer, to dance, from the Latin denſare, to thicken; as holding it a practice among the ancient fullers to leap and dance as they fulled their cloths.

Some diſtinguiſh the high dance, conſiſting of capers, gambades, &c. from the low dance, which is terra à terra or cloſe to the ground.

In the carouſal of king Louis XIII. there were dances of horſes. The invention of ſuch dances is attributed to the Sybarites.

Dancing has always been in uſe among all nations, both civilized and barbarous; though held in eſteem among ſome, and in contempt among others. Of itſelf, no doubt, dancing is harmleſs. There is a time, ſays the preacher to dance; and ſometimes it is even made an act of religion. Thus David danced before the ark, to honour God, and expreſs his exceſs of joy for its return into the city of Sion. The daughters of Shiloh are likewiſe ſaid to have danced in a yearly feaſt of the Lord. Judges, chap. xxi. And we find many references to this practice in the religious ſolemnities of the Jews. From them it paſſed to the Egyptians, and afterwards to the Greeks and Romans, with whom it was a principal part of the worſhip of their falſe Gods. It afterwards was adopted in many pagan nations; and Chriſtians in popiſh countries celebrated certain feſtivals, particularly thoſe of the ſacrament, and paſſion of our Lord, with dancing. Socrates learnt to dance of Aſpaſia. And the people of Crete and Sparta went to the attack dancing. On the other hand, Cicero reproaches Galbinius, a conſular man, with having danced. Tiberius expelled the dancers out of Rome: and Domitian excluded ſeveral members from the ſenate, for having danced. Caſtor and Pollux are ſaid to be the firſt who taught the art of dancing; and that to the Lacedæmonians: though others attribute the invention to Minerva, who, they ſay, danced for joy after the defeat of the giants.

The ancients had three kinds of dances, called bacchic; the firſt grave, called emmelia, anſwering to our low dances and pavanes. The ſecond gay, called cordax, anſwering to our courants, galliards, gavots, and vaults. The third, called ſiccinis, was a mixture of gravity and gaiety. Neoptolemus, ſon of Achilles, taught the Cretans a new ſort of dance, called Pyrrhica, or the armed dance; to be uſed in going to war: though, according to mythologiſts, the Curetes firſt invented this dance, to amuſe and divert the infant Jupiter, and to drown his cries with the noiſe and claſh of their ſwords, beating againſt their bucklers.

Diodorus Siculus, in the fourth book of his Bibliotheca, aſſures us, that Cybele, daughter of Menoes, king of Phrygia, and Dindymenis his wife, invented divers things, and, among others, the flageolet of ſeveral pipes, dancing, the tabor, and the cymbal. Numa, it is certain, inſtituted a ſort of dance for the ſalii, prieſts of Mars, who made uſe of weapons therein. From theſe dances were compoſed another ſort, called ſaltatio mimicorum, or the buffoons' dance; wherein the dancers were dreſſed in little corſlets, with gilt morions, and had bells on their legs, and ſwords and bucklers in their hands. Lucian has an expreſs treatiſe, and Julius Pollux a chapter, on this head; Athenæus, Cælius Rhodiginus, and Scaliger, alſo make mention of this dance.

It is not many years ago ſince Thoinot Arbeau, a dancing-maſter of Paris, gave an orcheſography, wherein all the ſteps and motions of a dance are written, or noted down; as the ſounds of a ſong are ſcored in muſic. Though the famous Beauchamp has ſome pretenſions to be the inventor of this ſecret, and accordingly procured an arret in his favour.

Dancing is uſually an effect and indication of joy among moſt nations: though M. Palleprat aſſures us, that there are people in South America, who dance to ſhew their ſorrow; and it likewiſe made a part of the funeral ſolemnities of the ancients.

Dancing is ſo neceſſarily connected with muſic, that in treating one art we cannot avoid alluſions to the other. What is it that excites dancing? Muſic. What is it that regulates the ſteps of the dance? Muſic. What is it that exhilarates and keeps off fatigue, but muſic? One of the moſt ancient proverbs in our language ſays; "No longer pipe, no longer dance," a truiſm which Ray has recorded among our national apophthegms.

From the ſocial and ruſtic dance of our peaſants and domeſtics to the ſublime ballet heroique, muſic is called in to animate and enliven the one, and to give grace and dignity to the other. No muſic can boaſt a ſuperior longevity to our country dances. No muſic is more accented, more impreſſive, and more varied in its meaſures, than that of the grand ballets, which of late years have been performed at the opera.

Muſic and dancing are frequent rivals; but as they cannot ſubſiſt without each other, their little jealouſies never come to an open quarrel.

Much has been written concerning the antiquity of this art, particularly in France, the reſidence of all the divinities who preſide over it. But Pere Meneſtrier, M. Cahuſac, and the celebrated ballet-maſter, Noverre, have nearly exhauſted the ſubject. Mademoiſelle Heynel, and the family of Veſtris, have left impreſſions of their ſuperior talents that will never be obliterated by the natives, nor will foreigners or poſterity be ſuffered to remain ignorant of their ſuperior worth, by hiſtorians and men of letters; any more than the readers of the reign of Auguſtus will be allowed to remain ignorant of the pantomimical powers of a Pylades or a Bathyllus.

Muſic, Lucian ſays, is attendant on the art of dancing, and ſubſervient to it. They are more reciprocally uſeful to each other, perhaps, than muſic and poetry; but muſic has its peculiar charms totally independent of both. Modern poetry of various kinds can delight without muſic, but melody is the ſoul of ſongs, without which few would find readers; and dancing, without muſic, would be heavy work, and to a ſpectator excite no other idea than the freaks of inſanity.

Dancing was probably at firſt no more than geſticulation, and moving gracefully in a proceſſion: a natural pantomime; and it has often been ſtyled by philoſophers, the art of geſticulation; and though at firſt natural and ſpontaneous, theſe geſtures were at length poliſhed and refined into rule; but it ſeems as if the firſt dances were religious, and hymns the firſt ſongs. Theſe were the germs of the two arts.

With the ancient Hebrews, as the ſacred writings inform us, dancing made a part of the celebration of all great events. David danced before the ark. In Egypt dancing was a principal part of the religious rites of the prieſthood; and it was in imitation of them that the children of Iſrael danced round the golden calf in the deſert. As the Greeks had their mythology from Egypt, Orpheus who travelled thither for knowledge, is ſuppoſed to have introduced into his country feſtal ceremonies ſimilar to thoſe of Egypt, in all which dance and ſong prevailed. The ingenuity and elegant taſte of the Greeks ſoon improved, refined, and poliſhed theſe ſacred ceremonies, which were adopted by the greateſt part of the civilized world; particularly by the Romans, who were original and ſuperior in nothing but the art of war, and in plundering, ſlaughtering, and enſlaving mankind.

Theſe were the religious dances of Paganiſm: but as a new religion is generally a reform of one more ancient, as the

Grecian

Grecian of the Egyptian; the Roman of the Grecian; the Chriſtian of the Jewiſh, &c., many forms and ceremonies to which the people have been long accuſtomed are neceſſarily retained; and among theſe the ſolemn dances of the Hebrews and Romans, on great feſtivals and celebrations, were admitted by the primitive Chriſtians; in which even the biſhops and dignified clergy, according to Scaliger and Pere Meneſtrier, were performers; and diſpoſitions were made in the firſt temples that were erected after Chriſtianity was firmly eſtabliſhed by Conſtantine, for theſe ſacred dances. Scaliger ſays, that the firſt biſhops were called *Præſules* in the Latin tongue, for no other reaſon than that they led off the ſolemn dance in great feſtivals: and Meneſtrier (Traité des Ballets, 1682) ſays, that he had ſeen the canons and choriſters, on Whitſunday, take each other by the hand and dance while they ſung hymns of jubilation. (And he has pointed out ſeveral ancient churches, ſtill ſubſiſting, in which the choir was conſtructed in a theatrical form.) After ſpeaking of the religious dances of the Hebrews and Pagans, this writer obſerves, that the name of choir is ſtill retained in our churches for that part of a cathedral where the canons and prieſts ſing and perform the ceremonies of religion. The word comes from χορος a *dance*, or a *company of dancers*. The derivation is remarkable, and not one of thoſe that can be ſuſpected of proceeding from fancy, and accidental ſimilitude of ſound. One of the acceptations of the term χορος, given by Suidas, is—το συςημα των ἐν ταις ἐκκλησιαις ᾀδοντων—a *company of ſingers in a church*; that is, a *choir*. It ſeems likewiſe to have been ſometimes uſed, like our word *choir*, in the *local* ſenſe: χορος, ſays Suidas, και οἱ χορευται, και ὁ τοπος, &c. that is, *dancers*, and *the place* in *which* they *danced*. It is ſo uſed by Homer, Od. viii. 260. Λειηναν δε χορον.—They made ſmooth, or level, the *place* appointed for *dancing*. The choir was formerly ſeparated from the altar, and elevated in the form of a theatre, encloſed on all ſides with a baluſtrade. It had a pulpit on each ſide, in which the epiſtle and goſpel were ſung, as may ſtill be ſeen at Rome in the churches of St. Clement and St. Pancratius, the only two that remain in this antique form. Spain, continnues he, has preſerved in the church, and in ſolemn proceſſions, the uſe of dancing to this day; and has theatric repreſentations made expreſsly for great feſtivals, which are called *Autes Sacramentales*. France ſeems to have had the ſame cuſtom till the twelfth century, when Odo, biſhop of Paris, in his ſynodical conſtitutions, expreſsly orders the prieſts of his dioceſe to aboliſh it in the church, cemeteries, and public proceſſions. Conſtitut. 36.

The deſcendants of the original inhabitants of our iſland, the Cambro-Britons, in our own memory, on Sundays, uſed to be played out of church by a fiddle, and to form a dance in the church-yard at the concluſion of the ſermon. Theſe could hardly be called religious dances, though in ſome meaſure connected with the ſervice of the church, where the people are aſſembled; but however harmleſs the practice may originally have been, it has, we believe, been totally diſcredited and aboliſhed by the diſſenters and methodiſts. In France, ſays M. Cahuſac, this ſimple and ruſtic amuſement, which ſeemed to imply gentle and cheerful manners, is now changed for a little wit and much corruption. (Traité Hiſtorique de la danſe.)

On the ſtage, heroic and hiſtorical ballets ſeem very early to have been introduced at Athens, either as intermezzi or in the texture of the drama. The labyrinth of Crete, the battle of Theſeus and the Minotaur, and other well known and popular ſubjects, were repreſented in pantomime, without oral utterance. Proteus, of whom ſuch marvellous changes of figure are related, was only one of their dancers.

In this art, like all others, the Greeks were copied by the Romans.

Pylades, a native of Cilicia, and Bathyllus of Alexandria, carried the pantomimical art at Rome to ſuch perfection in the time of Auguſtus, that all other ſpectacles were neglected by the public. Theſe actors opened a theatre at firſt in partnerſhip; Pylades repreſented grave, tender, and pathetic ſubjects; Bathyllus, ſuch as were cheerful, gay, and jocoſe. But each reciprocally mortified by the applauſe acquired by the other, of which each thought himſelf ſeverally robbed, they ſeparated in a fit of jealouſy, and each ſetting up for himſelf, improved the art by opening different theatres, forming ſcholars, and exhibiting to ſpectators partial to the peculiar talents of each. The public took ſides, diſcuſſed and diſputed their ſeveral merits, and forgot the loſs of the republic and of liberty, to the great increaſe of political tranquillity, and eaſe of Auguſtus and his imperial government. Rome was divided into two factions, the Pyladians and Bathyllians, as France ſome years ago into Gluckiſts and Picciniſts. In the time of Nero, a dancer repreſented the labours of Hercules, traced, in a manner ſo true, all the different ſituations of this hero, that a king of Pontus who ſaw this exhibition for the firſt time, followed the geſtures of the actor ſo cloſely as to comprehend with facility every circumſtance, and was ſo delighted that he entreated the emperor, as a great favour, to let him take the dancer home with him; informing Nero, that he had barbarous neighbours, whoſe language no one underſtood, and who had never been able to learn his own, but he thought the geſticulations of this man would explain his wiſhes to them.

P. Meneſtrier, not a philoſopher, but a regular eccleſiaſtic, who lived under, and wrote for a religious prince (Louis XIV.), ſays, that dancing is in itſelf one of thoſe indifferent things of which the good or bad uſe may incline us to approve or condemn.

The ſages of antiquity regarded dancing as a uſeful bodily exerciſe, an inoffenſive relaxation, and as an efficacious preſervative againſt the diſorders of the mind. When the body is in motion, the mind repoſes itſelf. The figure, the ſteps, the movements of the dance, are equally amuſing to the dancer and the ſpectator. See BALLET and PANTOMIME.

The intimate connexion between muſic and dancing is ſuch as to require a ballet-maſter, not only to be a practical muſician, but a judge of compoſition; if not a compoſer himſelf he ſhould be able to ſuggeſt ſuch ſubjects to the maeſtro di cappella, as will expreſs his ideas, ſuit his principal ſubject, and paint the ſituations into which the ſeveral characters are thrown. Noverre thought that a ballet well compoſed wanted no recit, no words to explain its meaning. Singing and dancing together mutually weaken each other; and even St. Auguſtine, in ſpeaking of ballets, in the third century, complained of their monotony, and ſaid that they were obliged to place a crier at the ſide of the ſcene, to proclaim to the ſpectators what the dancers were about to repreſent. The recits, dialogues, and monologues in the ſplendid dances of Lulli's operas in the time of Louis XIV., Noverre cenſures. He puts great contempt upon mere dancing, and wants to reduce the whole art to pantomime, deſpiſing agility and feats of activity. "Les belles pirouettes, les beaux entrechats," and the remaining ſteadily for a conſiderable time, "ſur le petit point du pied, ſeem hors d'œuvres," in his ſyſtem.

As man had ſenſations before articulation and language; and tones of voice expreſſive of joy, ſorrow, pleaſure, and pain; ſo his features muſt have changed, and geſtures varied in theſe various ſituations. At all times, and in all countries, dancing has advanced towards perfection with the drama. The feaſt

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of Flora, at the beginning of May, was more particularly celebrated by dancing than any other Pagan feſtival; and among Chriſtians the May-poles erected in our villages, adorned with garlands of real flowers, as well as artificial, around which our peaſants and domeſtics dance, are remains of the Pagan celebration of ſpring.

Domeſtic feſtivity on occaſion of the marriage of a child, the anniverſary of a parent's birth, the arrival of beloved and reſpected ſtrangers, checquered the monotony of ancient ſimplicity of manners.

Socrates himſelf learned late in life to dance of the beautiful and accompliſhed Aſpaſia; and Cato, with all his rigour and ſeverity of manners, diſdained not, at upwards of 60, occaſionally to practiſe what he had learned in his youth.

As there are few amuſements, however innocent in the beginning, while in the hands of the judicious, moral, and decorous members of ſociety, that do not degenerate into licentiouſneſs when imitated by the vulgar; ſo dancing among the Romans, when made a trade, and females were hired occaſionally to enliven domeſtic feſtivity and riotous joy by their talents, gave birth to diſſolute manners, and depravity.

But on ſolemn occaſions, as muſic had its mania, dancing was not confined to occaſions of mirth and joy; there were funeral dances at the interment of great perſonages. And the Spartans advanced to the enemy in a military ſtep, that was called the Phrygian dance.

After dancing had been incorporated in the drama of Athens, it became neceſſary for the ballet-maſter, according to Lucian, to be poſſeſſed of univerſal knowledge. Poetry was neceſſary to ornament, muſic to animate, geometry to regulate, and philoſophy to guide his compoſitions. Rhetoric was likewiſe required to enable him to expreſs and move the paſſions, painting to delineate attitudes, and ſculpture to form his figures. He ought to be equal to Apelles, and not inferior to Phidias. All times ſhould be preſent to his mind, but he ought moſt profoundly to ſtudy the emotions of the ſoul, in order to paint its operations by the movements of the body. His conceptions ſhould be eaſy and natural, his mind lively, his ear nice, judgment ſound, imagination fertile, taſte certain in ſelecting whatever is proper and neceſſary to his deſign. Theſe are rare but indiſpenſable qualities with which ancient hiſtory, or rather fable, will furniſh him materials for the moſt magnificent compoſitions.

He muſt, therefore, inform himſelf of every important event that has happened in the world, from its riſing out of chaos to the preſent time.

Lucian was born under Trajan, and ſurvived Marcus Aurelius. "Lucian," adds M. Cahuſac, "did not require too much of the ballet-maſters of his time; as at Rome all great ſubjects of tragedy and comedy were included in the circle of pantomime. The compoſers of ballets were there, at once poets, muſicians and actors; whereas in our time, the poet is ſeldom a muſician, the muſician never a poet, and the actor neither one nor the other."

In the time of Auguſtus, the two great actors and maſters of declamation, Roſcius and Æſop, were forgotten, and their talents replaced by thoſe of the two great maſters of pantomime, Pylades and Bathyllus. But this was not effected by mere dancing; ſteps, movements, attitudes and poſitions were no longer in queſtion: there reſulted from their performance an expreſſion ſo natural, images ſo reſembling, a pathos ſo touching, or a pleaſantry ſo agreeable, that the ſpectators thought they heard what they ſaw. Geſtures alone ſupplied the ſweetneſs of voice, the energy of diſcourſe, and the charms of poetry. Hanc partem, &c. Caſſiodorus Var. i. 20.

As literature and all the arts partook of the declenſion of the Roman empire, dancing and pantomime could not eſcape decay. Rome, ſubdued by barbarians, plunged into ignorance: and darkneſs covered the reſt of the civilized world. Warriors were left, but the culture of the human mind was ſo totally neglected, as to convert into a deſert and a wilderneſs its moſt poliſhed and fertile provinces.

Few attempts were made to revive the arts in Italy till the 15th century; and thoſe connected with the drama were clumſy and awkward. Poetry and painting, indeed, had made great ſtrides towards perfection before dramatic muſic and dancing had awakened any public intereſt. Dancing made no part of the firſt Italian operas; but in the ſecond ſpecies of melo-drama in Italy, authors tried to unite all the charms of muſic and poetry with the wonders of machinery; and ſoon after the opera was embelliſhed with ballets hiſtoriques, fabuleux, and poetiques.

There were ballets poetiques, allegoriques, boûffons, at the court of Turin, to celebrate the nuptials of illuſtrious perſonages.

In France, balls, maſquerades, and ballets, after the accident which happened to Henry II., in 1559, ſupplied the place of carouſals, tilts, and tournaments.

M. Cahuſac, in his "Traité Hiſtorique de la Danſe," is miſtaken in ſpeaking of the firſt opera, when he ſays, (tome ii. p. 82.) "Ce ſpectacle etoit ſans danſe;" for it appears in the ſcore, printed in 1600, that the choruſes were ſung and danced at the ſame time, like thoſe on the French ſtage in the operas of Lulli. But in the firſt operas it was certainly the intention of their legiſlators, to favour poetry, and conſtitute her miſtreſs of the feaſt; and it was a long time ere muſic abſolutely took the lead. Dancing ſtept into importance only during the laſt century; but rarely in that preceding it.

There were analogous dances in the firſt oratorio at Rome: Dell' anima e corpo, performed in the church of La Vallicella. In the inſtructions for performing this oratorio, it is ſaid, "The performance may be finiſhed with or without a dance. If without, the laſt chorus is to be doubled in all its parts, vocal and inſtrumental; but, if a dance is preferred, a verſe beginning thus: *Chioſtri altiſſimi, e ſtellati,* is to be ſung, accompanied ſedately and reverentially by the dance. Theſe ſhall ſucceed other grave ſteps and figures of the ſolemn kind. During the ritornels the four principal dancers are to perform a ballet, *ſaltato con capriole,* 'enlivened with capers or *entrechats,*' without ſinging. And thus, after each ſtanza, always varying the ſteps of the dance; and the four principal dancers may ſometimes uſe the *galiard,* ſometimes the *canary,* and ſometimes the *courant* ſtep, which will do very well in the ritornels."

Dr. D'Avenant's dramatic operas, in 1671, were all ſet off with the moſt expenſive decorations of ſcenes and habits, and with the beſt voices and dances.

Dryden's definition of an opera, is, "a fiction, repreſented by vocal and inſtrumental muſic, adorned with ſcenes, machines, and dances."

In July 1697, Italian intermezzi, or interludes and mimical entertainments of ſinging and dancing, were performed at York Buildings.

Little mention is made of dancing in the firſt Italian operas performed in England. At the end of Handel's *amadigé,* there was a dance to the melody of the coro finale, 1715. No ballet-maſter, dance, or dancers, are mentioned after the dramatis perſonæ of any one opera ſet by Handel; poetry, compoſition and ſinging, and a complete orcheſtra, ſeem to have ſatisfied the public, without doubling the expence

expence of the performance in ſupport of an additional art.

It was during the regency of lord Middleſex, that a regular ballet maſter, principal dancers, and figuranti of both ſexes, were taken into ſalary. Before that period we have heard of individual dancers of great abilities and attractions: ſuch as miſs Saintlow, a Camargo, a Barberini, a Sallé, the two Pauſſans, the Aurettis, &c. &c.; but ballets heroïques, ballets hiſtoriques, ballets allegoriques, &c. ſeem to have had no exiſtence in this country till about the middle of the laſt century.

The French ſeem to have been the firſt in modern times to introduce ballets analogues in their muſical dramas. Thoſe in all operas written by Luinault and ſet by Lulli, are of that kind. The Italians, not inſenſible of their ſuperiority to all other countries in whatever concerns the fine arts in general, and who are jealous of French pretenſions to rivality, as the French are envious of their claims to preeminence, frankly allow them the palm in dancing. All the Italian writers on the drama, particularly the muſical, recommend the doctrines of Cahuſac and Noverre to the conſideration and practice of their ballet-maſters.

Algarotti, in his Eſſay on the Opera, addreſſed to the firſt Mr. Pitt, 1762, ſays, that though his countrymen have compoſed and executed ſome comic dances, of which the pantomime would have done honour to Pylades and Bathyllus; in ſerious and heroic ſubjects the Italians, and all nations, muſt ſtrike to the French, who ſeem by nature and cultivation as much formed for excelling in this art as the Italians in muſic. Dances, analogous, and incorporated in the drama in which they are performed, at preſent, ſeem preferred in France to all others; but where they are diſtinct, and only performed between the acts, a groteſque and comic dance ſhould not, in a ſerious drama, counteract the labours of the poet and performer, in exciting that pity and terror, which Ariſtotle makes the conſtituent parts of a tragedy. But even comic dances in a theatre ſhould have ſome meaning, ſomething to intereſt, beſides capering and feats of activity. Such ſhould have a plot, its intricacies and dénouement; and in theſe dances, as well as the heroic, the French incline much more to pantomime, in intelligent and eloquent geſtures performed by the hands and features, than by the feet. In Ricoboni's Hiſtory of the Stage, dancing is never mentioned; and Algarotti ſays, "it never was a conſtituent part of the drama, but is always foreign to the buſineſs, and very often repugnant to it. If the ſcene of action be in Rome, the dance is often in Holland or China; and if the opera is ſerious, the dance is ſure to be comic."

DANCE *of St. Vitus*. See VITUS.

DANCE, *Country*. See COUNTRY-*Dance*.

DANCER, *Rope*, *Schœnobates*. Groddeck, profeſſor of philoſophy at Dantzic, has publiſhed a diſſertation on rope-dancers, "De Funambulis," full of learning, and an uncommon knowledge of antiquity. He defines a rope-dancer, a perſon who walks on a thick rope faſtened to two oppoſite poſts; which is preciſely what is expreſſed by the Latin word Funambulus. But our rope-dancers do more; for they not only walk, but dance and leap upon the rope.

The ancients, it is certain, had their rope-dancers as well as we: witneſs the Greek words, neurobates, and ſchœnobates; as well as the Latin funambulus, which everywhere occur. They had likewiſe the cremnobates and oribates, that is, people who walked on the brinks of precipices. Nay more, Suetonius, in Galba, cap. 6. Seneca in his eighty-firſt epiſtle, and Pliny, lib. viii. cap. 2. make mention of elephants that were taught to walk on the rope. This they did both backwards and forwards, as well as up and down; and this feat Galba firſt cauſed to be exhibited to the Roman people. After this, ſuch was the confidence repoſed in the dexterity of the animal, that a perſon ſat upon an elephant's back while he walked acroſs the theatre upon a rope, extended from the one ſide to the other. Lipſius, who has collected the teſtimonies, thinks they are ſo ſtrong, that they cannot be doubted. "Epiſtolarum ſelectarum centuria." Antwerp. 1605. 4to. Suet. Vit. Galba. Seneca Epiſt. 26. Dio Caſſius. In the 13th century ſome ventured to ride a horſe upon a rope.

Mr. Groddeck, coming from the hiſtorical to the moral conſideration, maintains that the profeſſion of a rope dancer is not lawful; that the profeſſors are infamous, and their art of no uſe to ſociety; that they expoſe their bodies to very great dangers; and that they ought not to be tolerated in a well-regulated ſtate. But, coming afterwards to temper the ſeverity of his morals, he allows that there are ſometimes reaſons for admitting them; that the people muſt have ſhews; that one of the ſecrets of government is to furniſh them therewith, &c.

The ancient rope-dancers had four ſeveral ways of exerciſing their art; the firſt vaulted, or turned round the rope, like a wheel round its axis, and there hung by the heels or the neck. The ſecond flew, or ſlid, from above, downwards, reſting on their ſtomachs, with the arms and legs extended. The third run along a rope ſtretched in a right line, or up and down. Laſtly, the fourth not only walked on a rope, but made ſurpriſing leaps and turns thereon. But it is needleſs to recount the various feats of this kind that are exhibited in our places of public amuſement.

DANCERIES, an old French term for country-dance tunes. Jean d'Etrées, a performer on the hautbois in the ſervice of Charles IX., publiſhed at Paris, in 1564, four books of Danceries, firſt writing down the common lively tunes, which, till then, had been probably learned by the ear, and played by memory, about the ſeveral countries ſpecified in the title. The editor of theſe books tells us, that they contained Les chant des branles communs, gais, de champagne, de Bourgogne, de Poitou, d'Ecoſſe, de Malte, des Sabots, de la Guerre, & autres gaillardes, ballets, voltes, baſſes dances, hauberrois, allemandes. Printed at Paris, 1564.

DANCERS, in *Eccleſiaſtical Hiſtory*, a ſect that ſprung up at Aix-la-Chapelle in 1373, and ſpread through Flanders. Perſons of both ſexes were ſuddenly ſeized with dancing fits, and continued them, with extreme violence, till they were quite exhauſted; and at theſe times they pretended to receive wonderful viſions. Like the Flagellants, the dancers wandered about from place to place, had recourſe to begging for their ſubſiſtence, treated with the utmoſt contempt both the prieſthood, and the public rites and worſhip of the church, and held ſecret aſſemblies. This new kind of phrenzy was regarded by the ignorant clergy of that age as the work of evil dæmons, who poſſeſſed, as they thought, this dancing tribe. Accordingly the prieſts of Liege endeavoured to caſt out the devils, which rendered theſe fanatics ſo merry, by ſinging hymns and applying fumigations of incenſe; and they gravely tell us, that the evil ſpirit was entirely vanquiſhed by theſe powerful charms. The French prophets, or convulſioniſts, in later times, and ſome wild enthuſiaſts in America, and in our own country, under the appellation of *ſhakers*, *jumpers*, &c. reſembled theſe more ancient religious dancers.

DANCETTE', in *Heraldry*, is when the out-line of any bordure, or ordinary, is indented very largely; the largeneſs

of the indentures being the only thing that diſtinguiſhes it from indented.

There is alſo a bearing of a bend, called *double dancetté*; thus, he beareth azure, a bend *double dancetté* argent.

DANCHE', or *Denché*, the ſame with indented; or, as others will have it, with *dancetté*.

DANCHET, Antony, in *Biography*, a French poet, and man of letters, was born at Riom in 1671. His parents were of low rank, but by the exertions of his friends he was enabled to acquire a good education, and was at length admitted ſtudent in the college of Louis le Grand at the time of taking Mons and Nice. He wrote a Latin poem upon theſe victories, which was printed while he was ſtill a collegian. He was afterwards choſen rhetorical profeſſor in the college of Chartres, which poſt he occupied four years. In after-life he applied himſelf chiefly to poetry, and the belles lettres, was admitted a member of the French academies, and had a place aſſigned him in the royal library. He died in 1748. He had no claims to be ranked in the firſt claſs of literary excellence, but his works obtained for him a conſiderable ſhare of reputation; they were collected and publiſhed in 1751 in four volumes 8vo. As a man he was highly eſteemed for the qualities of his mind and the mildneſs of his temper; he was ſincere, upright, and diſintereſted, and was an enemy to every ſpecies of ſatire and calumny, weapons too frequently uſed by poets and men of genius. Moreri.

DANCKERT, or Danckerts, Cornelius, a deſigner and engraver, born at Amſterdam in 1561. There were ſeveral engravers of this name, and moſt probably of this family, of which Cornelius may be conſidered the head. He eſtabliſhed himſelf at Antwerp as a print-ſeller; but he did not ſuffer this employment to engroſs his whole time, as he engraved many portraits, landſcapes, and hiſtorical pieces, as well from his own compoſitions as from the deſigns of Berghem, Rembrandt, and others. We ſhall only mention the following: Guſtavus Adolphus, king of Sweden, a large plate; Cornelius de Wit, in a battle, ditto; John Calvin, a large, oval plate. The following are from his own deſigns: the four Monarchies, Ninus, Cyrus, Alexander, and Cæſar; Figures on Horſeback, with emblematical devices, 4 plates, folio; the ſeven Wonders of the World, 7 plates, folio; the principal Subjects of the Old Teſtament, 100 ſmall prints, 4 on each plate; a ſet of Views in Holland, 6 plates. Huber.

Danckerts, Danckert, the ſon of Cornelius, was born at Antwerp, about the year 1600. He alſo engraved different ſubjects, as well from his own deſigns as from thoſe of other artiſts; and though his pieces are not ſo numerous as his father's, they ſurpaſs them in merit. Danckert combined the point and the graver with very great ſucceſs, and the pieces from Berghem and Wouvermanns, which he has wrought in this manner, are much eſteemed. We ſhall mention a few of his engravings: the Portrait of Charles II. king of England, folio; Venus and Cupid, aſleep, ſpied by a Satyr, folio, marked *D. Danckerts, exc.*; Pigeon-ſhooting and Stag-hunting, a pair, large plates, from Berghem, *Danckert Danckerts, fec. et exc.*; four large Landſcapes, from Berghem, lengthways; another ſet of four, of a ſmaller ſize, from the ſame maſter; another ſet of ſix, ſtill ſmaller, from the ſame. Huber.

Danckerts, John, a deſigner and engraver, who, about the year 1654, ſettled at Amſterdam; but being invited into England, he went to London, where he deſigned for the Engliſh Juvenal, the plates engraved by Hollar. This artiſt alſo engraved ſome plates. We ſhall only mention the following: Venus lying upon a Couch, from Titian, *Joh. Danckerts, sc. aq. forti* 1657.; Merchants ſhipping their Goods, *Joh. Danckerts sc.* Huber.

Danckerts, Henry, brother to the above, was alſo bred an engraver, but afterwards became a landſcape-painter. He was born at the Hague, but at an early age travelled into Italy, from whence he came to England. Here he enjoyed the favour of Charles II. who employed him to draw views of the Britiſh ſea-ports, and royal palaces. During the diſturbances which preceded the abdication of James II. (Walpole, by a ſtrange anachroniſm, ſays, *in the time of the popiſh plot*), he quitted England for Amſterdam, where he died ſoon after. The landſcapes painted by this artiſt were numerous, and are chiefly to be found in England. Amongſt them are Views of Windſor, Plymouth, Penzance, &c. marked HDankers, F. 1678, 1679. He alſo engraved from Vandyk, Titian, Jacopo Palma, &c. Walpole. Huber.

Danckerts, Justus. This artiſt was of the ſame family as the former. He was a deſigner, engraver, and print-ſeller, and reſided in Amſterdam. The following plates bear his name: the Portrait of Caſimir, king of Poland; a ditto of William III., prince of Orange; the Harbours of Amſterdam, a ſet of 7 pieces. Huber.

Danckerts de Ry, Cornelius. The circumſtance of both Milizia and Heinecken dating the birth of this architect in 1561, and ſaying that he was born in Amſterdam (the very time and place of the birth of Cornelius Danckerts mentioned above), leads us to ſuſpect ſome chronological error, if not, indeed, that theſe two artiſts were one and the ſame perſon. Cornelius was originally a ſtone-maſon, but afterwards applied himſelf to architecture. He conſtructed in the city of Amſterdam many public and private buildings, highly creditable to his talents on account of their beauty and convenience, and, amongſt others, three of the principal churches, the exchange, and the gate which leads to Haarlem, the moſt beautiful of the city.

Cornelius had a ſon named Peter, who was born at Amſterdam in 1605, and afterwards became painter to Uladiſlaus, king of Poland. Milizia, Mem. degli Architetti.

DANCORITON, in *Ancient Geography*, a town of Illyria, in Liburnia, ſuppoſed to be the ſame that is called by Pliny and Ptolemy Corinium.

DANCRETA, in *Botany*, a name given by the people of Guinea, to a plant which they uſe in diſorders of the head, boiling it in water, and uſing the decoction in the way of fomentation. It is a ſpecies of bindweed, and is called by Petiver, convolvulus quinque foliis Guinenſis foliis non ſerratis, or the five-leaved Guinea bindweed, with leaves not ſerrated. Caſpar Bauhine, in his Prodromus, deſcribes a ſpecies of bindweed growing in Egypt, which exactly agrees with this in all particulars, except that it is finely ſerrated all round the edges of the leaves. Phil. Tranſ. N° 292.

DANDA, in *Geography*, a river of Africa, which ſeparates Kongo Proper from the kingdom of Angola. It is a conſiderable river, and navigable quite up to the town of Icoa; that is, about 30 leagues and upwards. This river gives its name to the province through which it paſſes, and the countries of which it fertilizes; but without cauſing ſuch deſtructive inundations as the Zair. Its navigation, though not difficult or dangerous, is ſubject, however, to the interruption and moleſtation of the numerous ſwarms of crocodiles, ſea-horſes and monſtrous ſerpents, which infeſt it, and make a dreadful havoc among thoſe who frequent it in canoes and other ſmall veſſels. Its courſe is from ſouth-eaſt to north-weſt; during which it receives the Lucale, and ſome other leſs conſiderable ſtreams. This river, and alſo the Bengo and Lucale, are ſuppoſed to ſpring from a lake among the high

high mountains in the eaſt. On the northern ſhore of its mouth is a fort, called "Danda Capitantria," which ſerves as a guard of the frontiers between Kongo and Angola.

DANDACA, in *Ancient Geography*, *Eſki-Foros*, a town of the Cherſoneſus Taurica, upon the moſt weſterly point of the peninſula, W.N.W. of Cherſoneſus.

DANDAGULA, a town of India, on this ſide of the Ganges, in the vicinity of the promontory of Calingon.

DANDAR, in *Geography*, a circar of Hindooſtan, in the country of Guzerat, on the banks of the Puddar, S.W. of Oudipour.

DANDARICA, in *Ancient Geography*, a kingdom ſituated S.E. of the Palus Mæotides, which was traverſed by the river Hypanis.

DANDARII, a people of Aſia, who inhabited the vicinity of mount Caucaſus, Steph. Byz. Strabo places them to the ſouth of the Palus Mæotides. Theſe people occupied the northern coaſt of the Euxine ſea, at the angle of the eaſtern part. It is mentioned by Ammianus Marcellinus.

DANDAXANA, a town of Cappadocia, in the Melitené territory, towards the N.W. of Arca.

DANDELION, in *Botany*. See LEONTODON.

DANDELION, in *Agriculture*, is the name of a very troubleſome weed, the *leontodon officinale*, which is well known as infeſting meadows and other grounds, and which ſpreads greatly where the flowers are ſuffered to perfect their ſeeds, which from being light and downy, are readily capable of being blown about by the wind. It is a weed which ſhould of courſe be extirpated as ſoon as poſſible after it appears, in order to prevent its ſeeding.

DANDINI, CESARE, in *Biography*, a painter of ſome eminence, who was born at Florence, about the year 1595. At the age of 12 he was placed under the tuition of Franceſco Curado, with whom he ſtaid three years: he then became the diſciple of Chriſtofano Allori, and afterwards of Dominico Paſſignano, who took him to Piſa, where he availed himſelf of his aſſiſtance in a conſiderable work he was there employed to execute. On his return, Ceſare was ſent by his father to complete his ſtudies at Rome. There he remained ſome years, and upon his return to Florence enjoyed the reputation of an experienced and correct painter. His works, which much reſemble thoſe of Paſſignano, are by no means uncommon in the churches and palaces of Florence; but his chef-d'ouvre is an altar piece at Ancona, repreſenting St. Carlo and other ſaints, which is judiciouſly compoſed, executed with a maſterly pencil, and well preſerved. This artiſt died at the place of his nativity in 1658. Baldinucci.

DANDINI, VINCENZIO, brother to the laſt-mentioned artiſt, was born at Florence, in 1607. After having been taught the firſt rudiments of his art in the ſchool of Ceſare, he went to Rome, where he ſtudied ſome time under Pietro da Cortona, and copied with the greateſt aſſiduity the maſterpieces of art which adorn (or then adorned) the palaces and temples of that city. Vincenzio was conſidered one of the beſt of Cortona's ſcholars, and met with ample encouragement from the grand duke, as well as from private perſons, on his return to Florence. He painted a beautiful ceiling, in which he repreſented Aurora attended by the hours, at the villa of Poggio Imperiale; and a large picture of the Sacrifice of Niobe, at that of Petraja. One of his beſt altar-pieces, which are frequent at Florence, is the Conception of the Virgin, in the church of Ogniſanti. Lanzi. Storia Pitt.

DANDINI, PIETRO, the ſon and diſciple of Vincenzio, was born at Florence, in 1646. The ſtyle of Pietro Dandini, though founded on that of his father, ſoon degenerated into that manneriſm which is frequently the reſult of facility of execution too ſoon acquired. Although he poſſeſſed, in the opinion of ſome writers, talents even ſuperior to thoſe of his uncle and father, his deſire of gain ſo overbalanced the reſpect he owed his reputation, that his bold pencil generally contented itſelf to paint the unſtudied and ill-digeſted compoſitions of an hour. Sometimes, however, when he was well paid, he ſhewed his abilities; as in a cupola at the church of S. Maria Maddalena, at Florence, as well as in ſome freſcoes in the ducal palace and villas. In the public palace at Piſa, is an extenſive compoſition by this artiſt, repreſenting the taking of Jeruſalem, which likewiſe evinces great talent. One of his beſt altar-pieces is in the church of the Servi at Florence; it repreſents Beato Piccolomini in the act of ſaying maſs. Pietro Dandini died in 1712, leaving a ſon named Ottaviano, who followed the footſteps of his father in ſeveral public works which he executed in Florence. Lanzi.

DANDOLO, HENRY, in *Biography*, one of the moſt illuſtrious of the doges of Venice. In early life he had been ambaſſador at the court of Conſtantinople, where he maintained the rights of his country with ſpirit and dignity. It was not till he had reached his eighty-fourth year that he was advanced to the high honour of doge; but he retained his faculties at that period with ſo much vigour, that the events of his government were among the principal cauſes of the greatneſs of Venice. The republic, at the commencement of his adminiſtration, was engaged in war with the Piſans; but the deciſive meaſures of Dandolo ſoon brought it to a termination. He humbled alſo the Veroneſe; and on the formation of the league for the fourth cruſade, under Baldwin earl of Flanders, application was made to Venice for its aſſiſtance. Dandolo received their deputies favourably, and pleaded their cauſe with ſo much effect, that a treaty was formed in 1201 upon terms greatly to the advantage of the Venetians, who agreed to furniſh ſhips, proviſions, and a ſquadron of armed galleys. Hoſtilities were firſt directed againſt Zara, which was taken and diſmantled; and the conquerors proceeded to Conſtantinople, on the pretext of aiding Alexius Angelus to reſtore his father, the emperor Iſaac, who had been dethroned by his own brother. The ſpirited and venerable doge entered warmly into this meaſure, for the ſake of procuring to his country an acceſſion of commerce and dominion. The fleet arrived before Conſtantinople in June 1203, and the ſiege was ſoon begun. In this Dandolo took an active part. At the ſtorming of the city, he ſtood in a ſuit of complete armour, on the prow of his galley, with the great ſtandard of St. Mark diſplayed before him, commanded his men to row up to the walls, and was the firſt who leaped on ſhore. The walls and towers on that part were ſpeedily occupied by the Venetians, and the banner of the republic fixed upon them, when Dandolo was called away to the aſſiſtance of the French, who were ſurrounded by ſuperior numbers. The Greeks were ſoon repulſed, and the uſurper fled, leaving his capital to the invaders. Dandolo was afterwards nominated to the high office of emperor; but his great age, and the circumſtance of his ſituation as doge, rendered it impoſſible for him to accept the intended honour. The Venetians, however, ſhared the imperial dominions, and Dandolo was ſolemnly inveſted with the title of deſpot of Romania. He died at Conſtantinople, in the year 1205, at the great age of ninety-ſeven. Moreri.

DANDOLO, ANDREW, doge of Venice, and the hiſtorian of his country, was born about the year 1310. He diſtinguiſhed himſelf in early life by his attainments in literature, and was in 1344 elected doge. Under his government the military character of his country ranked very high, and its commerce was extended, particularly by a connection with Egypt, which Dandolo formed by menas of an embaſſy to the

the ſoldan, and the firſt Venetian ſhips ſailed to Alexandria in 1345. This new trade occaſioned a war between the republics of Genoa and Venice, which continued with various ſucceſs ſome years, and which gave riſe to a correſpondence between the doge, and the celebrated Petrarch. The poet was the friend and advocate of peace; the doge replied, and his anſwer is printed among the epiſtles of Petrarch. War was, however, continued, but it cauſed the death of Dandolo which happened in September 1354. He was highly eſteemed by his countrymen for learning, eloquence, courteſy, and patriotiſm. As an author he is diſtinguiſhed for his "Chronicle of Venice," which comprehends the hiſtory of the republic from its foundation to the year 1342; and to him has been aſcribed the compilation of the ſixth book of Venetian ſtatutes. His chronicle obtained conſiderable reputation for impartiality, and for the exhibition of authentic documents which the author produced to ſubſtantiate his facts. Modern Univer. Hiſt.

DANDRIDGE, in *Geography*, deriving its name from the maiden name of the wife of the preſident Waſhington, a poſt and county town of America, in the ſtate of Teneſſee, and county of Jefferſon; 565 miles W. of Waſhington.

DANDUTI, in *Ancient Geography*, a people of Germany, placed by Ptolemy in the neighbourhood of the Tarani, and W. of the Nerterani.

DANE, in *Geography*, a river of England in the county of Cheſter, which joins the Weever at Northwich.

DANEBROG, *Order of*, in *Heraldry*, was inſtituted by Wilderman II. king of Denmark, on St. Laurence's day, in the year 1219, in commemoration of a ſtandard which, as it is pretended, fell miraculouſly from heaven, and revived the courage of Wilderman's ſoldiers, ſo that they beat the Livonians in a battle, in which they were at that time engaged. This ſtandard, in which was ſeen a white croſs, was called, in the language of the country, "Danebrog," or "Danenburgh," *i. e.* the ſtrength of the Danes. Chriſtian V. in the year 1671, revived the order, which had fallen to decay. The badge of the order is "a croſs pattée enamelled white, charged with 11 diamonds." The collar worn on grand days, is "a chain, conſiſting of the letters W. C. alternately, and crowned with a regal crown of Denmark; between the letters a croſs enamelled white, in the C. a figure 5;" the firſt letter alluding to the inſtitutor, and the other to the reviver of the order; on other days the knights have the croſs tied to a white ribband edged red, worn ſcarfwiſe from right to left. The knights likewiſe have embroidered on their coats a ſilver ſtar, ſurmounted with a croſs argent, edged gules, and thus inſcribed, C. V. Restitutor.

DANEDI, Gioseffo, and Gio. Stefano, called likewiſe *Montalti*, in *Biography*, two painters, natives of Treviglio, a town in the ſtate of Milan, where they flouriſhed in the 17th century. They were both educated in the ſchool of Morazzone: the former, however, afterwards ſtudied with Guido Reni, whoſe ſtyle he ſought to imitate, as appears by his Murder of the Innocents, in the church of S. Sebaſtiano, at Milan. Stefano followed the precepts of Morazzone, though, after the example of his brother, he was deſirous to add ſomething of delicacy to the boldneſs and vigour, which characterize the works of his maſter. One of his beſt works is the Martyrdom of S. Giuſtina, in the church of S. Maria, in Pedone, at Milan, which is correctly deſigned, and exempt from that cold and languid tone of colour which too frequently pervades his works. Gio. Stefano died in 1689, at the age of 81. His brother died at the age of 70, but in what year is unknown. Lanzi.

DANEMORA. See Dannemora.

DANEGELT, or *Dane-geld*, from *Dane* and *gelt*, ſignifying in Dutch, *money*, an annual tax laid on our anceſtors, firſt of 1*s*. afterwards 2*s*. for every hide of land through the realm, for maintaining ſuch a number of forces as were thought ſufficient to clear the Britiſh ſeas of Daniſh pirates, which heretofore greatly annoyed our coaſts.

It was firſt impoſed as a ſtanding yearly tax on the whole nation, under king Ethelred, A. D. 991. That prince, ſays Camden, Britan. 142. much diſtreſſed by the continual invaſions of the Danes, to procure his peace, was compelled to charge his people with heavy taxes, called danegelt. At firſt they paid 10,000*l*. then 16,000*l*. then 24,000*l*. after that 36,000*l*. and laſtly, 48,000*l*. *per annum*.

Ethelred, in 1008, made a vigorous effort to free his people from this infamous tribute, by a general tax on all the land of the kingdom, for fitting out a fleet, which might effectually guard againſt the Danes.

It appears from records, that danegelt was levied in the reign of Edward the Confeſſor, not to be paid to the Danes, but to oppoſe their invaſions; and it ſeems to have been continued during the firſt eight years of that king, as a conſtant fund for his navy. We are told, however, that he took it off A. D. 1051, becauſe he ſaw the devil dance on a heap of the money collected by that tax; but Ingulphus, who mentions this ridiculous tale, only as a popular rumour, gives us a very good reaſon why the lands of the kingdom were then diſcharged of this burden, namely, there being a great famine that year which moved the king to remit it, out of charity to the poor. Yet it muſt be obſerved, that this *temporary* evil was no proper cauſe for aboliſhing a tax, which at other times might be neceſſary, to *all perpetuity*; and therefore lord Lyttelton much doubts the hiſtorian's exactneſs in ſaying it was ſo aboliſhed. Edward's ſucceſſor, Harold, drew together a fleet of 700 ſhips of war; and yet we do not find that danegelt, or other ſimilar impoſition, was levied by that prince. In the year 1083, or 1084, William the Conqueror, apprehending a great invaſion of England from Denmark and Flanders, revived danegelt, and advanced it to ſix ſhillings a hide; but its produce was little more than had been obtained from former danegelts. It is not certain, that danegelt, or, as the Saxon Chronicle terms it, "militare tributum," was even exacted by William Rufus. It appears by the "great roll," commonly called the fifth of king Stephen, but which Mr. Madox has demonſtrated to belong to the reign of Henry I. that it was collected ſix years together by that king, and accounted for in the ſame words that were wont to be uſed in accounting for the ſettled yearly revenue. Of Stephen's reign we have no rolls; but ſome hiſtories take notice of his levying of danegelt, which he had a good pretence to do, as he was in perpetual fear of invaſions from Normandy, or other parts of France, in favour of Matilda, or her ſon. We find by the rolls that it was paid in the 1ſt, 2d, 20th, and 21ſt years of Henry II. The low ſtate in which he found the fleet of England might make it neceſſary for that prince to continue this impoſition till the third year of his reign; and the danger of an invaſion from France or Flanders might naturally induce him to revive it in the twentieth. Upon extraordinary occaſions danegelt was levied; and although at the end of that century the name was loſt, a like proviſion was often made, in every age, by our parliaments, for the defence of the Britiſh ſeas, and ſecurity of the kingdom. Lord Lyttelton's Hiſtory, &c. vol. iii. p. 65, &c.

DANE-LAGE. See Common *Law*.

DANE-WORT, in *Botany*. See Sambucus.

Danewort, in *Agriculture*, is a term ſometimes applied provincially to that ſort of elder uſually known by the names of dwarf-elder and wall-wort, (*Sambucus ebulus*). It is remarked

marked by Withering, that the green leaves of this plant drive mice away from granaries; and that the Sileſians ſtrew them where their pigs lie, under the perſuaſion that they prevent ſome of the diſeaſes to which they are liable. It is not eaten either by cows, goats, ſheep, horſes, or ſwine.

DANET, Peter, in *Biography*, a French abbè, known by his dictionary, Latin and French, compoſed for the uſe of the dauphin. He compiled alſo a French dictionary of Greek and Roman Antiquities, in 4to. This was publiſhed in 1698, and has been tranſlated into Engliſh. He was one of the perſons ſelected as editors of the Delphin claſſics: Phædrus fell to his ſhare, but his commentary of this poet gained him little reputation. Moreri.

DANGALA. See Dongola.

DANGCANGHAC, in *Ornithology*, the name given by the people of the Philippine iſlands to the heron. The Spaniards call it *gazza*. It is the ſame ſpecies with that ſo common in Europe. See Heron.

DANGE, in *Geography*, a ſmall town of France, in the department of the Vienne, chief place of a canton in the diſtrict of Chatellerault, with a population of 846 individuals. The canton has an extent of 150 kiliometres, 9 communes, and 6753 inhabitants.

DANGEAU, Louis de Courcillon de, in *Biography*, abbot of Fontaine-Daniel and Clermont, was born at Paris, in 1643. His father was marquis de Dangeau, and his mother was deſcended from Du Pleſſis Mornay, a name celebrated in church-hiſtory as an oracle of Calviniſm. Their ſon was brought up a Proteſtant, but renounced his religion at the perſuaſion of Boſſuet. He travelled when young, and went to Poland, in 1667, as envoy-extraordinary. On his return he devoted himſelf to literature, and entered the church, but with a determination to accept no benefice which required miniſterial duties. He was nominated, in 1671, reader to the king; in this ſituation he uſed his influence in rendering his ſovereign the patron of letters, and was ſo far ſucceſsful that many men of real merit and genius were brought forward by his intereſt. He was admitted a member of the French academy, and became a moſt active and zealous aſſociate. He was particularly attentive to the ſtudy of grammar, and his eſſays on that ſubject were afterwards collected and publiſhed by the abbé Olivet in his Opuſcules ſur la Langue Francoiſe. The abbé Dangeau, himſelf a convert, became zealous in the converſion of others; but his ardour in this work was ſoon abated by the miſconduct of ſome of his diſciples. In the promotion of real knowledge he was very ſedulous, and publiſhed a variety of introductory pieces for the uſe of young perſons. He formed at his own houſe a literary ſociety which aſſembled weekly, and to which were admitted writers diſtinguiſhed for talents in every department of learning. Here all party diſtinctions were forgotten, and the converſation was carried on with perfect liberty. The abbé was celebrated more by his attachment to truth, than by any other circumſtance in life; ſometimes his pertinacity to the line of rectitude was deemed obſtinacy, yet it was admitted on all hands that he was polite, indulgent, well verſed in the manners of the world, humane and liberal to the indigent. He did much good, and was truly benevolent with a very moderate income. He died generally reſpected, and deeply lamented by his friends, in the beginning of the year 1723. Moreri.

Dangeau, in *Geography*, a ſmall town of France, in the department of Eure and Loire; 9 miles N. of Chateau Dun, and 18 S. of Chartres.

DANGER, *Iſlands of*, iſlands in the Southern Pacific Ocean, obſerved by commodore Byron, in June 1765, and ſo called on account of the rocks and ſhoals, which rendered acceſs to them dangerous. They had a more fertile and beautiful appearance than any before ſeen, and like the reſt, ſwarmed with people, whoſe habitations ſtood in cluſters along the coaſt. S. lat. 10° 15'. W. long. 169° 28'.

Danger, *Point*, a cape on the eaſt coaſt of New Holland. S. lat. 28°. E. long. 153° 30'.

DANGERIA, in *Antiquity*, a payment in money made by foreſt tenants, that they might have liberty to plough and ſow in time of pannage.

DANGOLISZKI, in *Geography*, a town of Lithuania; 36 miles S. S. W. of Breſlaw.

DANGU, a ſmall town of France, in the department of the Eure; 3 miles S. W. of Giſors.

DANICHA, a town of Ruſſia, in the government of Tobolſk, on the Chatanga; 360 miles N. N. E. of Turuchanſk. N. lat. 70° 45'. E. long. 98° 14'.

DANIEL, Gabriel, in *Biography*, a French hiſtorian, was born at Rouen in 1649, where he was educated himſelf, and where afterwards he taught others, in the colleges of the Jeſuits. He was invited thence to Paris, to take upon him the office of librarian in the houſe of the order. Of the Jeſuits he was a zealous defender, and wrote in their juſtification in anſwer to Paſchal: the title of his work was "Entretiens de Cleanthe et d'Eudoxe ſur les Lettres Provinciales," for which he was highly applauded by the brethren, but which did not produce the effect deſired. A work of more general intereſt written by father Daniel was, "Le Voyage au Monde de Deſcartes," which was intended as a refutation of the philoſopher's ſyſtem: it has been much read, and tranſlated into Latin, Italian, and Engliſh. But the moſt famous work of this author, and for which he is diſtinguiſhed as an hiſtorian, is the "Hiſtoire de France, depuis l'Eſtabliſhment de la Monarchie Francoiſe." It was publiſhed in 17 vols. 4to. in the year 1756. Voltaire, in ſpeaking of the author, ſays, "He has rectified the faults of Mezerai concerning the firſt and ſecond race. It has been objected to him, that his diction is not always pure, that his ſtyle is too feeble; that he has not given ſufficient information concerning uſages, manners, and laws; that his hiſtory is a long detail of warlike operations, in which a writer of his profeſſion is liable to great miſtakes. His great fault is not to have been informed of the rights of the nation, or to have concealed them: he ſeems to have had no knowledge of the finances, none of the internal condition of the kingdom, or of its manners." Father Daniel, beſides the works enumerated, wrote many others on philoſophical, theological, and critical ſubjects. After a life of intenſe ſtudy and labour, he died at Paris in 1728. Moreri.

Daniel, Peter, the intimate friend of the celebrated George Buchanan, was a native of St. Benoit ſur Loire; but the principal part of his life was ſpent at Orleans. His profeſſion was that of an advocate, and he held the office of *bailli* of the abbey of Fleuri. He was zealouſly attached to critical ſtudies, and attained to an uncommon familiarity with ancient MSS. Scioppius (De Arte Critica) characterizes him as a ſtore-houſe of every ſpecies of antiquities. He lived on terms of intimacy with ſome of the moſt diſtinguiſhed ſcholars of the age. Scaliger and Turnebus acknowledge themſelves indebted to him for the communication of his MSS. treaſures. After his death, which happened in the year 1603, his MS. library was purchaſed by Borgars and Paul Petau, for the ſum of 1500 livres. His only publications were editions of Petronius, Servius, and of the curious relique, entitled "Querolus ſive Aulularia," which is the "Aulularia," of Plautus tranſproſed. To this comedy, which had not formerly been printed, he

prefixed the commendatory verſes of Buchanan. Irving's Memoirs of George Buchanan.

DANIEL, in *Sacred Biography*, one of the Jewiſh prophets, was a deſcendant of the royal family of Judah, as we may partly infer from the book of his prophecies, (chap. i. 3.) and as Joſephus poſitively affirms. Whilſt he was young, as ſome ſuppoſe at the age of 12 years, though others think he might have been older, or not leſs than 18 years of age, he was carried captive from Jeruſalem to Babylon by Aſhpenaz, maſter of the eunuchs, under the order of Nebuchadnezzar, in the 4th year of Jehoiachim, king of Judah, 605 years B. C. Daniel was called Belteſhazzar, and his three companions in exile were Hananiah, Miſhael, and Azariah, who were denominated Shadrach, Meſhac, and Abed-nego. Theſe youths, immediately upon their removal to Babylon, were placed for three years under the tuition of the maſter of the eunuchs, in order to be inſtructed by him in the language and literature of the Chaldeans, previouſly to their admiſſion into the preſence and court of Nebuchadnezzar, as his choſen ſervants. In the 2d year of Nebuchadnezzar's reign at Babylon, from the death of his father, which was the 4th year after his firſt taking of Jeruſalem, B. C. 601, Daniel had liberty of acceſs to the king, and interpreted his dream; upon which he was immediately advanced to be chief of the Magi or wiſe men, and governor of the whole province of Babylon. For this truſt a leſs period than four years could not have been ſufficient for his inſtruction in the language, laws, uſages, and learning of the country; nor, conſidering his youth when he was made captive, could he at an earlier period have been capable of undertaking it. (Dan. ii. 31. 48). Prideaux reckons him at this time about the age of two and twenty. Thus diſtinguiſhed by royal favour, he was not unmindful of his three companions in bondage; but by his recommendation, they were preferred to places of honourable truſt under him in the province of Babylon. Their conſtancy in the profeſſion of their religion is particularly related in the third chapter of his book.

In the 7th year of Zedekiah, the 14th of Nebuchadnezzar, B. C. 591, Daniel had acquired ſuch a character for his wiſdom, and alſo for his piety and virtue, that the prophet Ezekiel (ch. xxviii. 3.) records it as a kind of proverb, "Thou art wiſer than Daniel," in his ironical addreſs to the king of Tyre; and in another place (ch. xiv. 14. 20.) God is repreſented as claſſing him with Noah and Job, and as ſaying, "Though theſe three men, Noah, Daniel, and Job, were in it, they ſhould deliver but their own ſouls by their righteouſneſs." At this time, if we allow him to have been 18, when he was carried away to Babylon, and brought up for the ſervice of the king, he could not have been more than 32 years of age; ſo that he dedicated the prime and vigour of his life to the ſervice of God. In the 36th year of his age, the 11th year of Zedekiah, 587 before Chriſt, he received that honourable teſtimony to his wiſdom already recited. (Ezekiel xxviii. 3.) At this time Nebuchadnezzar returned to Babylon, after the end of the Jewiſh war; and out of the ſpoils collected in that expedition, made a golden image to the honour of Bel his god, which he dedicated to him in the plain of Dura; and on this occaſion he ſummoned all his officers and miniſters to attend, when Daniel's three friends were condemned to the fiery furnace, and were miraculouſly delivered from it unhurt. (Dan. ch. iii.) Daniel himſelf, who was probably preſent, and who, without doubt, did not worſhip the idol, eſcaped accuſation. In the 35th year of Nebuchadnezzar, the 19th year after the deſtruction of Jeruſalem, 570 B. C., he returned from his Egyptian expedition, to Babylon, and there dreamed of a wonderful large tree, and the cutting down of it, of which we have an account in the 4th chapter of the book of Daniel. This dream was interpreted by the prophet, who thus intimated that it prefigured the future circumſtances of the king himſelf. Upon the death of Nebuchadnezzar, in the 43d year of his reign, B. C. 562, he was ſucceeded by his ſon Evilmerodach, or Ilvaradomus, who, after a ſhort reign of two years, fell a ſacrifice to his vices; ſo that his own relations conſpired againſt him, and put him to death. His ſiſter's huſband Nerigliſſar, who was at the head of the conſpiracy, reigned in his ſtead; but this prince being ſlain in the 4th year of his reign, in a battle with Cyrus, his ſon Laboroſoarchod reigned nine months, and was ſucceeded by Nabonadius, the laſt Babyloniſh king, called in Scripture Belſhazzar. In the firſt year of this king's reign, B. C. 555, Daniel had the viſion of the four great beaſts, which repreſented the four monarchies of the Chaldæans, Perſians, Greeks, and Romans, and of the kingdom of the Meſſiah, which was to ſucceed them, which is recorded in the 7th chapter. In the 3d year of Belſhazzar, B. C. 553, he had the viſion of the ram and the he-goat, prefiguring the overthrow of the Perſian empire by Alexander the Great; and he foreſaw alſo the perſecution that was to be raiſed againſt the Jews by Antiochus Epiphanes, king of Syria, the vengeance of God upon him, and the victories of the Maccabees, (ch. viii.) Daniel informs us (ch. v.), that Belſhazzar (in the 17th year of his reign, B. C. 559.) made a great feaſt, on which occaſion he applied to common or profane uſes, the ſacred veſſels, which he had taken out of the temple of Jeruſalem; and in that very night he was ſlain, and Darius the Mede, that is, Cyaxares the uncle of Cyrus, took the kingdom. The hand-writing on the wall, and the awful interpretation of it by Daniel, which he has particularly recorded, are well known. Cyaxares and Cyrus having concerted together for the diviſion of the empire, determined to divide it into 120 provinces, over which were appointed three preſidents, who were to reſide conſtantly at court as the king's miniſters. Of theſe preſidents Daniel was made the firſt; and he was entitled to this preeminence on account of his ſingular wiſdom, approved conduct, and long experience; for he had now, from the 2d year of Nebuchadnezzar, been employed full 65 years as a prime miniſter of ſtate under the kings of Babylon. This ſtation, however, which made him the next perſon to the king in the whole empire, excited the jealouſy and envy of the other courtiers; ſo that they laid that ſnare for him, which occaſioned his being caſt into the lion's den. But being miraculouſly reſcued from injury, this malicious contrivance terminated in the deſtruction of its authors; and Daniel being eſtabliſhed in the favour and confidence of Darius and Cyrus, he greatly proſpered in their time, as long as he lived. (Dan. vi. 28.) In the 1ſt year of Darius, he delivered his famous prophecy of the advent of the Meſſiah, (ſee the next article); and he had alſo another remarkable viſion, in which the angel Gabriel diſcovered to him the events that were to occur in Perſia after the death of Cyrus; *viz.* the arrival of Alexander the Great, the overthrow of the Perſian empire, the Greek dominion, the continued wars between the kingdom of Syria and Egypt, the perſecutions by Antiochus Epiphanes, the deſtruction of that perſecuting prince, and the victory and happineſs of the ſaints. (Dan. x.) Upon the death of Cyaxares, Cambyſes being alſo dead in Perſia, Cyrus returned and aſſumed the whole government of the empire both of the Medes and Perſians, over which he reigned ſeven years. This wiſe and excellent prince had formed a very favourable opinion of Daniel when he firſt came to Babylon and took the city; and when he returned thither again from his Syrian expedition,

tion, the fame of the prophet was augmented, and he had additional reaſons for holding him in high eſtimation. And as Daniel had earneſtly ſupplicated the Almighty for the reſtoration of his people, the Jews, (ſee Dan. ix.) it is reaſonable to imagine that he would intercede for it with the king, and exert his intereſt for the acceleration of this deſirable event. In order to induce him the more readily to comply with his requeſt, he laid before him the prophecies of Iſaiah, (xliv. 28. xlv. 1.), which mentioned him by name 150 years before he was born, as one whom God had deſigned to be a great conqueror, and king over many nations, and the reſtorer of his people, in cauſing the temple to be built, and the land of Judah and the city of Jeruſalem to be again occupied by its former inhabitants. Joſephus tells us, (lib. xi. c. 1.) that Cyrus had ſeen and read theſe prophecies; and it is plain from Scripture that this was the caſe; for they are recited in his decree in Ezra (i. 2.) for the rebuilding of the temple. Who, indeed, was more likely to ſhew theſe prophecies to Cyrus than Daniel, who by his ſtation had conſtant acceſs to him, and who was moſt anxious for ſeeing the accompliſhment of theſe prophecies? When the Samaritans, in the 3d year of Cyrus, B. C. 534, obſtructed and retarded the execution of Cyrus's decree for the rebuilding of the temple; Daniel (ch. x.) ſeems to have ſurrendered himſelf to mourning and faſting for three days; and he afterwards had the viſion already mentioned concerning the ſucceſſion of the kings of Perſia, the empire of the Macedonians, and the conqueſts of the Romans, &c. of which the three laſt chapters of his prophecies contain an account. From what is written in the concluſion of the laſt of theſe, we may infer that he died ſoon after; and, indeed his great age renders it unlikely that he could have ſurvived much longer. For the 3d of Cyrus being the 73d year of his captivity, if he were 18 years old when he was removed to Babylon, he muſt have been in the 91ſt year of his age at this time, a length of years to which few attained in thoſe days. The place of Daniel's death and burial is not aſcertained. Some have ſuppoſed that he died in Chaldæa, being probably detained there by his great employments in the Perſian empire. St. Epiphanius ſays that he died at Babylon, and he is followed by the generality of hiſtorians. Joſephus tells us (Antiq. l. x. c. 12.) that he built a famous edifice of the caſtellated kind at Suſa; and that this was the place where the Perſian and Parthian kings were uſually buried: the copies of Joſephus, now extent, place this building in Ecbatana in Media; but St. Jerom, who gives the ſame account of it *verbatim* out of Joſephus, places it in Suſa in Perſia, whence we may conclude that the copy of Joſephus, uſed by him, had this reading; and this is moſt likely to be true. For Suſa being within the Babyloniſh empire, the Scripture tells us, that Daniel ſometimes reſided there; and it has been a common tradition in thoſe parts for many ages paſt, that Daniel died in that city, which is now called "Tuſter;" and there they ſhew his monument. (Itinerary Benjamin of Tudela.) It is alſo to be obſerved, that Joſephus calls this building Baris, which is the ſame by which Daniel himſelf calls the caſtle or palace at Shuſhan or Suſa. For what we tranſlate "at Shuſhan in the palace," (Dan. viii. 2.) is in the original "Beſhuſhan Habirah," where, without doubt, the Birah of Daniel is the ſame with the Baris of Joſephus; and both ſignifies this palace or caſtle built there by Daniel, while he was governor of that province.

Daniel was a very extraordinary perſon, both for wiſdom and piety, and exhibits an example of conſtancy in maintaining his religious principles and profeſſion, notwithſtanding the temptations of a proſperous and affluent condition, and of a corrupt idolatrous court, which none can contemplate without admiration, and which ought to excite a laudable emulation.

DANIEL, *Book of*, a canonical book of the Old Teſtament, ſo denominated from its author, Daniel, of whoſe hiſtory and character we have given a brief ſketch in the preceding article. See BIBLE and CANON.

The book of Daniel may be divided into two parts; the *firſt* is hiſtorical, and contains a relation of ſeveral incidents that occurred with regard to Daniel himſelf, and the Jews under ſeveral kings at Babylon: the *ſecond*, beginning at the 7th chapter, and ending at the 12th, comprehends the viſions and prophecies, with which he was favoured, and which enabled him to foretell various events, that pertained to the monarchies of the world, the time of the advent and death of the Meſſiah, and the deſtruction of the kingdom of the Jews. Part of this book, *viz.* from the 4th verſe of the ſecond chapter to the end of the 7th chapter, was originally written in the Chaldee language; the reaſon of which was, that in this part the writer treats of the Chaldæan or Babyloniſh affairs, and, therefore, he wrote of them in the Chaldee or Babyloniſh language. The reſt is in Hebrew. The Greek tranſlation of this book, uſed by the Greek churches through all the eaſtern countries, was that which Theodotion had tranſlated. This was adopted by the ancient Chriſtians, becauſe they found the LXX. verſion too faulty to be uſed in their churches. In the vulgar Latin edition of the Bible, as well as in the Greek tranſlation of the book of Daniel by Theodotion, there is added in the third chapter after the 23d verſe, between that and the 24th verſe, the ſong of the three children, Hananiah, Miſhael, and Azariah, who were caſt into the fiery furnace; and at the end of the book, the hiſtory of Suſanna, and of Bel and the Dragon; the former is made the 13th, and the other the 14th chapter of the book in that edition:—but theſe additions were never received into the canon of Holy Writ by the Jewiſh church, neither are they extant either in the Hebrew or the Chaldee languages, nor have we any evidence, that they ever were ſo. That they were originally written in the Greek tongue by ſome Helleniſtic Jew, without having any higher ſource, from which they are derived, appears from this circumſtance, that in the hiſtory of Suſanna, Daniel, in his replies to the elders, alludes to the Greek names of the trees, under which, they ſaid, the adultery charged upon Suſanna was committed, which alluſions cannot hold good in any other language. The church of Rome, however, allows them to be of the ſame authority with the other parts of the book of Daniel; and by their decree at Trent, (ſeſſ. 4.) have given them an equal place with it among the canonical Scriptures. But the ancients never did ſo. Africanus, Euſebius, and Apollinarius have rejected theſe pieces, not only as being uncanonical, but alſo as fabulous; and Jerom gives the hiſtory of Bel and the Dragon no better title than that of "The Fables of Bel and the Dragon." And others, who have admitted them for inſtruction of manners, have, nevertheleſs, rejected them from the canonical Scriptures, in which reſpect they are followed by the Proteſtant churches, which exclude them from the canonical, and aſſign them to the apocryphal writings. See APOCRYPHA and BEL *and the* DRAGON.

The prophecies of Daniel, concerning the advent of the Meſſiah, and other important events, of times far remote from thoſe in which he lived, are ſo clear and explicit, that Porphyry, towards the cloſe of the third century after Chriſt, alleged againſt them, that they muſt have been written

written after the facts to which they refer had occurred. To him they appeared to be a narration of events that had already taken place, rather than a prediction of things to come; ſuch was the ſtriking coincidence between the facts, when accompliſhed, and the prophecies, which foretold them. Porphyry ſeems to have been the firſt perſon who denied their genuineneſs and authority. In the 12th of his 15 books againſt the Chriſtian religion, he attempts to depreciate Daniel's prophecies; alleging, that they were not compoſed by Daniel, whoſe name they bore, but by ſome perſon who lived in Judæa about the time of Antiochus Epiphanes, becauſe all to that time contained true hiſtory, but all beyond that period were manifeſtly falſe. This work of Porphyry (ſee PORPHYRY), together with the anſwers of Euſebius, Apollinarius, and Methodius, is wholly loſt, except ſome few fragments and quotations which are preſerved by Jerom, and others of the fathers. But, as Jerom rightly obſerves, this method of oppoſing the prophecies, affords the ſtrongeſt teſtimony to their truth. For they were fulfilled with ſuch exactneſs, that, to infidels, the prophet ſeemed not to have foretold things future, but to have related things paſt. We may obſerve, in general, that the prophecy relating to the kings of Syria and Egypt, (ch. xi.) which is ſaid to have been written after the times of Antiochus Epiphanes, was tranſlated into Greek 100 years before his time, and the tranſlation was in the hands of the Egyptians, who had no great kindneſs for the Jews and their religion: and thoſe prophecies that foretell the ſucceſſes of Alexander (ch. viii. 5. xi. 3.) were ſhewn to Alexander by the Jews, in conſequence of which they obtained ſeveral privileges from him.

The author of "The Scheme of Literal Prophecy" conſidered, (A. Collins, eſq.) hath followed the ſteps of Porphyry; and formed eleven objections againſt the book of Daniel, concluding with no ſmall degree of confidence, that it muſt have been written in the time of the Maccabees. But his two learned opponents, both of the ſame name, have ſolidly and clearly refuted his eleven objections, and ſhewn that they are all mere cavils, unfounded aſſertions, erroneous quotations, or evident contradictions. (See Biſhop Chandler's Vindication of his Defence of Chriſtianity, and Dr. Samuel Chandler's Vindication of the Antiquity and Authority of Daniel's Prophecies, in Anſwer to the Scheme of Literal Prophecy conſidered.) The following ſummary of Mr. Collins's objections, and the replies to them, may not be unacceptable to the theological reader; and comports with the deſign of the editor in all articles of this kind, which is to defend and eſtabliſh the truth of our holy religion, and the authenticity of the Scriptures, upon which our faith in it depends. Collins objects, *firſt*, that the famous Daniel, mentioned by Ezekiel, could not be the author of the book of Daniel; becauſe Ezekiel, who propheſied in the fifth year of Jehoiakim, king of Judah, ſuppoſes that Daniel at that time was a perſon in advanced life; whereas the book of Daniel intimates that he was then a young man. To this objection it has been replied, that Ezekiel did not propheſy in the fifth year of Jehoiakim, nor in the reign of Jehoiakim at all; but he began to propheſy in the fifth year of the captivity of king Jehoiachin, the ſon and ſucceſſor of Jehoiakim (Ezek. i. 2.) that is, 11 years after. When Daniel was firſt carried into captivity, he might be a youth about 18; but when Ezekiel magnified his wiſdom and piety (ch. xiv. xxviii.) he was between 30 and 40; and ſeveral years before that period he had interpreted Nebuchadnezzar's dream, and was advanced to an honourable ſtation in the court of Babylon (Dan. ii. 48.); and he was therefore very fit and worthy to be celebrated by his fellow-captive Ezekiel. See DANIEL. The *ſecond* objection of Collins is, that Daniel is repreſented in his book as living chiefly at the courts of the kings of Babylon and Perſia; and yet the names of the ſeveral kings of his time are all miſtaken in the book of Daniel. As to the miſtake of the names of the kings, we may obſerve, that there are only four kings mentioned in the book of Daniel, *viz.* Nebuchadnezzar, Belſhazzar, Darius the Mede, and Cyrus. Of the firſt and laſt there never was any doubt; and the other two may be rightly named, though they have been differently denominated by the Greek hiſtorians, who yet differ as much from one another as from Daniel. The Eaſtern monarchs, it is well known, had ſeveral different names: and one writer might uſe one, and another writer might uſe another. Mr. Collins further ſtates, that it is more ſuited to a fabulous writer than to a contemporary hiſtorian, to ſpeak of "Nebuchadnezzar's dwelling with the beaſts of the field, and eating graſs like oxen, &c." and then returning again to the government of his kingdom. It ſhould be conſidered, however, that the caſe of Nebuchadnezzar is related in the prophetic figurative ſtyle: and ſtripped of its figures, the plain meaning is, that Nebuchadnezzar ſhould be puniſhed with madneſs, ſhould fancy himſelf a beaſt and live accordingly, and be obliged to ſubſiſt upon a vegetable diet; but after ſome time ſhould recover his reaſon, and reſume the government. What is there in this account fabulous or abſurd? The dream was not indited by Daniel, but was told by Nebuchadnezzar himſelf. The *third* objection of Mr. Collins is, that the book of Daniel could not be written by that Daniel, who was a captive at Babylon, becauſe it abounds with derivatives from the Greek, which language was unknown to the Jews till long after the captivity: it is not true, that the book of Daniel abounds with derivatives from the Greek; but an affinity is obſervable between ſome few words in the Greek and the Chaldee language; and it is not unreaſonable or unlikely, if we advert to the analogy of languages, that the Greeks derived them from the Chaldee, and not the Chaldees from the Greek; or they might both derive them from a common ſource. Moſt of the words are names of muſical inſtruments; and the Greeks themſelves acknowledge that they received their muſic from the Eaſtern nations, from whence they themſelves originally deſcended. It is objected, *fourthly*, that the book of Daniel does not appear to have been tranſlated into Greek, when the other books of the Old Teſtament were, which are attributed to the LXX.: the preſent Greek verſion, inſerted in the Septuagint, being taken from the tranſlation of Theodotion, made in the ſecond century of the Chriſtian era. It appears, however, that there was an ancient Greek verſion of Daniel, which is attributed to the LXX.; it is cited by Clemens Romanus, Juſtin Martyr, and many of the ancient fathers; it occupied a column of the Hexapla of Origen; and it is quoted ſeveral times by Jerom. This verſion, which had been repudiated by the doctors of the church, and in the room of which Theodotion's was ſubſtituted, was publiſhed ſome years ago from an ancient MS., diſcovered in the Chighian library at Rome. A *fifth* objection is that of Porphyry already ſtated; *viz.* that ſeveral matters of fact are ſpoken of with the clearneſs of hiſtory, to the times of Antiochus Epiphanes; whence Porphyry inferred that the book of Daniel was written about the time of this Antiochus, the author appearing to be well acquainted with things down to the death of this prince, but not farther. This indeed is a ſingular kind of argument againſt the book of Daniel. His prophecies are clear, and therefore are no prophecies. Could

not God who inſpired the prophet, enable him to deliver clear predictions of future events, perfectly known to himſelf? Has he not done ſo in other inſtances? Beſides, there are ſeveral prophecies in Daniel's book, which relate to events far beyond the death of Antiochus; and theſe are as clear as thoſe that pertain to events that occurred before his death. Mr. Collins's *ſixth* objection is, that Daniel is omitted among the prophets, enumerated in Eccleſiaſticus, where it ſeems proper to have mentioned him, if his book had been received as canonical, when Eccleſiaſticus was publiſhed. The author, however, does not profeſs to give a complete catalogue of the Jewiſh canonical writers; others are omitted beſides Daniel. No mention is made of Job and Ezra, and of the books under their name. It is of greater importance, that Daniel is propoſed (1 Maccab. ii. 60.) as a pattern by the father of the Maccabees, and his wiſdom, as we have already ſeen, is highly extolled by Ezekiel; and there are ſufficient teſtimonies of his antiquity, without the confirmation of a later writer. It is further objected, *ſeventhly*, that Jonathan, who made the Chaldee paraphraſes on the prophets, has omitted Daniel; whence it ſhould ſeem that his book was not held in the ſame eſtimation by the Jews with other books of the prophets. The caſe is the ſame with regard to the books of Ezra and Nehemiah; and Jonathan might not have made a Targum or Chaldee paraphraſe on Daniel, becauſe half of the book is written in Chaldee: or if he made ſuch a Targum, it has been loſt as well as others: and, indeed, biſhop Chandler has ſhewn, that there was an ancient Targum on Daniel. After all it deſerves conſideration, that Jonathan frequently applies the prophecies of Daniel, as fuller and clearer than thoſe of other prophets, and we may hence conclude, that he was regarded by him as a prophet of equal authority, at leaſt with thoſe who preceded him. The Jews, indeed, ſince the time of Chriſt, have not regarded Daniel as a prophet, and therefore they have placed his prophecies only among the "Hagiographa;" alleging, that his manner of life was not conformable to that of the other prophets, but he lived like the courtiers and grandees of Babylon; and that, although he had divine revelations communicated to him, it was not in the prophetic mode, but by dreams and viſions of the night, which they reckon to be the moſt imperfect manner of revelation, and below the prophetic. But Joſephus thought very differently. (Antiq. l. x. c. 12.) This Jewiſh writer reckons him among the greateſt of the prophets, and mentions ſome circumſtances relating to his predictions, which evince his ſuperiority to other prophets; and he was always eſteemed a prophet by the ancient Jewiſh church. But the point in diſpute between the Jews and Chriſtians is fully decided by the authority of our bleſſed Lord, who calls him "Daniel the prophet" when he cites his prediction. (Matt. xxiv. 15. Mark xiii. 14.)

"The Jews," ſays the eminently learned biſhop Lowth, (Lectures on the Sacred Poetry of the Hebrews, lib. x. vol. ii. p. 61., &c. Gregory's Tranſlation,) "would refuſe to Daniel even the character of a prophet: but the arguments under which they ſhelter this opinion are very futile: for thoſe points which they maintain concerning the conditions, on which the gift of prophecy is imparted; the different gradations, and the diſcrimination between the true prophecy and mere inſpiration, are all trifling and abſurd, without any foundation in the nature of things, and totally deſtitute of Scripture authority. They add, that Daniel was neither originally educated in the prophetic diſcipline and precepts, nor afterwards lived conformably to the manner of the prophets. I do not, however, comprehend how this can diminiſh his claim to a divine miſſion and inſpiration; it may poſſibly enable us, indeed, to aſſign a reaſon for the diſſimilarity between the ſtyle of Daniel and that of the other prophets, and for its poſſeſſing ſo little of the diction and character of poetry, which the reſt ſeem to have imbibed in common from the ſchools and diſcipline in which they were educated."

It has been objected, *eighthly*, that the part of Daniel's book which is written in Chaldee, reſembles the ſtyle of the old Chaldee paraphraſes; which, being compoſed many hundred years after the time of Daniel, muſt have a different ſtyle from that uſed in his time; and, therefore, that part could not have been written at a period very remote from the date of the eldeſt of theſe Chaldee paraphraſes. This argument is one of thoſe which, by proving too much, proves nothing. According to this mode of reaſoning, Homer cannot be ſo ancient an author as he is generally reputed to be, becauſe the Greek language continued much the ſame many hundred years after his time: but the ſtyle of Daniel's Chaldee differs more from that of the old Chaldee paraphraſes than Homer does from the lateſt of the Greek claſſic writers.

It has been farther objected, *ninthly*, that the book of Daniel ſeems to have been compoſed to do honour to the Jews, in the perſon of Daniel, by making him, as a Jew, ſuperior to all the wiſe men of Babylon. Hence we might infer, that, becauſe books have been counterfeited under the names of perſons of renown, there can be no genuine books of the ſame perſons. Some pieces in Greek have been forged under the name of Daniel, and, therefore, he wrote no book in Chaldee and Hebrew long before thoſe forgeries. Poems have been aſcribed to Homer and to Virgil, which they did not compoſe: and therefore one was not the author of the Iliad, and the other did not write the Æneid. Spurious writings have been attributed to St. Peter and St. Paul, and therefore theſe apoſtles have tranſmitted to us no true writings. As ſome books have been counterfeited in the name of this or that writer; it is a much more probable preſumption than the contrary, that there were ſome genuine books of his writing.

The *tenth* objection is, that the author of the book of Daniel appears plainly to be a writer of things paſt, after a prophetical manner, by his uncommon punctuality, by not only foretelling things to come, like other prophets, but fixing the time when the things were to happen. But other prophets have done the ſame, *e. g.* 120 years for the continuance of the antediluvian world; 400 years for the ſojourning of Abraham's poſterity in a ſtrange land; 40 years for the peregrination of the children of Iſrael; 70 years for the deſolation of Tyre; 70 years for the captivity of Judah, &c.; and, therefore, the fixing of the times and dates cannot be a particular objection againſt the prophecies of Daniel. Joſephus (Antiq. l. x. c. 11.) aſcribes this punctuality to divine revelation, and not, like the objector, to the late compoſition of the book; and deduces from it an argument in proof of the diſtinguiſhing excellence of the prophet.

Laſtly, it is objected, that the book of Daniel gives an imperfect, confuſed, contradictory, obſcure, and emblematical relation of facts, blended with images and ſymbols, unlike the books of the other prophets, and taken from the ſchools of the Greeks. It may be replied, that Daniel's mode of writing was ſuited to his deſign, which was not to compoſe a hiſtory, but to deliver prophecies, and hiſtory merely ſo far as it relates to prophecies. The charge of his contradicting other hiſtorical relations is altogether unfounded. As to the cenſure of his emblems, which are ſaid not to reſemble thoſe of other prophets, and to have been borrowed from the ſchools of the Greeks, this is unjuſt; for ſimilar

emblems

emblems are uſed by other prophets, and they are agreeable to the ſtyle and genius of all the eaſtern writers of his time. So far from having borrowed them from the Grecian ſchools, if any of them ever were uſed by the Greeks, they borrowed them from the oriental writers. The laſt objection ill accords with the *fifth* and *tenth*. *There* obvious matters of fact were narrated with the clearneſs of hiſtory; and the author was charged with forgery, on account of his uncommon punctuality. *Here* all is dark and emblematical, imperfect, and contrary to other hiſtories. Such objections contradict, and deſtroy one another. Both may be falſe, but both cannot be true. Upon the whole, we may obſerve, that the ſtyle of Daniel is not ſo lofty and figurative as that of the other prophets; it is clear and conciſe, and his narrations and deſcriptions are ſimple and natural; and he writes more like an hiſtorian than a prophet.

Of the genuineneſs and authenticity of the book of Daniel, we have all the external and internal evidence, which can be reaſonably deſired. As to external evidence, we have not only the teſtimony of the whole Jewiſh church and nation, which have conſtantly received this book as canonical, but particularly of Joſephus, who commends Daniel as the greateſt of the prophets; of the Jewiſh Targums and Talmuds, which frequently cite and appeal to his authority; of St. Paul and St. John, who have copied many of his prophecies; of our Saviour himſelf, who has cited his words, and ſtyled him "Daniel the prophet;" of ancient hiſtorians, who relate many of the ſame tranſactions; of the mother of the 7 ſons, and of the father of the Maccabees, who both recommend the example of Daniel to their ſons; of old Eleazar in Egypt, who, praying for the Jews then ſuffering under the perſecutions of Ptolemy Philadelphus, (3 Macc. vii. 6, 7.) mentions the deliverance of Daniel out of the den of lions, together with the deliverance of the three men out of the fiery furnace; of the Jewiſh high prieſt, who ſhewed Daniel's prophecies to Alexander the Great, while he was at Jeruſalem; and of Ezekiel, a contemporary writer, who greatly extols his piety and wiſdom. The internal evidence is not leſs convincing; for the language, ſtyle, manner of writing, and all other internal marks and characters, are perfectly agreeable to that age; and he appears plainly and undeniably to have been a prophet, by the exact accompliſhment of his prophecies, as well thoſe which have been already fulfilled, as thoſe which are now fulfilling in the world.

Of the viſions and prophecies of Daniel we ſhall now give a brief account. His firſt prophecy was his interpretation of Nebuchadnezzar's dream, recorded in the ſecond chapter. When the Magi, or wiſe men, had failed to interpret it, and the king had ordered them to be deſtroyed, Daniel offered himſelf to the captain of the guard, benevolently interpoſing for preſerving the lives of the Magi, under a ſentence of deſtruction, and modeſtly aſcribing to divine communication the ſuperior wiſdom which he poſſeſſed. The object of Nebuchadnezzar's dream was a great image, whoſe form was terrible. This image was not an improper emblem of human power and dominion; and the various metals of which it was compoſed do not unaptly typify the various kingdoms which ſhould ariſe. It conſiſted of four different metals, gold, ſilver, braſs, and iron mixed with clay; and theſe four metals, according to Daniel's interpretation, mean ſo many kingdoms; and the order of their ſucceſſion is clearly denoted by the order of the parts; the head and higher parts ſignifying the earlier times, and the lower parts the later times. "The head of the image was of fine gold," (v. 32.) which Daniel interprets as referring to Nebuchadnezzar himſelf, his family, and his repreſentatives. The Babylonian was, therefore, the firſt of theſe kingdoms, fitly repreſented by the head of fine gold, on account of its great riches. But this empire, though of great extent, was yet of no long duration; for it ended in his grandſon Belſhazzar, not 70 years after the delivery of this prophecy, nor above 23 years after the death of Nebuchadnezzar. "The breaſt and arms of the image were of ſilver," (v. 34.) which Daniel interprets in theſe words, (v. 39) "After thee ſhall ariſe another kingdom inferior to thee;" the kingdom which aroſe after the Babylonian, was the Medo-Perſian. The two hands and the two ſhoulders, ſays Joſephus, (Ant. l. x. c. 10. § 4.) ſignify that the empire of the Babylonians ſhould be diſſolved by two kings; who were the kings of the Medes and Perſians, whoſe powers were united under Cyrus, by whom Babylon was beſieged and taken, and who, putting an end to that empire erected on its ruins the Medo-Perſian, or Perſian empire. Thus far all critics and commentators are agreed, that the two firſt kingdoms repreſented in the dream of Nebuchadnezzar were the Babylonian and the Perſian. "The belly and thighs of the image were of braſs," (v. 32.) which Daniel interprets (v. 39.), "And another third kingdom of braſs, which ſhall bear rule over all the earth." Alexander the Great, it is well known, ſubverted the Perſian empire; and therefore the kingdom which ſucceeded to the Perſian was the Macedonian, repreſented by braſs, becauſe, as it is ſaid, the Greeks were famous for their brazen armour. It has been controverted, whether this kingdom terminated in the perſon of Alexander, or was continued in his ſucceſſors. The two thighs of braſs, it is ſuggeſted, might be deſigned to denote the Saleucidæ, who reigned in Syria, and the Lagidæ, who reigned in Egypt, who were the only ſucceſſors of Alexander particularly pointed out, becauſe they had the moſt intimate connexion with the Jewiſh church and nation. The kingdom of Alexander and of his ſucceſſors was one and the ſame kingdom, though Grotius conſidered them as diſtinct; for they are ſo repreſented by all ancient authors. "The legs of the image are of iron, his feet part of iron and part of clay" (v. 33.), which deſcription is interpreted by Daniel (v. 40, 41, 42, 43.) This fourth kingdom is deſcribed as ſtronger than the preceding, and is ſuppoſed to repreſent that of the Romans. The Roman empire was ſtronger and larger than any of the preceding; and the Romans brake in pieces, and ſubdued all the former kingdoms. The two legs of iron might ſignify the two Roman conſuls; and the iron, mixed with miry clay, might intimate that the Romans were defiled by a mixture of barbarous nations. The Roman empire was at length divided into ten leſſer kingdoms, correſponding to the ten toes of the image. Beſides the image, already deſcribed, Nebuchadnezzar ſaw "that a ſtone was cut without hands, which ſmote the image upon his feet that were of iron and clay, and brake them to pieces, &c." (v. 34, 35.) which part of the viſion is interpreted and explained by Daniel (v. 44, 45.) This is underſtood by the ancients of the kingdom of Chriſt, which was ſet up during the days of the kingdom of the Romans. The ſtone was totally a different thing from the image, and the kingdom of Chriſt is totally different from the kingdoms of this world; it was cut without hands, that is, this kingdom was ſpiritual: it was ſet up by the God of heaven, and hence the phraſe of the kingdom of heaven came to ſignify the kingdom of the Meſſiah, as it was underſtood by the Jews, and is applied by our Saviour in the New Teſtament. This kingdom was to "break in pieces and conſume all the kingdoms," to ſpread and enlarge itſelf, ſo that it ſhould comprehend within itſelf all the former

mer kingdoms. This kingdom was to "fill the whole earth," to become univerſal, and to "ſtand for ever."

A revelation, ſimilar to that made unto Nebuchadnezzar, in the ſecond year of his reign, concerning the four great empires of the world, was communicated to Daniel with ſome different circumſtances, in the firſt year of Belſhazzar, or about 48 years afterwards. (Dan. vii.) To Daniel the repreſentation was, not in the form of a great image, but in the ſhape of great wild beaſts. The firſt kingdom is repreſented by a beaſt (v. 4.) that "was like a lion, and had eagle's wings, &c.;" this is the kingdom of the Babylonians, which, by the figures of a lion, the king of beaſts, and an eagle, the king of birds, is deſcribed as the firſt and nobleſt kingdom. The eagle's wings denote ſwiftneſs and rapidity; and the conqueſts of Babylon were very rapid; that kingdom having been advanced to its height within a few years by a ſingle perſon, under the conduct and arms of Nebuchadnezzar. The ſecond kingdom is repreſented (v. 5.) by "another beaſt like a bear, &c." This is the kingdom of the Medes and Perſians, and, on account of their cruelty and thirſt for blood, they are compared to a bear. Its three ribs are underſtood by Jerom, Vatablus, and Grotius, to denote the three kingdoms of the Babylonians, Medes, and Perſians; but ſir Iſaac Newton and biſhop Chandler explain them, as ſignifying the kingdoms of Babylon, Lydia, and Egypt, which were conquered by it, but were not properly parts and members of its body. They might be called ribs, as the conqueſt of them much ſtrengthened the Perſian empire; and they might be ſaid to be between the teeth of the bear, as they were much grinded and oppreſſed by the Perſians. The third kingdom is repreſented (v. 6.) by "a beaſt like a leopard, &c." which aptly repreſents the kingdom of the Macedonians; the ſwiftneſs of the leopard denoting the rapidity of Alexander's conqueſts; its ſpots being emblematic, according to Bochart, of the different manners of the nations which Alexander commanded, or, according to Grotius, of the various diſpoſitions and manners of Alexander himſelf, who was alternately merciful and cruel, temperate and drunken, abſtemious and incontinent. The principal point of likeneſs ſeems to conſiſt in the ſwiftneſs and impetuoſity of the one and the other. The fourth kingdom is repreſented (v. 7.) by a "fourth beaſt, dreadful and terrible, &c." which can pourtray no other than the Roman empire. The 10 horns of this beaſt repreſent 10 kingdoms, which are variouſly enumerated by different writers. Machiavel (Hiſt. Flor. lib. i.) gives them under the following names; *viz.* the Oſtrogoths in Mœſia, the Viſigoths in Pannonia, the Suevi and Alani in Gaſcoigne and Spain, the Vandals in Africa, the Franks in France, the Burgundians in Burgundy, the Heruli and Thuringii in Italy, the Saxons and Angles in Britain, the Huns in Hungary, and the Lombards at firſt upon the Danube, and afterwards in Italy. Mr. Mede (Works, B. iii.), reckons up the 10 kingdoms in the year 456, the year after Rome was ſacked by Genſeric, king of the Vandals, in the following manner: *viz.* Britons, Saxons in Britain, Franks, Burgundians in France, Wiſigoths in the ſouth of France and part of Spain, the Suevi and Alani in Gallicia and Portugal, the Vandals in Africa, the Alemanni in Germany, the Oſtrogoths, ſucceeded by the Longobards, in Pannonia, and afterwards in Italy, and the Greeks in the reſidue of the empire. Biſhop Lloyd (Addenda to Lowth's Comm. p. 524.) exhibits the following liſt, adding to each the time of its riſe; *viz.* Huns about A. D. 356, Oſtrogoths 377, Wiſigoths 378, Franks 407, Vandals 407, Suevi and Alani 407, Burgundians 407, Heruli and Thuringii 476, Saxons 476, and Longobards, who began to reign in Hungary, A.D. 526, and were ſeated in the northern parts of Germany, about the year 483. Sir Iſaac Newton (Obſ. on Daniel, chap. 6.), enumerates them thus: the kingdom of the Vandals and Alans in Spain and Africa, that of the Suevians in Spain, that of the Wiſigoths, that of the Alans in Gallia, that of the Burgundians, that of the Franks, that of the Britons, that of the Huns, that of the Lombards, and that of Ravenna. The number of theſe kingdoms was not conſtantly 10, but ſometimes more and ſometimes fewer; but, as ſir Iſaac Newton obſerves, whatever was their number afterwards, they are ſtill called the "ten kings," from their firſt number.

Beſides theſe 10 horns or kingdoms, another little horn was to ſpring up among them (v. 8.) which Grotius, Collins, and ſome others have ſuppoſed to be Antiochus Epiphanes, without ſufficient reaſon; but we are more probably to ſeek for it in the weſtern Roman empire; and it is commonly conceived to denote the pope of Rome, whoſe power, as a horn or temporal prince, was eſtabliſhed in the eighth century. All the kingdoms above deſcribed will be ſucceeded by the kingdom of the Meſſiah. (v. 9, 10.)

Daniel had another viſion in the third year of the reign of Belſhazzar, or about 553 years B. C. (ch. viii. 1.) This viſion was that of a ram and he-goat. Here we have two beaſts denoting two empires. The Babylonian is omitted, becauſe its fate was nearly terminated. The ram with two horns was the empire of the Medes and Perſians, or the Medo-Perſian empire, founded by Cyrus. Mr. John Mede (Works, B. iii.), conjectures, that the Hebrew word for a ram, and that for Perſia, *i.e.* אַיִל and אֵלָם, both ſpringing from the ſame root, and both implying ſomewhat of ſtrength, the one is not improperly made the type of the other. Beſides, it was uſual with the king of Perſia to wear a ram's head, made of gold, and adorned with precious ſtones, inſtead of a diadem; for thus Ammianus Marcellinus deſcribes him. Biſhop Chandler, Wetſtein, and others, obſerve, that rams' heads with horns, one higher and the other lower, are ſtill to be ſeen on the pillars at Perſepolis. The exploits of the ram are recapitulated in verſe 4; and it is well known that, under Cyrus, the Perſians extended their conqueſts weſtward, as far as the Ægean ſea, and the boundaries of Aſia; northward, they ſubdued the Armenians, Cappadocians, and various other nations; ſouthward, they conquered Egypt. Under Darius they ſubdued India.

The next animal that commands our notice in this viſion is the he-goat (v. 5.); which is properly the type or emblem of the Grecian or Macedonian empire, becauſe the Macedonians at firſt, about 200 years before Daniel, were denominated "Ægeadæ," or the goat's people; the city Ægeæ or Ægæ, was the uſual burying place of the Macedonian kings. In verſes 6 and 7 we have an account of the overthrow of the Perſian empire by the Grecians; for, as the Perſians, in the reigns of Darius Hyſtaſpis and Xerxes, had poured down with great armies into Greece, the Grecians, in their turn, carried their arms into Aſia, and the he-goat invaded the ram that had invaded him. The empire of the goat, as deſcribed in the prophetic language, was in its full ſtrength, in conſequence of the rapid and extenſive conqueſts of Alexander, when he died at Babylon; but, in the ſpace of about 15 years, the royal family became extinct, and the governors of provinces aſſumed the titles of kings. By the defeat and death of Antigonus in the battle of Iſſus, theſe were reduced to four; *viz.* Caſſander, Lyſimachus, Ptolemy, and Seleucus, who parted between them the dominions of Alexander, and ſettled them into four kingdoms. Theſe are the four notable horns, which came up in the room

of the firſt great horn; and they are the ſame as the four heads of the leopard in the former viſion. The prophecy ſays, that they were to extend "towards the four winds of heaven;" accordingly, in the partition of the empire, Caſſander held Macedon and Greece, and the *weſtern* parts; Lyſimachus had Thrace, Bithynia, and the *northern* regions; Ptolemy poſſeſſed Egypt, and the *ſouthern* countries; and Seleucus obtained Syria and the *eaſtern* provinces. Thus were they divided towards the four winds of heaven. Here a little horn is deſcribed as riſing among the four horns of the Grecian empire, (v. 9, 10, 11, 12.) This is explained in the verſes 23, 24, 25. The little horn is generally underſtood, both by Jewiſh and Chriſtian, and ancient and modern interpreters, to mean Antiochus Epiphanes, king of Syria, who was a great enemy and cruel perſecutor of the Jews. Sir Iſaac Newton entertains a different opinion; nor, indeed, according to the interpetation of other parts of this propheey already given, is it likely that the little horn ſhould ſignify Antiochus Epiphanes, or any ſingle king; but it ſhould denote ſome kingdom, *i. e.* ſome government, ſtate, or polity in the world, either monarchical, republican, or ſome other form. Our views are, therefore, directed to the Romans. When they gained footing in Greece, they then became a horn of the goat. Out of this horn they proceeeded, and were at firſt a little horn, but in proceſs of time they overtopped the other horns; extending their arms from Greece, and overrunning the other parts of the goat's dominions, perſecuting and oppreſſing the people of God, wherever they came. This horn, as ſir Iſaac Newton juſtly obſerves, was to riſe up in the N.W. parts of thoſe nations, which compoſed the body of the goat, and from thence was to extend their dominion towards Egypt, Syria, and Judæa. Another remarkable property of the little horn, and that diſtinguiſhed it from all others, was, that "his power ſhould be mighty, but not by his own power," which deſcription applied more juſtly to the Romans than to Antiochus Epiphanes, or any other ſovereign or kingdom. The ſtrength of the other kingdoms conſiſted in themſelves, and had its foundation in ſome part of the goat; but the Roman empire, as a horn or kingdom of the goat, was not mighty by its own power, or by virtue of the goat, but drew its nouriſhment and ſtrength from Rome and Italy. There grew that trunk and body of the tree, though the branches extended over Greece, Aſia, Syria, and Egypt. The remainder of the prophecy relates chiefly to the perſecution and oppreſſion of the people of God. (v. 24.) Antiochus was perſecuting and oppreſſive to the Jews, but his power was limited, and laſted only for a ſeaſon; but the Romans poſſeſſed and exerciſed a more extenſive and durable power to oppreſs and injure. "He took away the daily ſacrifice" for a few years; but the Romans for many ages; and they utterly deſtroyed the temple, which he only ſpoiled and profaned. When he took Jeruſalem, he ſlew 40,000, and ſold as many more; but when the city was beſieged and taken by the Romans, the number of captives amounted to 97,000, and of the ſlain to 11 hundred thouſand. The Romans put an end to the government of the Jews, and entirely took away their place and nation. It is added, "he ſhall alſo ſtand up againſt the prince of princes." If by the "prince of princes" we underſtand the high-prieſt, it is true that Antiochus appointed and removed the high-prieſts at pleaſure; but the Romans took away the whole adminiſtration. If by the "prince of princes" we underſtand the Meſſiah, Antiochus had no ſhare in the completion of the prophecy; it was effected by the Romans. By the malice of the Jews, but by the authority of the Romans, our Saviour was put to death; and he ſuffered the puniſhment of the Roman malefactors and ſlaves. Moreover, the perſecuting power of Rome, whether Pagan or Chriſtian, whether exerciſed towards the Jews or towards the Chriſtians, by the emperors or by the popes, is ſtill the "little horn." The tyranny is the ſame; but as exerted in Greece and the Eaſt, it is the little horn of the he-goat, or the third empire; as exerted in Italy and the Weſt, it is the little horn of the 4th beaſt, or the 4th empire. But the little horn, like other tyrannical powers, was to come to a remarkable end; "he ſhall be broken without hand;" *i. e.* it ſhall fall, not by the hand of man, but by a ſtroke, as it were, from heaven, ſhall it periſh; in other words, the dominion of the Romans ſhall finally be deſtroyed with ſome extraordinary manifeſtation of the divine power. Antiochus Epiphanes died, indeed, in a very extraordinary manner. (See ANTIOCHUS *Epiphanes*.) But, though in a variety of particulars, the prediction of Daniel may be applicable to his exploits, and to his character, and the general hiſtory of his life, and though it has been thus generally applied; yet it ſeems to have a more extenſive reference, and to receive itsfull accompliſhment in the conduct and hiſtory of the Romans. The anxiety and concern felt by Daniel in the view of the events, that were likely to befal his country and countrymen, ſeem to intimate his apprehenſion of ſome more grievous and permanent calamities which would befal them, than any Antiochus Epiphanes would have it in his power to inflict. In this inſtance, and indeed in every other, Daniel exhibits a moſt amiable temper, no leſs ſolicitous for the honour of religion than for the welfare of his country; alike pious and public ſpirited; and no leſs eminently a patriot than a prophet.

The memorable events which were revealed to Daniel, in the viſion of the ram or he-goat, are again more clearly and explicitly revealed to him in his laſt viſion; ſo that this latter prophecy may not improperly be ſaid to be a comment and explanation of the former. This revelation was made (ſee ch. x. 1.) in the third year of Cyrus king of Perſia, when Daniel was very far advanced in years; and the prophecy delivered in conſequence of it muſt comprehend the fate and fortune of the people of God for many years. It muſt extend much further than from the 3d year of Cyrus, B.C. 535, to the death of Antiochus Epiphanes, B. C. 165, which was not above 370 years. It comprehends in reality many ſignal events after that time to the end of the world. The firſt prophecy relates to the Perſian empire, which was then ſubſiſting. "Behold, there ſhall ſtand up three kings in Perſia, &c." (xi. 2.) *i. e.* after Cyrus the founder of the empire, who was then reigning. Theſe three kings were Cambyſes, the ſon of Cyrus, Smerdis the Magian, who pretended to be another ſon of Cyrus, and was really an impoſtor; and Darius, the ſon of Hyſtaſpes, who married the daughter of Cyrus; "and the fourth ſhall be richer than they all." The fourth, after Cyrus, was Xerxes, the ſon or ſucceſſor of Darius. Of him it is ſaid that "by his ſtrength through his riches he ſhall ſtir up all againſt the realm of Grecia." Accordingly Xerxes's expedition into Greece is one of the moſt memorable adventures in ancient hiſtory. Xerxes, in raiſing his army, ſearched every place of the continent; and his army is ſaid to have amounted, including ſoldiers and followers of the camp, to 5 millions, 283 thouſand, 220 men. He alſo ſtirred up the weſt, and engaged his allies the Carthaginians to collect an army of 300 thouſand men, and a fleet of 200 ſhips. Alexander is characterized in verſe 3, as "a mighty king that ſhall rule with great dominion, and do according to his will." This prediction is amply verified in the extenſive conqueſts and arbitrary mandates of Alexander. (See his article.) But his kingdom was ſoon to be broken and divided (v. 4.) We have already ſhewn how ſoon his glory terminated,

terminated, and how his kingdom was divided. In this prophecy two out of the four kingdoms into which his empire was divided, are ſpecified, *viz.* Egypt and Syria, which were by far the moſt conſiderable, and continued diſtinct kingdoms, after the others were ſwallowed up by the Romans. The kings of Egypt and Syria are denominated, in reſpect to the ſituation of theſe countries to Judæa, the kings of the *ſouth* and the *north*. "The king of the ſouth," it is ſaid, "ſhall be ſtrong;" which was verified when Ptolemy had annexed Cyprus, Phœnicia, Caria, and many iſlands, and cities, and regions, to Egypt; and, moreover, by the acquiſition of Cyrene, he was become ſo great, as to be the terror of all his enemies. Nevertheleſs, Seleucus Nicator, the king of the north, was "ſtrong above him;" for, having annexed the kingdoms of Macedon and Thrace to the crown of Syria, he was become maſter of three parts out of four of Alexander's dominions. "In the end of years," ſays the prophet, "they ſhall join themſelves together," &c. (v. 6.) All theſe particulars, and thoſe mentioned in verſes 7—30, were verified by the events, which we cannot now recite. This prophecy concerning the kingdoms of Egypt and Syria, from the death of Alexander to the time of Antiochus Epiphanes, is ſo particular and circumſtantial, that it is really more perfect than any hiſtory. The prophecy is equally exact beyond the time of Antiochus, extending to remoter ages, and reaching even to the general reſurrection. The ſequel of the prophecy is ſuppoſed by Porphyry, among the ancients, and by Grotius, among the moderns, to have been literally accompliſhed in Antiochus Epiphanes. Others, however, as Jerom, and moſt of the Chriſtian fathers, conſider Antiochus as a type of Antichriſt. Others again underſtand what remains partly of the tyranny of Antiochus, and partly of the great apoſtaſy of the latter days, or the days of the Roman empire. Others again apply it wholly to the invaſion and tyranny of the Romans, the ſubſequent corruptions in the church, and alterations in the empire. But our limits will not allow us to detail the particulars. For an application of the celebrated prophecy relating to the Meſſiah (ch. ix. 24. 27.), and an account of the exactneſs with which it was accompliſhed, we ſhall refer to the article PROPHECY. See alſo WEEK.

We ſhall now conclude this extended article, with the reflections of biſhop Newton on Daniel's prophecy of the things noted in the Scriptures of truth, recorded in chap. xi. "Upon the whole, what an amazing prophecy is this, comprehending ſo many various events, and extending through ſo many ſucceſſive ages, from the firſt eſtabliſhment of the Perſian empire, above 530 years B. C., to the general reſurrection! And the further it extends, and the more it comprehends, the more amazing ſurely, and the more divine it muſt appear, if not to an infidel like Porphyry, yet to all who, like Grotius, have any belief of revelation. How much nobler and more exalted the ſenſe, more important and more worthy to be known by men, and to be revealed by God, when taken in this extended view, and applied to this long and yet regular ſeries of affairs, by the moſt eaſy and natural conſtruction; than when confined and limited to the times and actions of Antiochus, to which yet it cannot be reconciled by the moſt ſtrained and unnatural interpretation! What ſtronger and more convincing proofs can be given or required of a divine providence, and a divine revelation; that there is a God who directs and orders the tranſactions of the world, and that Daniel was a prophet inſpired by him, "a man greatly beloved," as he is often addreſſed by the angel! Our bleſſed Saviour hath beſtowed upon him (Matt. xxiv. 15.) the appellation of "Daniel the Prophet;" and this is authority ſufficient for any Chriſtian; but in this work have been produced ſuch inſtances and atteſtations of his being a prophet, as an infidel cannot deny, or, if he denies, cannot diſprove. The character that is given of him by Joſephus, is nothing more than ſtrictly his due. It expreſſeth the ſenſe of the Jewiſh church: and the ſame muſt be the ſentiments of every man, who will conſider and compare the prophecies and events together. This hiſtorian is commending the ſuperior excellence of Daniel's predictions; "for he was wont, ſays he, not only to foretell future things, as other prophets alſo did; but he likewiſe determined the time wherein they ſhould happen." Afterwards, having mentioned ſome of Daniel's prophecies, he proceeds thus: "All theſe things, God having ſhewn them to him, he left in writing, that they who read them, and behold the events, might admire Daniel for the honour vouchſafed him by God; and by theſe things might be convinced how much the Epicureans are miſtaken, who deny a providence, and allow not that God regards human actions, nor that all things are governed by a bleſſed and immortal Being for the preſervation of the whole, but aſſert that the world is carried on at random, without a guide or ruler: which, if it was without a governor, as they pretend, would have been deſtroyed by the blind impulſe, and have periſhed and come to nought, as we ſee ſhips, which are deſtitute of pilots, overwhelmed by the ſtorms, and chariots overturned and broken to pieces, which have no drivers. For, by theſe things predicted by Daniel, they appear to me widely to err from the truth, who declare, that God hath no care of human affairs; for we ſhould not ſee all things ſucceed according to his prophecies, if it happened that the world was governed by chance." Prideaux's Connection. Dupin's Hiſt. of the Canon. Newton's Diſſertations on the Prophecies. Calmet's Dict.

DANIEL, in *Geography*, a ſmall iſland in the river Meuſe, a little below Stockem, in the biſhopric of Liege.

DANIEL, *Eau de*, a ſpring of mineral water, in the department of the Gard, in France, not far from Alais, the chief place of the department.

DANIEL, *Port*, lies on the northern ſide of Chaleur bay, and is a commodious harbour for veſſels of a conſiderable draught of water. It affords a cod-fiſhery, and is about nine leagues from Pato, W.N.W. of Cape Deſpair.

DANILOF, a diſtrict and town of Ruſſia, in the government of Yaroſlaf, ſeated on a rivulet that falls into the Volga; 28 miles E.S.E. of Yaroſlaf, and 360 E.S.E. of Peterſburg.

DANILOWICZE, a town of Lithuania, in the palatinate of Wilna; 44 miles S. of Braſlaw.

DANK, in *Agriculture*, a term made uſe of to ſignify damps, humid, moiſt, or wet, as applied to graſs, &c.

DANK, in *Commerce*, a piece of ſilver current in Perſia, and in ſome parts of Arabia, weighing the ſixteenth part of a drachm. It is alſo a weight uſed by the Arabians to weigh jewels and drugs.

DANKALI, in *Geography*. See DANCALI.

DANN, a ſmall town of France, in the department of the Meurthe, diſtrict of Sarrebourg, three miles N. of Phalſbourg, remarkable for a mineral ſpring, called La Bonne Fontaine, which is conſidered as a ſure remedy againſt hemorrhagies.

DANNA, in *Ancient Geography*, a town of Paleſtine, ſituated in the mountains of the tribe of Judah.

DANNEBERG, or DANNENBERG, in *Geography*, a ſmall town of Germany, on the river Jetze, not far from the Elbe, 48 miles S.E. of Luneburg, and 90 N. by E. of Brunſwick, in the duchy of Luneburg Zell, belonging to the king of England, as elector of Hanover, but at preſent in the poſſeſſion of the French. It has about 1000 inha-

bitants, and its diſtrict, which is nearly 40 Engliſh miles in circumference, comprehends 77 villages. Near Dannenberg is a decayed caſtle, at the entrance of which is a tower, where Waldemar II. king of Denmark, is ſuppoſed to have been confined, in the year 1223, by Guntzel, count of Schwerin: but Buſching very juſtly thinks it more probable that Tannberg, in the duchy of Mecklenburg Schwerin, was the place of the Daniſh king's confinement.

DANNEMARIE, a ſmall town of France, in the department of the Upper Rhine, chief place of a canton in the diſtrict of Befort, with a population of 724 individuals. The canton has 27 communes, and 7630 inhabitants, upon a territorial extent of 110 kiliometres.

DANNEMORA, a famous Swediſh iron mine, near Oſterby, 26 Engliſh miles N.W. of Upſal, in the government of Upſal, which yields the beſt iron in the world. It has no ſubterraneous galleries. The pits are deep excavations, like gravel pits, into which the miners go down and from which they are drawn up in a bucket. The richeſt ore yields 70, the pooreſt 30 *per cent.* The collective maſs gives upon the average one third of pure metal. Twelve thouſand tons are annually drawn from the mine, and yield four thouſand tons of bar-iron. The maſs of ore occupies a comparatively ſmall compaſs. Conſidered as one, the length of the pits is 760 feet, and the breadth from three to twelve. The ore runs in veins from eaſt to weſt. The richeſt pit is near 500 feet deep, and the great pit (Storymningen) has not yet been fathomed. The matrix of the ore, being a calcareous earth, contains but little ſulphur, which is perhaps the reaſon of the ſuperior quality of the iron. Cox's Travels.

Near 300 perſons are employed in mining and tranſporting the ore. The water is drawn out of the pits in ſummer by pumps worked by water, and in winter by a ſteam engine, which is not uſed in ſummer, on account of the ſcarcity and dearneſs of coals, and is often heated with wood.

In ſummer the ore which is dug is laid out in heaps, and during the winter months it is conveyed on ſledges to the forges; the four principal of which are Leufsta, Oſterby, Gimo, and Akerby.

The mine of Dannemora conſiſts of twelve pits belonging to thirteen different proprietors. Baron de Geer poſſeſſes more than one-third of the whole mine.

Notwithſtanding the mine of Dannemora has been wrought theſe 320 years, having been diſcovered in the year 1448, it yet yields a vaſt quantity of iron of a ſuperior quality, much uſed in the Engliſh ſteel manufactures of Sheffield and Birmingham.

The ſale of the Dannemora iron in England is a monopoly in the hands of two Engliſh commercial houſes, one at London, the other at Hull. They procure it excluſively for the Britiſh manufactures, by a ſpecial contract with the proprietors of the mine.

DANNGE, a river of Pruſſia, which runs into the ſea at Memel.

DANNOCKS, in *Agriculture*, a term provincially applied to hedging gloves or mittens.

DANT, or LANT, in *Zoology*, called by the Africans *Lampt*, an animal of the figure of a ſmall ox, but having ſhort legs. It has black horns, which bend round and are ſmooth. Its hair is whitiſh, and its hoofs are black and cloven. It is ſo ſwift that no animal, except the Barbary horſe, can overtake it. Theſe dants are common in the deſerts of Numidia and Libya, and ſeveral northern provinces of Africa. Buffon ſuppoſes that this animal is the ſame with the dwarf ox, or *Zebu*, which ſee. The name dant has been transferred from Africa to America, and applied to a very different animal. See TAPIR.

DANTE, ALIGHERI, in *Biography*, a celebrated Italian poet, was born at Florence in 1265. He was initiated at an early age to the ſtudy of the ſciences, and of polite literature under Brunetto Latini. He attached himſelf to the profeſſors of the ornamental arts who flouriſhed at that period; but was his own maſter in the art of poetry in which he afterwards ſo much excelled. When he had attained to years of manhood he joined the military defenders of his country, and was engaged in two actions, one againſt the Aretines, in 1289, the other againſt the Piſans, in 1290. In the following year he married Gemma, the daughter of Manetto de Donati, from whom, after having had ſeveral children, he ſeparated. He entered public life, and was conſiderably employed in the affairs of the Florentine republic. In 1300 he was one of the chief magiſtrates of Florence, an honour which proved the ſource of many of his misfortunes. At that period all the towns of Italy were diſtracted by the oppoſite parties of the Guelphs and Ghibellines; and in Florence a further diſtinction took place in the factions of the Neri and Bianchi, or Blacks and Whites. Dante belonged to the latter, of which a more full account will be given under the word FLORENCE: ſuffice it to ſay, his party was overpowered, and himſelf impriſoned, with the loſs of his property. He was afterwards baniſhed, and ſentence of death paſſed upon him, ſhould he again fall into the power of the Florentine ſtate. The poet, after this, may be traced to Padua, Urbino, Bologna, and various other places. When Henry of Luxembourg was elected emperor, Dante ſedulouſly paid his court to him, in hopes that by his means he might be reſtored to his country: but the death of Henry in 1313 cut off all the hopes of Dante.

About this period he went to Paris, where he engaged in the ſtudies of the univerſity. He here made a literary diſplay of his talents by holding a ſolemn diſputation on ſome theological queſtions, in which, according to the manners of the age, he was well verſed. From this time he ſeems to have roved about Italy in an indigent and diſtreſſed condition, till he was hoſpitably received by the lord of Ravenna, a patron and proficient in letters. By him Dante was employed in ſome political negociations, and was ſent to Venice, in order to compromiſe a quarrel which had ariſen between him and the republic. The Venetians, however, refuſed to admit Dante to an audience, by which he was ſo much affected, that ſoon after his return to Ravenna, he died on the 14th of Sept. 1321. Funeral honours and a ſplendid monument were given him by his patron, who alſo pronounced an oration over the dead body. A new and more ſumptuous monument was erected to his memory in 1780, by the legate cardinal Gonzaga, bearing the following inſcription: "Danti Aligherio, poetæ ſui temporis primo, Reſtitutori politioris humanitatis."

The Florentines now began to be aſhamed of their enmity to this great man: they made many efforts to obtain his remains, in order to pay them that reſpect and honour which they merited; and Michael Angelo offered to execute, gratuitouſly, a monument which ſhould be worthy of the poet. But Ravenna would not grant them the honour. The fame of Dante did not, however, depend on marble or braſs: his "Divina Commedia" has given him an unfading and immortal reputation. The ſubject of this work is the deſcription of a viſion in which the author is led through hell, purgatory, and paradiſe; it is full of extravagances, but it contains a variety of paſſages of ſingular ſtrength and ſublimity. The admirers of this poem

contend that no work of Italian poetry bears ſuch a ſtamp of original and ſublime genius; and that in grandeur of conception, warmth of feeling, and energy of expreſſion, no compoſition of modern times can compare with it. Scarcely had this poem appeared, before it became the object of univerſal admiration throughout Italy: copies of it were multiplied, and commentaries written for its illuſtration. Its firſt expoſitors were the ſons of the poet; and in 1373 a profeſſorſhip was eſtabliſhed at Florence, for the expreſs purpoſe of explaining Dante to the public: the firſt perſon who filled the chair was Boccacio. The beſt edition is that of Venice, in three vols. quarto, publiſhed in 1757. Boccacio has deſcribed Dante as of a middle ſtature; of a penſive and melancholy expreſſion in his countenance. His gait was compoſed, his manners grave and ſedate, his addreſs courteous and civil, his way of living extremely temperate. He is ſaid to have been a very abſent man, of which inſtances have been recorded; once meeting with a book in an apothecary's ſhop, which he had been long looking for, he opened it, and read from morning to night without being rouſed from his purſuit by the diſtraction and tumult occaſioned by a great wedding paſſing through the adjacent ſtreet. Dante was a conſiderable writer in the Latin as well as in his own language: but his "Commedia" is the only work to which he is indebted for celebrity. Gen. Biog. Moreri.

Danté, Ignatius, an Italian mathematician of the 16th century, a native of Perugia, was deſcended from a family eminent for their knowledge of the ſciences. His father was a mathematician and an architect, and he himſelf applied ſo aſſiduouſly to the ſtudy of mathematics, that he was invited to Florence by the grand duke Coſmo: here he was treated with the utmoſt liberality; and here he left, as monuments of his fame, a marble quadrant, an equinoctial and meridian line on the front of the church of St. Maria Novella. He removed to Bologna after the death of Coſmo, where he was appointed mathematical profeſſor, and here, in the church of Saint Petronius, he traced the meridian, which was completed by Caſſini. He was afterwards employed by pope Gregory XIII. in reforming the calendar, and in the conſtruction of the maps of Italy in the Vatican gallery. For this labour he was preſented with the biſhopric of Alatri, which he did not enjoy any length of time. He died Oct. 19, 1586, at the age of 49, leaving behind him ſome mathematical treatiſes. Gen. Biogr. Moreri.

Dante, Jean Baptise, native of Perugia, a mathematician, who flouriſhed towards the end of the fifteenth century. He is ſaid to have invented a method of making artifical wings, ſo well proportioned to the weight of the body that he was able to fly: he made many ſucceſsful experiments, but at length one of his wings failed him, when he was exhibiting at a grand ſpectacle; he fell upon the church of Notre Dame, and was ſeriouſly wounded. He, however, recovered under the hands of an able ſurgeon, and afterwards taught the mathematics at Venice. He died at the age of forty. Moreri.

DANTELLE', in *Heraldry*, the ſame with danché, or rather with dancetté, *viz.* a large open indenture. See Dancette.

DANTHELETÆ, in *Ancient Geography*, a people who, according to Ptolemy, inhabited Thrace. This author aſſigns them the town of Pantalia.

DANTZIC, or Dantzick, in the Poliſh language *Gdantzk*, in German *Danzig* or *Dantzig*, in Latin *Gedanum* or *Dantiſcum*, in *Geography*, an ancient and large city of Poliſh or Weſtern Pruſſia, in that part which, from having anciently belonged to the duchy of Pomerania, has retained the name of Little Pomerania or Pomerellia, is ſeated on the leaſt of the ſeveral branches of the river Viſtula, which form the iſlands called the *Dantziger Werder*. Hence large veſſels have not depth of water ſufficient to come loaded into the harbour, although Dantzic is but four miles from the place where the Viſtula falls into the Baltic ſea. The harbour at the town admits only ſhips of one hundred tons burthen; thoſe of greater burthen deliver and receive their cargoes at Weixel or Weichſel Munde, *Viſtulæ Oſtium*, the mouth of the Viſtula; and when the weather is calm, in Dantzic road, called the *Fahrwaſſer*, which is from eight to fifteen fathoms deep.

The city of Dantzic is bounded on the Eaſt by the Viſtula, on the ſouth by the kingdom of Pruſſia, on the north by the Baltic ſea, and on the weſt by the duchy of Pomerania, which belongs to the king of Pruſſia. It is ſituated in E. long. 18° 36', and N. lat. 54° 22' 23" twenty-four miles N. W. of Marienburg, and thirty-two N. W. of Elbing, 76 miles N. of Thorn, 150 N. W. of Warſaw, 260 N. of Cracow, 220 N.E. of Breſlau, 80 miles S.W. of Konigſberg, 260 S.W. of Riga, 900 N.E. of Paris, and 540 S.W. of St. Peterſburg. Two ſmall rivers, the Radaun and Motlau, run through the city, which is divided into three towns, the Vorſtadt (Fore town), Altſtadt (Old town), and Reichsſtadt (Imperial town,) with their reſpective ſuburbs, St. Albrecht or Albert, Old Scotland, Stoltzenberg, Hagelberg, Biſchofsberg, Schidlitz, Langefuhr, and New Scotland. Stoltzenberg which is ſituated on a high ſandy hill, to the weſt by ſouth, commands a fine view of the town and harbour, with the ſhips' road, even to the ſea. But moſt of the ſuburbs were burnt down in 1806, when Dantzic was beſieged by the French.

The circumſtance of two of the ſuburbs of Dantzic being called Old and New Scotland, is owing to the ſignal ſervices which a gentleman, of the Scotch family of the Douglas, rendered to the city whilſt it was beſieged by the Poles, in conſequence of which the Scots obtained privileges that induced numbers of them to ſettle at Dantzic in the ſeventeeth century.

The corn magazines or granaries form a ſeparate town of lofty buildings, divided into ſeveral ſtreets. It has no communication with the city but by a large drawbridge, being completely encompaſſed by water, ſo that boats may load and unload at each granary's door. Few of theſe magazines are lower than five ſtories, and each ſtory is provided with funnels or pipes to let down the corn from one chamber into the other. Not a ſingle individual is allowed to lodge in this corn iſland, which is guarded at night by fierce maſtiffs let looſe by their keepers, who quit the iſle ſoon after ſun-ſet, when the bridge is drawn up.

The houſes at Dantzic are of brick and ſtone, commonly five, ſix, or more ſtories high, with a ſort of gallery called a *Beyſchlag* on the outſide of the ground floor projecting into the ſtreet, in the middle of which gallery there is an aſcent of a few ſteps to the principal entrance of the houſe. Several ſtreets have rows of trees on each ſide. The principal buildings are the cathedral, the guildhall, the arſenal built in 1606, the public weigh-houſe, and the exchange; but they are old ſtructures generally more remarkable for their antiquity than for their elegance.

Dantzic was the firſt town of Poland that embraced the Lutheran perſuaſion in the year 1525. It counts fourteen Lutheran churches, two belonging to Calviniſts, one to Roman Catholics, and before its ſurrender to the French, in 1807, it had alſo an Engliſh chapel. There are ſeveral hoſpitals and charitable foundations.

Cluverius, or Cluvier, the celebrated geographer, is the moſt illuſtrious learned man that was born at Dantzic, although

though it boaſts of a gymnaſium or academy which has ſeveral profeſſors; of an extenſive public library, and of a ſociety for promoting the ſtudy of natural hiſtory.

In 1709, Dantzic was ſeverely viſited by the plague, which ſwept off above 40,000 of its inhabitants; yet their number, in 1730, is ſaid to have approached 200,000. But this computation is evidently erroneous, for in the year 1752, when the trade of Dantzic was ſo flouriſhing that 1014 ſhips entered inwards, Buſching ſtates the number of deaths to have been only 1846, which, calculating even at one in fifty, gives but 92,300 inhabitants. In the year 1774 Ludwig von Baczko, a very reſpectable Pruſſian author, eſtimates the population of Dantzic at 50,000. In 1802, nine years after it had been forced to ſubmit to the king of Pruſſia, Dantzic contained 47,000 inhabitants, beſides the garriſon; and in 1804, including the garriſon, its whole population amounted to 60,097.

Dantzic was formerly at the head of the Hanſeatic league in the north. Towards the end of the fourteenth century its trade was conſiderable, having already engroſſed all the foreign commerce of Culm and Thorn. Before the diſaſtrous war of 1806, its own ſhipping was numerous, and more than 1000 ſhips were reckoned to enter inwards annually: but in that unfortunate year the number of veſſels arrived was only 379, and of thoſe that ſailed 408. In the year 1803 there entered into the ſeveral ports of Great Britain only, 204 ſhips from Dantzic.

The principal ſtaple commodity is corn of all ſorts bought up in Poland, of which Dantzic ſhips annually from 40 to 50,000 laſts. It alſo exports oak planks, timber, ſtaves, wax, honey of a ſuperior kind, hemp and flax, yarn, potaſs, cordials, a large quantity of ſpruce beer, known in England by the name of black beer, and a variety of other articles. Its principal manufactures, beſides the diſtilleries and breweries, are thoſe of ſaltpetre, potaſs, woollen cloth, hardware, and refined ſugar.

According to Buſching, it appears from ancient records that, ſo early as the year 997, Dantzic was a conſiderable commercial town; it is, however, generally ſuppoſed that, till the year 1164, it conſiſted only of ſome fiſhermen's cottages; that Maſleirn the ſecond duke of Pomerania, dying without male iſſue, left it to Primiſlaus, king of Poland, who annexed it to the crown, and in 1295 erected it into a city. In 1310, the knights of the Teutonic order rendered themſelves maſters of Dantzic, and by them it was firſt walled round in 1343. In the year 1454 Caſimir IV., king of Poland, reconquered Dantzic, and granted great privileges to the citizens, who afterwards, in defence of the Lutheran confeſſion, ſided with Maximilian of Auſtria againſt the Poles, which provoked king Stephen Battori to beſiege Dantzic in 1577; but, by the mediation of other princes, the citizens were reſtored to all their former immunities and liberties in 1597. In the year 1632 Dantzic was made a member of the ſtate in the Poliſh diets, and admitted to a vote on the election of a king of Poland. For a long ſeries of years Dantzic continued a free republic, with a territory of above 40 miles in circumferance, under the protection of Poland. In 1655 Dantzic ſtrenuouſly adhered to the intereſt of John Caſimir V., king of Poland, whom Charles Guſtavus of Sweden had unjuſtly attacked, and by ſhutting its gates to the invader, put a barrier to the victories of the Swedes, ſaved the kingdom of Poland, and occaſioned five years after an honourable concluſion of the war, by the peace of Oliva in 1660.

The weakneſs of Dantzic, as a ſtate, expoſed it to frequent moleſtations from the neighbouring powers, who often exacted from it large contributions; and though in 1706 the queen of England, the king of Pruſſia, and the ſtates of Holland, entered into a league to protect it, yet the czar, Peter I. of Ruſſia, called twice on Dantzic for large ſums.

In 1734 Staniſlaus, king of Poland, took refuge in this city, which ſubmitted to Auguſtus III., only after Staniſlaus had made his eſcape. From that time till the year 1752, Dantzic was frequently convulſed by ſerious diſſenſions between the magiſtrates and the citizens, which terminated by the *Ordinatio regia civitati Gedanenſi præſcripta.*

At the firſt partition of Poland, in 1772, the king of Pruſſia, by obtaining Weſt Pruſſia, extended his dominions to the very gates of Dantzic, and even occupied ſome of its ſuburbs. This circumſtance, and the eſtabliſhment of a cuſtom-houſe at Fordon, where the king of Pruſſia levied heavy tolls upon the articles that were brought from Poland to Dantzic, depreſſed the commerce of this city to ſuch an intolerable degree, that the expiring republic claimed the protection of Ruſſia againſt the oppreſſions of Pruſſia. Several diplomatical notes were exchanged in the years 1784 and 1785, but Dantzic obtained very little redreſs; and at the ſecond partition of Poland in 1793, it acknowledged the Pruſſian ſway. Under the protecting influence of the then powerful kingdom of Pruſſia, the trade of Dantzic revived, and had nearly regained its ancient importance, when the diſaſtrous war of 1806, between France and Pruſſia, plunged this flouriſhing town into a ſtate of great diſtreſs. At the approach of the enemy the ſuburbs were burnt down, and, during a ſiege of ſeveral months, about 3000 buildings in the town itſelf were conſiderably damaged. The whole damage has been eſtimated at ten millions of dollars, or nearly one million and a half ſterling. At length the Pruſſian general count Kalkreuth ſurrendered Dantzic, by capitulation, to the French marſhal Lefebvre, who on this occaſion received the title of duke of Dantzic from the French emperor.

On the 10th of July, 1807, Dantzic recovered its old conſtitution as a free republic under the protection of Ruſſia, Saxony and Pruſſia, and the territory which it had poſſeſſed before the year 1772, being nearly fifteen miles in extent round the city, beſides the Dantzic Werder, and the Dantzic or Friſche Nehrung. The former is an uncommon fertile iſland formed by a branch of the Viſtula and the river Motlau, containing twelve pariſhes and thirty-three villages. The latter is a narrow ſlip of land between the Friſche Haf and the Baltic ſea, 50 Engliſh miles long and not more than two miles and a half broad in its greateſt breadth, containing five pariſhes.

Agreeably to its former conſtitution Dantzic was divided into three cities, each of which had its particular burgomaſter or major. Theſe three burgomaſters, a limited number of aldermen, and a common council of one hundred citizens, elected promiſcuouſly out of the three cities, formed together one ſenate, to which all matters relating to the government of the republic were referred. How far this conſtitution is at preſent acted upon, it is difficult to know; Dantzic having ſtill a French garriſon, which it is to retain till a general peace, or at leaſt what is termed a maritime peace between Great Britain and France, takes place. In the mean time trade is at a ſtand, and there is every reaſon to ſuppoſe that the inhabitants of Dantzic are ſubject to the martial law of the French, or nearly ſo. The French general Rapp is governor of the place. His proclamations take precedency of the decrees of the Dantzic ſenate, which till this moment has not diſtinguiſhed itſelf by

by any tranſaction that characterizes a perfectly independent ſtate.

DANTZIGERS, or PRUSSIANS, in *Eccleſiaſtical Hiſtory*, a ſect of the refined anabaptiſts (ſee FLEMINGIANS), ſo called on account of their adopting the manners and diſcipline of the Pruſſians.

DANUBA, in *Geography*, a town of Africa, in the kingdom of Tomani.

DANUBE, *The*, in German the *Donau*, is the moſt conſiderable river of Germany, its courſe, without reckoning its windings, being computed at 1620 miles. It has its ſource near the ſmall town of Doneſchingen, in the court-yard of the palace of the princes of Furſtenberg; and although the two ſmall rivers of Bribach and Brege, which unite below the town, are far more conſiderable than the ſtreamlet that flows into them from Doneſchingen ſoon after their junction, yet this little ſtream alone has the honour of being acknowledged as the ſource of the mighty Danube. Two celebrated Swiſs writers, Sceuchzer and Fæſi, have contended that the Danube riſes in Swiſſerland, becauſe the river Inn, which actually has its ſource in the canton of the Griſons, is 890 feet wide at the place where it joins the Danube, whilſt the width of the latter is only 784 feet. But the rivulet which comes from Doneſchingen has the name of the Danube, or Donau, long before it reaches the river Inn; and admitting that the Danube is narrower and cramped up by hills where it meets the Inn, it is yet certain that it contains much more water upon equal ground, and is already a much mightier river than the Inn far above Ratiſbon, even before it has received four ſmaller rivers. Suabia, therefore, is the true birth-place of the majeſtic Danube, with which only the Volga, amongſt the European rivers, can vie.

The Danube is one of the few rivers that flow from eaſt to weſt. From its ſource it runs N.E. to Ulm, where, in the month of October, 1805, it overflowed its banks, with a violence which had been unparalleled ſince the time of Louis XIV., particularly in the night that preceded the diſgraceful capitulation of general Mack.

From Ulm the Danube continues its north-eaſt courſe to Ratiſbon, from whence it runs ſouth-eaſtwards to Deckendorf, where it receives the river Iſer. It was here that Dr. Burney entered the Danube, on his aquatic excurſion from Munich to Vienna. This ſouth-eaſt courſe goes on to Vilohofen, where there is a wooden bridge of ſixteen arches. In this part the Danube abounds in rocks, ſome above water, and ſome below, which occaſion a great noiſe, owing to the rapidity of the current running over or againſt them. The ſame courſe holds to Paſſau; at the end of which town there is a confluence of three rivers, the Inn on the right hand, the Iltz on the left, and the Danube in the middle. After this junction, the Danube becomes more and more rapid; the ſhore on each ſide, for a conſiderable way below Paſſau, has high hills and rocks, covered with ſpruce fir-trees, and box.

As far as Ingelhartzeil, or the entrance into Auſtria, the Danube is compreſſed and ſhut up between two high mountains; and ſometimes the noiſe againſt rocks is as loud and as violent as a cataract. The river continues running through a woody, wild, and romantic country. For fifty miles not a corn-field or paſture is to be ſeen. At Aſha the country opens a little. Here river after river comes tumbling into the Danube, and yet it grows rather more deep than wide by theſe acceſſions; many ſmall rivers detach themſelves again from it; and iſlands are frequently formed in the middle of this world of waters.

Towards Lintz the Danube runs almoſt full eaſt, through a flat country, with high mountains covered with trees at a diſtance. At Lintz there is a bridge over the Danube of twenty very wide arches.

At Spieburg there is a water-fall. Ens is here in ſight upon the right hand. The courſe of the Danube now becomes extremely irregular, and inclines a while to the ſouth, and then to N.E. The river is ſometimes like a ſea, ſo wide, that there is ſcarce any land in ſight; at other times it is broken and divided into ſmall ſtreams by iſlands.

At Strudel, which is ſituated in a very wild country, is the famous water-fall and whirl-pool, which, in winter, often proves fatal to boats that are drawn into its vortex. At Ips the country opens, and is very beautiful. Beyond Melk the country grows more and more wild as far as Stein. The rocks are often ſo high on each ſide of the Danube, as to prevent the ſun from being ſeen. At Stein, which is on the left of the river, there is a wooden bridge of twenty-five wide arches, which leads to Krems on the right-hand of the Danube.

As the Danube rolls on to the S.E. towards Vienna, the country becomes leſs ſavage. The vine grows on the hills, and innumerable iſlands divide the Danube.

From Vienna the Danube flows to the S.E. towards Preſburg, and below the town of Haimburg quits Auſtria and Germany to enter Hungary. From Preſburg to Comorn it continues to the eaſt, but afterwards flows to the ſouth, and even a little to the ſouth-weſt, and then again ſouth-eaſt, towards Belgrade and Widdin, when it runs on eaſtwards, dividing Bulgaria from Wallachia, and diſcharges itſelf at laſt by ſeveral channels into the Black ſea, in the province of Beſſarabia. It is ſo deep between Buda and Belgrade, that men of war have been navigated upon it, and yet it is not navigable to the Black ſea, on account of the cataracts.

The Danube abounds in fiſh; particularly the *huſo*, Iſin. in Latin *antacæus*, in the Ruſſian language *beluga*, of which is made the glue known in commerce by the name of *iſinglaſs* in Latin *ichthyocolla*; but this fiſh is much more plentiful in the Volga.

The Danube is ſuppoſed to have been the northern boundary of the Roman empire in Europe; towards its mouth the ancients called it the *Iſter*; which ſee.

The courſe of the Danube, with regard to its length, compared with the Thames, is as 7 to 1, or ſix times longer than the Thames.

DANUBE, in *Mythology*, a river worſhipped by the Scythians, on account of the great extent of its water. This river deity is exhibited on a medal of Trajan, ſitting with his urn, and diſtinguiſhed by a large veil floating over his head: but the fineſt figure of him is to be ſeen on the column of Trajan at Rome. Mr. Spence (Polymetis) ſays, that he is one of the firſt figures on that column, very near the baſe; and that he appears there, from the waiſt upward, riſing out of his ſtream, to ſhew his duty to the Romans, and to ſupport the bridge of boats, which they had laid over it. The hand of the god may be diſcerned, though partly covered with the water, ſtretched quite to the bridge, and ſome way under it, as willing to ſupport it.

DANUM, in *Ancient Geography*, a town of Albion, marked in Antonine's Itinerary between Segelocum or Agelocum, and Legeolium. It is the preſent Doncaſter.

DANVERS, in *Geography*, a townſhip of America, in the ſtate of Maſſachuſetts and county of Eſſex, adjoining Salem on the N.W. in which it was formerly comprehended by the name of Salem village. It conſiſts of two pariſhes, and contains 2643 inhabitants; and it was incorporated in 1757.

1757. The moſt conſiderable and compact ſettlement in it is formed by a continuation of the principal ſtreet of Salem, which extends more than two miles towards the country, having many work-ſhops of mechanics, and ſeveral for retailing goods. Large quantities of bricks and coarſe earthen ware are manufactured here. Another pleaſant and thriving ſettlement lies at the head of Beverly river, called New-Mills, where a few veſſels are built. The town of Danvers receives an annual compenſation of 10*l.* from the proprietors of Eſſex bridge, on account of the obſtruction of the river. A ſlitting tide-mill was erected here in 1797. On the ſame dam are a griſt-mill, an anchor ſhop, a ſcythe-ſhop, whoſe hammers are carried by water, and a ſhovel-manufactory.

DANVILLE, a thriving poſt-town of America, in Mercer county, and formerly the metropolis of Kentucky, pleaſantly ſituated, in a large fertile plain, on the S.W. ſide of Dick's river; 35 miles S.S.W. of Lexington. It conſiſts of about 50 houſes, and a Preſbyterian church, and contains 270 inhabitants, of whom 101 are ſlaves. N. lat. 37° 30′. W. long. 85° 30′.—Alſo, a very thriving town-ſhip in the ſtate of Vermont, and county of Caledonia; it was a few years ago a wilderneſs, and now contains 1544 inhabitants; 8 miles N.W. of Barnet.—Alſo, a thriving poſt-town in Pittſylvania county, and ſtate of Virginia, ſituated on Dan river, on the main road from Philadelphia to the Moravian town, N. Carolina.—Alſo, a poſt-town of Northumberland county, in Pennſylvania, on the Suſquehanna, at the mouth of Mohoning creek; 12 miles above Northumberland.

DANYCLOW, a town of Poland, in the palatinate of Lemberg; 64 miles E. of Lemberg.

DANZI, Mademoiselle, afterwards *Madame* le Brun, in *Biography*, with many excellencies, an extenſive compaſs of voice, a good figure, and a great knowledge of muſic, was cold and unintereſting in her performance. She was an admirable inſtrumental performer on the piano-forte, in Emanuel Bach's ſtyle, and had more expreſſion with her fingers than voice.

DAOLA, in *Mythology*, a Tonquineſe idol, who preſides over travellers.

DAON, in *Geography*, a town of France, in the department of the Mayenne, and diſtrict of Chateau-Gontier; 2 leagues S. of Chateau-Gontier.

DAONA, in *Ancient Geography*, a town and alſo a river of India, on the other ſide of the Ganges. Ptolemy.

DAONUS, or Daos, in *Mythology*, a deity of the ancient Chaldæans.

DAOULAS, or Doulas, in *Geography*, a ſmall town of France, in the department of Finiſterre, and chief place of a canton, in the diſtrict of Breſt. It has but 440 inhabitants. The canton, which has an extent of 235 kiliometres and 10 communes, contains a population of 13,799 individuals.

DAOURIAN Mountains, mountains of Aſiatic Ruſſia. See Nershinsk.

DAOURITA. See Schorl.

DAPALIS, in *Mythology*, an epithet of Jupiter, deduced from the great feſtivals celebrated in honour of him.

DAPHNÆ, Pelusiæ, in *Ancient Geography*, a town of Egypt, 16 miles from Peluſium, on the route from Memphis, near the canal of Peluſium formed by the Nile.

DAPHNÆUS, in *Mythology*, an epithet of Apollo, deduced from the fable of his amours with Daphne.

DAPHNE, Δαφνη, in *Antiquity*, a kind of divination, taken from the crackling of laurel leaves thrown into the fire.

Daphne, in *Botany*, (after the nymph Daphne, in alluſion to her transformation into a laurel; ſome of this genus having the aſpect of laurels. Linnæus, it ſeems, originally deſigned this name for his *andromeda polifolia*; but having found ſo apt a denomination for that plant, he applied *daphne*, as it remains at preſent, to the *thymelæa* of Tournefort, the latter name being, according to his rules, untenable, as compounded of another eſtabliſhed one, *thymus*.) Linn. Gen. 192. Schreb. 260. Willd. Sp. Pl. v. 2. 415. Juſſ. 77. Claſs and order, *octandria monogynia*. Nat. Ord. *Thymelææ*, Juſſ.

Gen. Ch. *Cal.* of one leaf, funnel-ſhaped; externally rude; internally coloured; its tube cylindrical; border four-cleft, ſpreading, ſhorter than the tube, deſtitute of glands or crown at the baſe. *Cor.* none. *Stam.* Filaments eight, inſerted in two rows into the tube, and encloſed within it, very ſhort; anthers roundiſh, erect. *Piſt.* Germen, ovate, ſuperior; ſtyle very ſhort; ſtigma capitate, depreſſed. *Peric.* Drupa roundiſh, coloured, juicy, of one cell. *Seed* ſolitary. Some ſpecies are dicœcious.

Eſſ. Ch. Cal. coloured, funnel-ſhaped, four-cleft, withering, including the ſtamens. Cor. none. Drupa of one ſeed.

About 30 or more ſpecies of this elegant genus are known, ſome of which have a lateral, others a terminal, inflorescence. Their habit is ſhrubby, tough and flexible, often ſilky; their inner bark invariably compoſed of fine ſattin-like white, and ſhining fibres. Leaves ſimple, moſtly ever-green, without ſtipules. Flowers more or leſs cluſtered, externally rude, ſilky, and frequently greeniſh; internally ſmooth, red, white, or yellowiſh; for the moſt part highly and agreeably ſcented. Fruit red or black. Every part of theſe plants is highly acrid; and hence they have, in conſideration moreover of their habit, obtained the names of ſpurge-laurel, and ſpurge-olive. D. *mezereum*, common mezereon, Engl. Bot. t. 1381, found apparently wild in ſome parts of England, belongs to the firſt ſection (flowers lateral), and is frequent in gardens. The leaves are ſmooth, deciduous, and come after the flowers, which are crimſon, occaſionally white, and appear in the early ſpring. Their fragrance is ſo ſtrong as to be, to ſome perſons, intolerable in a room. The bark of the root eſpecially, is uſed in medicine as a powerful ſtimulant. This ſpecies is propagated by ſeeds, or by ſuckers from the root. D. *alpina*. (D. altaica, Pallas, Roſſ. t. 35.), is another hardy ſpecies, a native of the Alps, eaſily raiſed from ſeeds in our gardens, eſpecially in bog-earth. Its flowers are white and ſweet-ſcented. Leaves deciduous, ſmoothiſh. D. *laureola*, ſpurge-laurel, Eng. Bot. t. 119, is frequent in ſhady woods and thickets. Its flowers are green, and ill-ſcented. Berries black. The tuft of ſhining leaves, crowning the naked ſtem, gives this ſhrub an elegant palm-like aſpect. D. *pontica*, Andr. Repoſ. t. 73, firſt found by Tournefort in the Levant, and figured in his voyage, has of late become frequent in our gardens, where it is very hardy, and very acceptable. The leaves are ever-green. Flowers copious, early, greeniſh-yellow, exhaling in the evening a rich, pungent, lemon-like odour.—Of thoſe with terminal flowers, D. *odora*, Sm. Exot. Bot. t. 47, is remarkable for its ſweet white bloſſoms. In order to have them in perfection, the heat of a ſtove, in the autumn and winter, is requiſite; otherwiſe the plant itſelf is almoſt hardy enough to bear our climate; but it ſcarcely ever flowers in the open ground. D. *collina*, Sm. Spicil. t. 18. Curt. Mag. t. 428. Neapolitan mezereon, is very able to bear our hardeſt winters, though an ever-green, and a native of Italy, Greece, &c. Its ſweet roſe-coloured flowers, produced in ſpring, or even in the winter, if mild, and its dark-ſhining leaves,

leaves, ſilky beneath, render this a very deſirable plant. It is increaſed by budding on D. *laureola*, or by ſeeds. D. *cneorum*, Curt. Mag. t. 313, an elegant and fragrant Alpine ſhrub, is rather more difficult to keep in a garden. It requires bog-earth, and regular moderate ſupplies of water. D. *lagetto* produces a kind of lace from the artificial extenſion of its inner bark. It it a native of Jamaica.

Daphne, in *Gardening*, comprehends plants of the low, ſhrubby, ornamental, ever-green, and deciduous kinds; of which the ſpecies moſtly cultivated are the mezereon (D. *mezereum*); the wood, or ſpurge laurel (D. *laureola*); the ſilver-leaved daphne, or tartouraira (D. *tartouraira*); the trailing (*daphne cneorum*); and the ſweet-ſmelling daphne, (D. *odora*).

Method of Culture.—Theſe plants are capable of being raiſed in different methods, according to the kind and nature of them.

The firſt ſort and varieties are beſt propagated by ſowing the ſeeds or berries, as ſoon as they have become perfectly ripe, as about Auguſt, on beds of light ſandy earth, covering them in to the depth of half an inch. When poſſible, a ſouth-eaſterly aſpect ſhould be choſen. And, to preſerve the ſeeds in a perfect ſtate, the ſhrubs ſhould be netted in the latter end of the ſummer, to prevent the attacks of the birds, by which they are very liable to be injured.

The young plants generally appear in the following ſpring, when they ſhould be kept clear from weeds, and the largeſt ones removed when too cloſe together: they may remain in theſe beds till the beginning of the ſecond autumn, when they ſhould be removed, and ſet out in nurſery-rows, at the diſtance of a foot and a half, and ten or twelve inches in the rows, great care being taken not to break or injure their roots. After they have had two years' growth in theſe ſituations, they are in a proper condition for being planted out where they are to remain: and as the plants flower very early in the ſpring, the beſt time for removing them is in the early part of the autumnal ſeaſon.

The plants grow to the greateſt ſize, and flower in the moſt full and perfect manner, when the ſoils are of a dry quality: as in moiſt adheſive ſoils they are apt to become moſſy, and grow in a very imperfect manner.

The ſecond ſpecies may be increaſed by ſowing the ſeeds in the ſame manner as the above; and alſo by cuttings and layers of the young ſhoots; theſe ſhould be planted out or laid down in the beginning of the autumn, and in the following autumn they will be well rooted: the layers may be taken off and planted where they are to remain, or put into nurſery-rows as above. The cuttings may, likewiſe, be treated in the ſame way.

And the third and fourth ſorts ſucceed beſt when raiſed from ſeed procured from abroad, and ſown on a warm dry ſituation, in the early autumn, in the places where the plants are to remain, as they do not bear tranſplanting well. The ground ſhould be as little as poſſible ſtirred about the plants. The former ſhould have a dry warm aſpect, where the land is poor, but the latter ſucceeds in ſuch as are more cool: theſe plants are ſufficiently hardy to ſucceed in the open air, when the winters are not very ſevere.

The laſt ſort is raiſed by ſowing the ſeeds, procured from its native ſituation, on a gentle hot-bed, in the autumn or ſpring, and when the plants are of ſufficient growth, removing them into ſeparate pots, to be placed under the protection of the green-houſe. It is much more tender than the other ſorts, not being capable of bearing the open air in cold weather.

The firſt and ſecond kinds are highly ornamental plants in the clumps, borders, and other conſpicuous parts near the houſe; the former flowering early; and, where many are together, affording a fine fragrance.

The other ſorts, though more tender, are curious, and afford an agreeable variety, in aſſemblage with others of ſimilar growth, either in the borders, or among potted plants.

Daphne *Mezereum*, in *Pharmacy*. Many parts of the mezereon are diſtinguiſhed for their extreme acrimony, eſpecially the berries and bark both of the trunk and root. It is the root which is employed in medicine.

When a piece of the root is chewed, at firſt it appears equally without taſte as ſmell; but after a time, a ſenſe of heat and pungency in the fauces comes on, which increaſes to a painful degree, and is remarkably permanent, often remaining for many hours, and not to be waſhed away or removed. This pungency is ſo intenſe in the berry or freſh bark, as to corrode the cuticle of the tongue and fauces, and when it has ſubſided, an inſenſibility of theſe organs remains for ſome time.

Two ounces of the bark digeſted with hot water affords, (according to Murray,) about two drams of a gummy extract, and with ſpirit, 48 grains of reſin. Both theſe preparations poſſeſs the acrimony of the entire plant.

The mezereon root was firſt introduced into this country as an ingredient in the compound decoction of ſarſaparilla or Liſbon diet drink, and was afterwards employed alone in the cure of venereal nodes by Dr. Ruſſel. The formula which he gives, and which has been adopted by the Edinburgh college, is two drams of the mezereon, and half an ounce of liquorice-root boiled with three pints of water down to a quart. From four to eight ounces of this decoction may be given four times a day. This medicine produces ſcarcely any ſenſible effect except a moderate heat in the mouth as already mentioned, and ſometimes it excites perſpiration.

The mezereon has alſo been uſed with advantage in rheumatic complaints, and in ſeveral obſtinate cutaneous affections.

The bark of the mezereon is in popular uſe in France, as a ſtimulant application to the ſkin, to excite a ſerous diſcharge, which it effects, without actually bliſtering; a practice which deſerves a further trial, and might often ſuperſede with advanntage ſome of the ſtimulating plaſters and unguents now in uſe. A piece of the bark, cut of the required ſize, is ſteeped for a ſhort time in vinegar, and then bound upon the ſkin. It ſhould be renewed every day. It is apt, however, to produce eruptions on the contiguous ſkin.

Daphne, in *Geography*, a river of Paleſtine which runs into the Leſſer Jordan, at ſome diſtance from lake Samochonites.

Daphne, a very conſiderable village of Aſia, in Syria, ſituated on the river Orontes, near its mouth in the Mediterranean, reckoned a ſuburb of Antioch, though at the diſtance of 4 or 5 miles from it. Here Seleucus planted a thick grove of laurels and cypreſſes, reaching 10 miles in circumference, and forming in the moſt ſultry ſummer a cool and impenetrable ſhade. In the middle of the grove he erected a magnificent temple which was conſecrated to Apollo and Diana, and he made the whole an aſylum. Daphne was the ſame with reſpect to Antioch that Baiæ was to Rome, and Canopus to Alexandria, a place of reſort for amuſement and pleaſure. Here a thouſand ſtreams of the pureſt water, iſſuing from every hill, preſerved the verdure of the earth, and the temperature of the air; the ſenſes were gratified with harmonic ſounds, and aromatic odours; and

and the tranquil grove was devoted to Bacchus and Venus, to health and joy, to luxury and love. With regard to voluptuous gratification and enjoyment, it was ſo infamous that "Daphnicîs moribus vivere," *i. e.* to live after the manners of Daphne, became a proverb, expreſſing the moſt luxurious and diſſolute mode of living; and all that had any reſpect for modeſty and virtue avoided the place. The ſoldier and the philoſopher wiſely ſhunned the temptations of this ſenſual paradiſe, where pleaſure aſſuming the character of religion, imperceptibly diſſolved the firmneſs of manly virtue. Caſſius, the Roman general, when he came to Antioch, prohibited his ſoldiers, by public proclamation, and under penalty of being caſhiered, from viſiting Daphne, that they might not be corrupted by its luxury and debaucheries. Nevertheleſs the groves of Daphne continued for many ages to attract the veneration of natives and ſtrangers; the privileges of the holy ground were enlarged by the munificence of ſucceeding emperors; and every generation added new ornaments to the ſplendour of the temple. When Julian, on the day of the annual feſtival, haſtened to adore the Apollo of Daphne, his devotion was raiſed to the higheſt pitch of eagerneſs and impatience. His lively imagination anticipated the grateful pomp of victims, of libation, and of incenſe; a long proceſſion of youths and virgins, clothed in white robes, the ſymbols of their innocence; and the tumultuous concourſe of an innumerable people. In his time there was an oracle at Daphne, which was deſtroyed by the Chriſtian emperors: and Julian complained, that inſtead of hecatombs of fat oxen, ſacrificed by the tribes of a wealthy city to their tutelar deity, he found only a ſingle gooſe, provided at the expence of a prieſt, the pale and ſolitary inhabitant of this decayed temple. The altar was deſerted, the oracle had been ſilenced, and the holy ground was profaned by the introduction of Chriſtian and funereal rites.

After Babylas, a biſhop of Antioch, who died in priſon in the perſecution of Decius, had reſted near a century in his grave, his body, by the order of Cæſar Gallus, was tranſported into the midſt of the grove of Daphne. A magnificent church was erected over his remains; a portion of the ſacred lands was uſurped for the maintenance of the clergy, and for the burial of the Chriſtians of Antioch; and the prieſts of Apollo retired, with their affrighted and indignant votaries. As ſoon as another revolution ſeemed to reſtore the fortune of Paganiſm, the church of St. Babylas was demoliſhed, and new buildings were added to the mouldering edifice, which had been raiſed by the piety of Syrian kings. Julian was anxious to deliver the oppreſſed deity from the odious preſence of the dead and living Chriſtians; the bodies were decently removed; and the miniſters of the church were permitted to convey the remains of St. Babylas to their former habitation within the walls of Antioch. The return of the ſaint was a triumph; and the triumph was an inſult on the religion of the emperor, who exerted his pride to diſſemble his reſentment. During the night which terminated the proceſſion that accompanied the removal of the relics of St. Babylas, the temple of Daphne was in flames; the ſtatue of Apollo was conſumed; and the walls of the edifice was left a naked and awful monument of ruin. It was ſaid, however, by the Chriſtians at Antioch, that the powerful interceſſions of St. Babylas had pointed the lightnings of heaven againſt the devoted roof; but Julian aſcribed the fire of Daphne to the revenge of the Galilæans. For the diſcovery of the criminals ſeveral eccleſiaſtics were tortured; and a preſbyter of the name of Theodoret was beheaded by the ſentence of the count of the Eaſt. But this haſty act was blamed by the emperor, who lamented, with real or affected concern, that the imprudent zeal of his miniſters would tarniſh his reign with the diſgrace of perſecution. Gibbon's Hiſtory, vol. iv.

Daphne, *Fountain of*, a fountain of Judæa, in the tribe of Naphtali. According to Steph. Byz. there was a town called Daphne in Lycia.—A ſea-port on the Euxine ſea had alſo this name.

Daphne, in *Mythology*, a nymph with whom Apollo is ſaid to have had an amour. Whilſt he was in purſuit of her, it is ſaid that ſhe was transformed into a laurel. The name is ſaid to be derived from Δαφονεω, *voco*, becauſe the laurel makes a crackling noiſe while it burns. The fable of the amours of Apollo and Daphne, is thus accounted for by Banier. Some prince, called Apollo, on account of his love of the belles lettres, falling in love with Daphne, the daughter of Peneus, king of Theſſaly, and being one day in purſuit of her, the young princeſs died upon the banks of a river in ſight of her lover. Some laurels ſpringing up on that ſpot gave riſe to her metamorphoſis; or rather the etymology of Daphne's name, which in Greek imports a laurel, was the foundation of the fable.

DAPHNELÆON, in *Medicine*, Δαφνελαιον (from δαφνη, the *bay-tree*, aud ελαιον, oil), *laurinum*, or oil of bay. This is prepared of the berries, when full ripe and ready to fall off, by boiling them in water; by which they tranſmit through their huſks a fat ſubſtance, which, after compreſſing the berries with the hand, is taken off with ſhells. Some, after they have inſpiſſated oil of unripe olives with cyperus, juncus odoratus, and calamus, caſt therein the tender leaves of the bay, and boil them together; and others add the berries, until it ſmells ſufficiently ſtrong; and ſometimes ſtyrax and myrrh are mixed with them. The mountainous and broad-leaved bay is the fitteſt for the preparation of this oil, which is beſt of its kind when recent, of a green colour, very bitter and acrimonious.

DAPHNEPHORIA, Δαφνηφορια, in *Antiquity*, a novennial feſtival, celebrated by the Bœotians in honour of Apollo.

At this feſtival a globe of braſs was ſet upon a branch of olive, from which hung ſeveral other ſmall globes; the firſt repreſented the ſun or Apollo; the ſecond, ſomewhat leſs in ſize, repreſented the moon; and the reſt, the ſtars. Crowns which encircled theſe globes pointed out the days of the year. This branch, with all its ornaments, was carried about in proceſſion by a young man, who held likewiſe in his hand a laurel-bough, and thence had the name "Daphnephoros." This youth, according to Pauſanias (in Bœot.), was to be choſen out of the beſt families, and to be well-formed, vigorous, and robuſt.

DAPHNOMANCY, from δαφνη, *laurel*, and μαντεια, *divination*; a kind of divination practiſed by throwing branches of laurel into the fire: the crackling of them was deemed a favourable omen; the contrary, otherwiſe. The leaves of laurel were alſo chewed, in order to communicate the gift of prophecy.

DAPHNUS, in *Ancient Geography*, a part of the canal of Conſtantinople, at the diſtance of 80 ſtadia from this city, and 40 ſtadia from the Euxine ſea. Arrian.—Alſo, a town of Lower Egypt, ſeated on a branch of the Nile, on the route from Peluſium to Memphis.—Alſo, a fort on the Danube, conſtructed by the emperor Conſtantine; and after being demoliſhed by the barbarians, repaired by the emperor Juſtinian.—Alſo, baths in Sicily, near Syracuſe.—Alſo, a ſea-port of Ethiopia, on the Arabic gulf.—Alſo, a town of the Opuntian Locrians, ſituated on the ſea-coaſt, near the frontiers which ſeparated the Opuntians from the Epicnemidian Locrians. It formerly belonged to the Phocæans.—Alſo, a river of Aſia Minor, in Caria.

DAPHNUSA,

DAPHNUSA, an iſland of the Ægean ſea, placed by Pliny near thoſe of Samos and Leſbos.

DAPHNUSIS, a lake of Aſia Minor, in Bithynia.

DAPHTHITÆ, a people of Africa, placed by Ptolemy in the interior of Libya, at the foot of mount Atlas.

DAPIFER, the dignity or office of grand-maſter, or grand-ſewer, of a king's or prince's houſehold.

The word is pure Latin, compounded of *daps*, *dapis*, a diſh of meat ſerved on the table, and *fero*, I bear; ſo that dapifer literally ſignifies a diſh-carrier, or an officer who ſerves the meats upon the table.

The title of dapifer was given by the emperor of Conſtantinople to the czar of Ruſſia, as a teſtimony of favour. In France, the like office was inſtituted by Charlemagne, under the title of dapiferat, and ſenechauſſe; to which was affixed the ſuperintendance over all the officers of the houſehold.

In England the office of dapifer was leſs eminent; being found in ſeveral of our ancient charters named one of the laſt of the officers of the houſehold.

The dignity of dapifer is ſtill ſubſiſting in Germany. Till the year 1623, the elector palatine was dapifer, or grand-ſewer of the empire: ſince that time, the elector of Bavaria has aſſumed the title of arch-dapifer of the empire. His office is, at the coronation of an emperor, to carry the firſt diſh of meat to table on horſeback.

The ſeveral functions of a dapifer occaſioned the ancients to give him divers names: as, ελειατρος, and eleater, dipnocletor, convocator, trapezopæus, architriclinus, proguſta, præguſtator, domeſticus, megadomeſticus, œconomus, majordomus, ſeneſchallus, ſchalus, gaſtaldus, aſſeſſor, præfectus, or præpoſitus menſæ, princeps coquorum, et magirus.

DAPIFERAT, DAPIFERATUS, the office of DAPIFER.

DAPPLE, in *Rural Economy*, a term uſed to ſignify marked with different colours as applied to animals; thus we have in horſes dapple, or dappled bays and grays.

DAPPLE *bay*, in the *Manege*, is uſed for a horſe which has marks of a dark bay colour. Such are alſo called bays à mirroir.

DAPPLE *black*, a black horſe, having ſpots or marks blacker and more ſhining than the reſt of his ſkin.

DAPS, in *Geography*, a river of Denmark, which runs into the Little Belt; 14 miles north-eaſt of Haderſleben.

DAPSILES CORONÆ, among the Romans, a kind of crowns or garlands worn by the women, which covered their faces, and ſerved as a veil.

DARA, in *Ancient Geography*, a river of Aſia, in Caramania, which falls into the Perſian gulf; called by Pliny *Daras*.—Alſo, a river of Africa, which diſcharged itſelf into the Atlantic ocean, called by Ptolemy *Daratis*, and ſuppoſed to be the river Senegal of modern times.

DARA, a fortified town of Aſia in Meſopotamia, 14 miles from Niſibis, and four days' journey from the river Tigris, was peopled and adorned by the emperor Anaſtaſius, from whom it derived the name of *Anaſtaſiopolis*. Dara has been amply deſcribed by Procopius, who ſays that it was traverſed by the river Cordes. The haſty works conſtructed in this place, by order of Anaſtaſius, were improved by the perſeverance of Juſtinian; and as a ſpecimen of the military architecture of that age, we ſhall give a brief deſcription of it.

The city was ſurrounded with two walls, and the interval between them of 50 paces afforded a retreat to the cattle of the beſieged. The inner wall was a monument of ſtrength and beauty; it meaſured 60 feet from the ground, and the height of the towers was 100 feet; the loop-holes, from which an enemy might be annoyed with miſſile weapons, were ſmall, but numerous; the ſoldiers were planted along the rampart, under the ſhelter of double galleries, and a third platform, ſpacious and ſecure, was raiſed on the ſummit of the towers. The exterior wall appears to have been leſs lofty, but more ſolid; and each tower was protected by a quadrangular bulwark. A hard rocky ſoil reſiſted the tools of the miners; and on the ſouth-eaſt, where the ground was more tractable, their approach was retarded by a new work, which advanced in the ſhape of an half-moon. The double and treble ditches were filled with a ſtream of water; and in the management of the river, the moſt ſkilful labour was employed to ſupply the inhabitants, to diſtreſs the beſiegers, and to prevent the miſchiefs of a natural or artificial inundation. Dara continued more than 60 years to fulfill the wiſhes of its founders, and to provoke the jealouſy of the Perſians, who inceſſantly complained, that this impregnable fortreſs had been conſtructed in manifeſt violation of the treaty of peace between the two empires. When Choſroes, the Perſian monarch, aſſumed the guard of the gates of Caucaſus, he ſuſpended the demolition of Dara, on condition that it ſhould never be made the reſidence of the general of the Eaſt. In his laſt wars with the Romans, A. D. 572, &c., Choſroes conducted in perſon the ſiege of Dara; and although that important fortreſs had been left deſtitute of troops and ma gazines, the valour of the inhabitants reſiſted above five months, the archers, the elephants, and the military engines of the great king. During the reign of Choſroes II., the ſtrong cities of Martyropolis and Dara were reſtored to the Romans; and the Peſarmenians became the willing ſubjects of an empire, the eaſtern limit of which was extended, beyond the example of former times, as far as the banks of the Araxes, and the vicinity of the Caſpian.

DARA, or *Dra*, in *Geography*, a large river of Africa, which riſes in the Greater Atlas, not far from Teſza, and diſcharges itſelf into the Atlantic, not far from Cape Non, encloſing a great part of the country called Mauritania Cæſarienſis.

DARA, or *Dra*, a province of the kingdom of Morocco, ſo called from the river Dara, which paſſes through it, and comprehending, according to ſome modern authors, a great part of Biledulgerid. It is bounded on the north by the provinces of Morocco, Gezula, and Tafilet, on the eaſt and ſouth by Sahara, and on the weſt by Sus. Some have eſtimated its length at about 100 leagues. It contains a number of caſtles, forts, and ſtrong holds along the banks of the Dara. One of the chief towns is Beniſabih, or Macabah, not far from which is Quiteoa, about 200 paces from the river, well defended by walls, and fortified by a citadel. Near this town is Tozarin, and at the diſtance of about 20 leagus from Quiteoa is Tayamadert. On the banks of the Dara are Turzela and Margala; the former of which is ſaid to contain 4000 houſes, a caſtle, and above 400 Jewiſh families. Yinzulin is the largeſt town of the province, ſituated about 12 leagues from Jaragala, and ſtrongly fortified by a citadel and walls. Timeſguit, another of its towns, is ſituated on the confines of Gezula, and contains within its walls about 3000 houſes, according to La Croix, and about 200 families in the ſuburbs. The province of Dara is generally barren, though ſome parts of it produce grain, eſpecially after the overflow of its river. The whole province depends for the ſubſiſtence of its inhabitants, on corn and other neceſſaries procured at Fez, in exchange for its indigo and dates. The inhabitants who are Arabians and Mahometans, are for the moſt part of a very dark complexion, which is aſcribed to their frequent alliances with the Negroes. The women, though ſome-

what corpulent, are reckoned handſome; and their general diſpoſition is mild, and leſs ſavage than that of other females of the country. Some diſtricts of the country are dependent on the emperor of Morocco, to whoſe ſovereignty Dara is ſubject, though they are governed by their own ſcheiks.

DARAAN, or DARAUN, a town of Aſia, in Great Tartary; about 24 leagues E. of Samarcand.

DARABA, in *Ancient Geography*, a town of Ethiopia, placed by Strabo on the other ſide of the foreſt of Cumania, and in the vicinity of the country belonging to the people called Elephantophagi.

DARABGERD, or DARABGUIERD, in *Geography*, a town of Perſia, in the province of Farſiſtan, ſaid to have been founded by Darius; it is large, but not populous; and near it is found ſalt of various colours, white, black, red, and green. A conſiderable manufacture of glaſs is carried on in this place: 116 miles E S.E. of Schiras.

DARABITTA, in *Ancient Geography*, a village of Paleſtine, at the extremity of Galilee. Jonathan paſſed through it in his way from Tiberias to Jeruſalem.

DARADÆ, a people of Africa, in the interior of Libya, placed by Ptolemy on the coaſt of the weſtern ocean, in the environs of the river Daratis. Pliny calls them *Daratitæ*.

DARADAX, a river of Aſia, in Syria. We learn from Xenophon, that Beleſis, governor of Syria, had a large and beautiful park, and alſo a palace, near the ſource of this river. Cyrus cauſed the trees of the park to be cut down, and ſet fire to the palace.

DARADI, a people of Africa, in the interior of Ethiopia.

DARADUS, a river of Libya Interior.

DARAE, a people of Africa, in Libya, who formed a part of the Getulians, and inhabited a diſtrict very remote from the ſea.

DARAIA. See HANIFA.

DARAMAJON, a town on the north-weſt of the iſland of Java; 30 miles E. of Batavia.

DARAMPOORY. See DAREMPOORY.

DARAN, JAMES, in *Biography*, a French military ſurgeon, who acquired much celebrity for his ſkill in treating diſorders in the urethra, particularly for his improved method of making bougies, publiſhed in 1745, "Recueil d'Obſervations Chirurgicales ſur les Maladies de l'Urethra. It has been ſeveral times reprinted, and, in 1750, was tranſlated into Engliſh by Mr. Tomkyns, an eminent ſurgeon of London, who was able, he ſays, from his own experience, to atteſt the ſuperior utility of Daran's bougies over thoſe that had been commonly uſed. In the fifth volume of the "Journeaux de Medicine," there is a communication by Daran, in which he makes mention of a tube he had invented for drawing off the urine. This he deſcribes more particularly in his "Treatiſe on the Gonorrhœa Virulenta," firſt publiſhed in 1756. It is a flexible catheter, formed of a ſpiral wire, covered with the ſame compoſition as that uſed in making the bougies, and was capable of being introduced into the bladder, in many caſes, where it would have been dangerous, often impoſſible, to uſe the common catheter. Conſiderable improvements have been ſince made of this inſtrument, but the merit of the invention ſtill remains with Daran. Haller Bib. Chirurg.

DARANI, in the *Materia Medica*, a word uſed by ſome of the old writers to expreſs the ſal ammoniac of the times, which was the ſame with our ſal gemmæ.

DARAPORUM, in *Geography*, a town of Hindooſtan, in the Coimbetore country, 36 miles E.S.E. of Coimbetore, and 73 W. of Tritchinopoly. N. lat. 10° 42'. E. long. 77° 40'.—Alſo, a river of the ſame country, which has its ſource from an elevated plain about 60 miles in extent, which ſtretches acroſs the eaſtern mouth of the gap or valley encloſed between the branches of the Gauts, and riſes ſuddenly like a vaſt terrace, from the level of the ſurrounding country.

DARAPTI, in *Logic*, a mode of ſyllogiſm in the third figure, wherein the major and minor are univerſal affirmative propoſitions, and the concluſion a particular affirmative, E. gr.

DA "Every truly religious man is virtuous."
RA "Every truly religious man is hated by the world."
PTI "Therefore, ſome virtuous men are hated by the world."

DARBY, in *Geography*, a ſmall town in Delaware county, Pennſylvania, on the E. ſide of Darby creek, containing about 50 houſes and a Quaker meeting-houſe, and lying 7 miles S.W. by W. of Philadelphia. There are two townſhips of this name in the county, called Upper and Lower, from their relative ſituation.

DARDA, a town and fortreſs of Hungary, built by the Turks in the year 1686, and taken by the Imperialiſts in 1687; 30 miles S. of Bacs, and 44 S.S.E. of Zinget.

DARDANARIUS, *Uſurer*, *Monopoliſt*; a name anciently attributed to ſuch as cauſed a ſcarcity, and dearneſs of proviſions, particularly corn, by buying and hoarding it up to raiſe its value, and ſell it again at an extravagant rate.

The name Dardanarius was given from one Dardanus, who is ſaid to have made a practice of ſpoiling and deſtroying the fruits of the earth by a ſort of ſorcery. Hof. Lex. in voc.

The ſame people are alſo called æruſcatores, directarii, ſitocapeli, annonæ flagellatores, and ſeplaſiarii.

DARDANELLES, STRAITOF, in *Geography*, is ſituated 50 leagues to the weſt of Conſtantinople, between the Archipelago and the little ſea of Marmora, and extending from the coaſt of Troy to Gallipoli over againſt Lampſacus. This ſpace, about 12 leagues, of an unequal breadth, contains different points, in which the continents of Europe and Aſia, which this ſtrait ſeparates, approach to within the diſtance of three or four hundred fathoms. Three leagues from its mouth, on the ſide next the Archipelago, at the narroweſt part of the ſtrait, have been built in the year 1658, by Mahomet IV., the two caſtles called the Dardanelles; the cannon of each of which commanded the oppoſite ſhore. Theſe were, for a long time, the only barrier to ſecure Conſtantinople; but the Turks, becoming more fearful, though not more enlightened, built two others near the mouth; but as they are at the diſtance of 1500 fathoms, their fire is uncertain, and their defence inſufficient.

DARDANI, in *Ancient Geography*, a people of Illyria in Dalmatia, who inhabited the country called *Dardania*.

DARDANIA, a country of Aſia Minor, in the northern part of the Troade, when the kingdom of Troy ſubſiſted; but when this country was otherwiſe divided, it formed a part of the leſſer Myſia. It lay between the Helleſpont and the ſources of the Granicus. It took its name from Dardana, Dardania, or Dardanus, its capital; and its inhabitants were called *Dardanii* or *Dardanidæ*.—Alſo, a country of Illyria, in Dalmatia; the capital of which bore the ſame name.—Alſo, a name given to Mœſia Superior, on the ſide of the mountains which ſeparate this province from Macedonia Salutaris. Theſe mountains abounded with mines and mineral waters. Dardania was bounded on the eaſt by Pæonia, on the ſouth by Pelaconia, on the weſt by Dalmatia, and on the north by Dacia Ripenſis. In proceſs of time, they gave to this country the name of *Dacia Mediterranea*.—Alſo, a town

of

of Aſia Minor, in the Troade, called *Dardana*, or *Dardanus*. This town, the capital of Dardania, was ſituated on the ſea-coaſt, near the Helleſpont, 16 miles from Troy, 8 miles N. from Abydos, and 8 miles S. from Rhetœum. It is pretended that it was founded by Dardanus, who had married the daughter of Teucer, king of this country; and Steph. Byz. ſays, that it had been called Teucris. In this city, as Plutarch ſays, peace was concluded between Mithridates and Sylla, the Roman general. This town gave name to the *Dardanelles*.

DARDANIS, a town of Africa, in the Pentapoli, placed by Ptolemy on the frontiers of Marmarica, near the promontory Zephyrium.

DARDANIUM Promontorium, a promontory of the Troade.

DARDANUS. See Dardania.

Dardanus, a town of Italy, which, according to Lycophron, was ſurrounded by the waters of the marſh of Salpé.—Alſo, a town of Macedonia, mentioned by Lycophron, probably the ſame with Dardania in Illyria.—Alſo a mountain of Spain in the Tarragoneſe territory; ſuppoſed to be the moden *La Penna de Orduna*.

DARDESSEN, or Dardesheim, in *Geography*, a ſmall town of the kingdom of Weſtphalia, in the former principality of Halberſtadt, which, till the peace of Tilſit in July 1807, belonged to the kings of Pruſſia. It is ſituated on an eminence called the Ortſberg, from which there is a capital view of the Hercynian foreſt or the Hartz, and which is famous for quarries of excellent free-ſtone.

DARE. See Dace and Fishing.

DAREA, in *Botany*, a genus of dorſiferous ferns, named by Juſſieu in honour of Mr. Dare, an Engliſh botaniſt of the time of Ray, one of the firſt who found the *Hymenophyllum tunbridgenſe*, Engl. Bot. v. 3. t. 162. Bergius, who firſt diſtinguiſhed this genus, which we now call *Darea*, denominated it *Cœnopteris*, a *new fern*, a name to which we object, not only for its being compounded of another generic name previouſly eſtabliſhed, *Pteris*, which objection, though founded in Linnæan principles, ſeems in danger of being overruled; but even more on account of its abſurdity. See Sm. Introd. to Bot. 388. Dr. Swartz, however, has retained *Cœnopteris*, perhaps thinking himſelf obliged in ſome degree to do ſo, out of reſpect to its author, the founder of the new profeſſorſhip at Stockholm, which he himſelf ſo worthily fills. We alſo entertain very high reſpect for the botanical merits of Bergius, though few authors have been ſo peculiarly unfortunate in the conſtruction of generic names. We think alſo that the authority of Juſſieu, as a leading ſyſtematic writer, may, though ſubſequent to that of Bergius, be preferred to it. Juſſ. Gen. Pl. 15. Sm. in Mem. de l'Acad. de Turin, v. 5. 409. Tracts 233. (Cœnopteris. Berg. in Act. Nov. Petrop. v. 6. part. alt. 248. Sw. Fil. 87. Thunb. Prod. 172.). Claſs and order, *Cryptogamia Filices*; ſect. *Annulatæ*. Nat. Ord. *Filices dorſiferæ*.

M. de Juſſieu, G. Pl. 447, by an accidental error, refers the *Cœnopteris* of Bergius to his *Myriotheca*, which is the *Marattia* of Swartz, but their characters are too different to cauſe any confuſion.

Eſſ. Char. *Capſules* in ſcattered lines. *Cover* originating laterally from a vein, and ſeparating outwards. The habit of this genus is firm, ſmooth, abundant in ſlender ſubdiviſions. Cover linear, membranous, entire, pale or browniſh. Capſules each embraced by a jointed ring. Its eſſential character is juſt the reverſe of that of *Aſplenium*, whoſe cover opens inwardly, that is, always towards a rib or vein, and the habits of theſe two genera are ſo different as to prove this a moſt ſolid diſtinction.

Sp. 1. D. *flaccida*. (Aſplenium flaccidum; Forſt. Prod. 80. Cœnopteris flaccida; Thunb. in Act. Nov. Petrop. v. 9. 159. t. D. f. 1, 2.) Frond looſely pinnate. Leaflets alternate, ſtalked, lanceolate pinnatifid; ſegments linear, uniform, undivided. Found by Forſter at Duſky bay in New Zealand. *Frond* ſmooth, lax, of a pale green, ſomewhat glaucous, two feet or more in height, lanceolate, with a long *ſtalk*, looſely pinnated. *Leaflets* on ſlightly bordered ſtalks; two or three of the lower pairs oppoſite; the reſt alternate; all lanceolate, pointed, long, pinnatifid, ſerrated at the point; ſegments alternate, linear. *Lines* of fructification ſolitary, running along the lower part of the inner edge of each ſegment; their *cover* originating from its midrib, and reaching nearly to the margin, ſomewhat revolute when ripe. *Capſules* ſmall, very numerous. 2. D. *auriculata*. (Cœnopteris auriculata; Sw. Fil. 87. Act. Nov. Petrop. v. 9. t. E. f. 2.) Frond pinnate, lanceolate. Leaflets oblong, obtuſe, cut; ſegments linear; the lowermoſt cloven, auricled. Sw. A native of the Cape of Good Hope. 3. D. *odontites*. (Cœnopteris odontites; Sw. Fil. 87. Act. Nov. Petrop. v. 9. t. E. f. 1.) Frond doubly pinnatifid. Segments lanceolate, acute, the lowermoſt cloven. Sw. A native of the Cape of Good Hope. 4. D. *rutæfolia*. (Cœnopteris rutæfolia; Berg. in Act. Nov. Petrop. v. 6. 249. t. 7. f. 2. Adiantum furcatum; Linn. Suppl. 447, excluſ. ſyn.) Frond pinnate. Leaflets once or twice pinnatifid; ſegments linear-lanceolate. Main-ſtalk ſcarcely winged. A native of the Cape of Good Hope. *Frond* two feet or more in height, ſmooth, pale, lanceolate, alternately pinnate. *Stalk* ſmooth, ſcarcely winged or bordered even at the very top. *Leaflets* ſtalked, two or three inches long, broadeſt at the baſe; doubly pinnatifid in their lower part, ſimply pinnatifid upwards; ſegments all uniform, and as nearly as poſſible of an equal ſize, linear-lanceolate, ſlightly incurved, entire, with a ſhortiſh *line* of fructification about the middle of their inner edge. 5. D. *furcata*. (Cœnopteris furcata; Berg. in Act. Nov. Petrop. v. 6. 249. t. 7. f. 1. Adiantum borbonicum; Jacq. Coll. v. 3. 286. t. 21. f. 1.) Frond pinnate. Main-ſtalk winged. Leaflets pinnatifid; their lowermoſt lobes ſubdivided; ſegments obovato-lanceolate, obtuſe. A native of the iſle de Bourbon. Swartz unites this with the laſt, but it appears to us diſtinct. It is indeed but half ſo large, which might account for its *frond* being leſs compound; but it differs eſſentially in having the principal ſtalk winged all the way up, and its ultimate ſegments are all ſhorter, blunter, and rather obovate than lanceolate. Each *line* of capſules is alſo much ſhorter, its length being ſcarcely twice its breadth. 6. D. *pectinata*. Frond pinnate. Main-ſtalk winged upwards. Leaflets crowded, nearly oppoſite, pinnatifid; ſegments lanceolate, obtuſe, the lowermoſt palmate. For this beautiful ſpecies we are obliged to Mr. Menzies, who found it in the Sandwich iſlands. It is of a richer green than the foregoing. *Frond* linear-lanceolate, a foot high, with a ſhort ſtalk. *Leaflets* numerous, crowded, nearly if not quite oppoſite, ſcarcely above an inch long, linear-lanceolate, bluntiſh, cut into ſeveral lanceolate bluntiſh ſegments; all ſimple, except here and there one which is ſlightly cloven, and the firſt at the baſe of each leaflet at its upper edge, which is palmate. *Lines* rather longer, and much narrower, than in the laſt. 7. D. *vivipara*. (Cœnopteris vivipara; Berg. in Act. Nov. Petrop. v. 6. 250. t. 7. f. 3. Sw. Fil. 89. Acroſtichum viviparum; Linn. Suppl. 444.) Frond doubly

bly pinnate. Leaflets linear-lanceolate, acute, ſimple, cloven, palmate or pinnatifid. Gathered by Sonnerat in the iſles of Mauritius and Bourbon, and communicated by Thouin to the younger Linnæus, who candidly obſerves that "it but ill agrees with the generic character of *Acroſticum*, but that its fructification comes forth as in A. *ſeptentrionale* and *auſtrale*." This is correct, if the direction in which the cover ſeparates be overlooked, and this no one had then thought of. The *frond* has a broadiſh-lanceolate, pointed form, and is doubly pinnate. Its primary diviſions are oppoſite, ſomewhat crowded, linear-lanceolate, taper-pointed, ſubdivided into numerous alternate *leaflets*, of which the uppermoſt are linear-lanceolate, acute, undivided; the next cloven; thoſe ſtill nearer the baſe palmate or pinnatifid, all the ſegments being uniform. *Lines* ſolitary in each leaflet or ſegment, very long and narrow. Sometimes the ſeeds germinate upon the plant, and the inverſely-heart-ſhaped ſeed lobes are very apparent. 8. D. *cicutaria*. (D. tripinnata; Cav. Leccion. 259? Cœnopteris cicutaria; Sw. Fil. 88. Aſplenium cicutarium; Sw. Prod. 130. A. criſtatum; La Marck Encycl. v. 2. 310. Filix pinnulis criſtatis; Plum. Fil. 34. t. 48 A. Petiv. Fil. t. 5. f. 8. Rutæ murariæ accedens filicula, &c.; Sloane Jam. v. 1. 92. t. 52. f. 3.) Frond doubly pinnate. Leaflets crowded, pinnatifid and palmate, ſomewhat wedge-ſhaped; ſegments elliptical, obtuſe. Not rare in Jamaica, or other Weſt Indian iſlands. *Frond* from one to two feet high, dark green, doubly pinnate in an alternate order. *Leaflets* ſomewhat ovate or obovate, very much crowded, pinnatifid or palmate, eſpecially the firſt ſegment of each leaflet, which is broad and wedge-ſhaped; the reſt are elliptical inclining to lanceolate, and obtuſe. *Lines* ſhortiſh, brown. 9. D. *microphylla*. Frond doubly pinnate. Leaflets doubly pinnatifid; ſegments uniform, linear. Cover jagged. Brought by Mr. Menzies from the Sandwich iſlands. The *frond* is three feet or more in height, far more compound than in any other known ſpecies; inſomuch that each conſiſts, at a very moderate computation, of at leaſt a million of ſegments; and as ten capſules, if not more, may be reckoned to each ſegment, one with another, the quantity of ſeeds produced by each plant will be found ſo immenſe, that if they and their offſpring were to increaſe for a few years at the ſame rate, the land of the whole globe would be covered with this fern, as, according to Linnæus's computation, the offſpring of one haddock would in twenty years fill up the whole ocean. The principal diviſions of the *frond* very much reſemble the leaves of *Achillea millefolium*. They are alternate, and alternately pinnate, each *pinna* being in like manner doubly and deeply pinnatifid, of a dark green; the ultimate ſegments uniform, about a line in length, linear, or ſomewhat lanceolate, bluntiſh, often with a minute curved point. *Dots* dark brown, chiefly on the lowermoſt ſegments. *Covers* broadiſh, tranſparent, brown, jagged or criſped. 10. D. *rhizophylla*. (Cœnopterus rhizophylla; Sm. Pl. Ic. ex Herb. Linn. t. 50. Sw. Fil. 88.) Frond doubly pinnate, taking root at the point. Leaflets ſtalked, obovate, ſomewhat falcate; the lowermoſt lobed. Gathered in Hiſpaniola, by M. Thierry de Menonville. *Frond* a ſpan long, darkiſh-green, lanceolate, taking root by the naked point of its ſtalk, alternately doubly pinnate, ſmooth. *Leaflets* on ſhortiſh ſtalks, rather diſtant, broad, obovate, obtuſe, ſomewhat falcate or curved, now and then obſcurely notched, the lowermoſt eſpecially lobed. *Dots* broad and ſhort, ſolitary towards the baſe of each leaflet at its upper edge. Dr. Swartz now refers Sloane's t. 52. f. 3. to this ſpecies, which we are confident he had originally cited with much more propriety under D. *cicutaria*, which it repreſents in a young and barren ſtate. 11. D. *myriophylla*. (Cœnopteris myriophylla; Sw. Fil. 88.) Frond twice or thrice pinnate. Stalks winged. Leaflets obovate, obcordate, or lobed. Gathered in Jamaica by Dr. Swartz, one of whoſe ſpecimens has been given us by Mr. Menzies. It is ſmaller than the laſt, and of a pale green, appearing curiouſly ſpeckled under the microſcope. *Stalks*, both general and partial, all equally winged, and twice or thrice compounded in an alternate manner. *Leaflets* a line or rather more in length, ſtalked, obovate, obtuſe, entire, keeled, ſometimes cloven ſo as to be inverſely heart-ſhaped, more rarely three-lobed. *Lines* pale brown. The name of this ſpecies would have been much more applicable to our D. *microphylla*, had it not been pre-engaged. 12. D. *heterophylla*. Frond deeply pinnate. Barren leaflets rhomboid, cut and ſerrated; fertile ones ſuperior, deeply pinnatifid; their ſegments linear; ſometimes forked. A native of New South Wales, near Port Jackſon, from whence we received it through the hands of the late R. Moleſworth, eſq. It is one of the fineſt and moſt remarkable of its genus. *Frond* about two or three feet high, of a paliſh, ſomewhat glaucous green, ſmooth, broad, doubly and alternately pinnate. The lower *leaflets*, till towards the middle of the frond, are barren, above an inch long, of a broad lanceolate figure, inclining to rhomboid; dilated, lobed, and approaching to auricled, at their baſe; their margin jagged and ſerrated: all the upper leaflets of the ſame dimenſions, but very deeply pinnatifid, their ſegments alternate, linear, acute, entire, ſome of the lower ones occaſionally cloven or forked. The upper edge of each ſegment is almoſt entirely occupied by a long *line* of fructification, whoſe reflexed, ſmooth, whitiſh *cover* is very conſpicuous. *Capſules* very numerous, brown. S.

DAREC, in *Geography*, a town of Perſia, in the province of Segeſtan; 60 miles S. of Zareng.

Darec *de Camuna*, a town of Perſia, in the province of Mecran; 180 miles W. of Kidge.

DAR-El-Hamara, a town of Africa, in the kingdom of Fez, ſaid to have been built by the Romans; the trade of which conſiſts principally in corn and oil. N. lat. 34° 20′. W. long. 8° 46′.

DAREMMA, in *Ancient Geography*, a town of Aſia, placed by Ptolemy in the interior of Meſopotamia.

DAREN, in *Geography*, a river of Wales, in the county of Caernarvon, which runs into the ſea; 15 miles S.W. of Pwllhely.

DARENT, a river of England, in the county of Kent, which runs into the Thames, 3 miles N. of Dartford. The mouth near the Thames is called *Dartford Creek*.

DAREW, a town of Lithuania, in the palatinate of Novogrodek; 34 miles S.S.E. of Novogrodek.

DAR-FUR, a country in the interior part of Africa, extending, according to Mr. Browne's map, from about 11° to 15° 20′. N. lat. and in its greateſt breadth from about 26° to 29° 15′. E. long. The capital of this country is *Cobbé*; which ſee. The other towns of principal note are Sweini, Kûrma, Cubcabia, Rîl, Cours, Shoba, Gidid, and Gellé. Sweini is ſituated almoſt north of Cobbé, at the diſtance of more than two days' diligent travelling. Kûrma, or Kourma, is a ſmall town, W. by S., at the diſtance of $4\frac{1}{2}$ or 5 hours, 12 or 13 miles. Cubcabia, a more conſiderable place, is nearly due weſt, at the diſtance of $2\frac{1}{2}$ days. Cours, a place of little note, N.W. by W. at $5\frac{1}{2}$ hours travelling from Cobbé. Rîl is ſomewhat more than three days removed from it, in the direction S.S.E., or about 60 miles. Shoba is $2\frac{1}{2}$ days from Cobbé. Gidîd is nearly S.E., and about $1\frac{1}{2}$ day from Cobbé. Gellé is not far from Cubcabia, but ſome hours further removed to the ſouth. (See the reſpective

tive articles.) The perennial rains, which fall in Dar-Fûr, from the middle of June till the middle of September, in greater or leſs quantity, but generally both frequent and violent, ſuddenly inveſt the face of the country, which was before dry and ſterile, with a delightful verdure. As ſoon as the rain begins, the proprietor, and all the aſſiſtants he can collect, go out to the field, and having made holes at about two feet diſtance from each other, with a kind of hoe, the *dohn* is thrown into them, and covered with the foot. The time for ſowing the wheat is nearly the ſame. The *dohn* remains nearly two months before it is ripe; the wheat about three. Wheat is ſcarce, and as the preſent ſultan forbids the ſale of it till he is ſupplied, it is with difficulty procured by purchaſe. The *mahrick*, or greater *kaſſob*, which is a larger grain than the *dohn*, is common, and a ſmall quantity of ſeſamum is ſown. Their beans are different from ours; and in their gardens are *bamea*, *meluchia*, lentils (*adis*), kidney beans (*lubi*), and ſome others. The water-melons, and that called at Cairo *abd-el-awi*, together with ſome other kinds, abound during the wet ſeaſon, and even before, if they be watered. Wood is found abundantly in this country; and there are ſeveral ſpecies of trees, but none that produce fruit worth gathering, unleſs it be the tamarind. The dates are few, and their fruit ſmall, dry, and deſtitute of flavour. Indeed this tree ſeems not indigenous in the country, but to have been tranſported thither from the neighbourhood of the Nile, Dongola, Sennaar, &c. The quadrupeds, or at leaſt the diſtinct ſpecies of them, are not very numerous. The only good horſes which the inhabitants of this country poſſeſs, are bred in the country of Dongola, and by the Arabs E. of the Nile. The Arabs feed them with milk, and they are ſeldom caſtrated. None of the horſes of Soudân are ſhod. Two or three diſtinct ſpecies of ſheep (*ovis aries*) exiſt in Soudân. Their meat is not ſo good as that of the Egyptian ſheep. They are covered with coarſe wool, reſembling hair, and apparently unfit for any manufacture. The goats (*capræ cerviciporæ*) are more numerous than the ſheep, and their fleſh is cheaper; they are not very different from thoſe of Egypt, but ſomewhat larger. The aſs reſembles that of Great Britain, in its form, and indocile nature. The only good ones are brought by the Jelabs from Egypt; but they are not much uſed for riding. The bull is ſometimes caſtrated; but of the animals ſlaughtered in the market, the emaſculated are feweſt in number; nor is any preference manifeſted to the one above the other as an article of food. The horned cattle, fed by the tribes in the vicinity of the rivers, amount to a great number, and the tribute paid on their account to the monarch forms a valuable part of his revenue. The beef is good. Cows are alſo abundant; but their milk is not very palatable; ſome of the ſettlers make of it a kind of cheeſe; but the inhabitants are not generally acquainted with that proceſs. The camels of Fûr are of a mixed breed, and are found of all colours and ſizes. Thoſe that are brought directly from the weſt or ſouth are large, ſmooth-haired, and in colour moſt frequently approaching to white, or light brown. Many of thoſe of Kordofân are black; and they are leſs docile than the others. There are few countries where this animal abounds more than in Dar-Fûr. When the male camel is unruly, they ſometimes deprive him, by a cruel operation, of one or both of his teſticles. The fleſh of the camel, particularly the female, which is fattened for the purpoſe, is much uſed for food, and the milk is alſo much eſteemed. The camels of Fezzan, and other weſtern countries, are reckoned for labour ſuperior to thoſe of Fûr, and fetch a higher price. The former are larger, and able to carry a greater burden, but leſs capable of enduring thirſt. Soudân affords many fine dromedaries; but thoſe of Sennaar are moſt celebrated. It is ſaid, that, in travelling, they will proceed at the rate of 10 miles an hour, for 24 hours.

The dogs of Dar-Fûr are of the ſame kind with thoſe of Egypt; the common houſe-cat is ſcarce; and it is ſaid there are none beſides thoſe which were brought originally from Egypt. They are of the ſame kind with ours. The wild or ferocious animals are, principally, the lion, the leopard, the hyæna, the wolf, the jackal, and the wild buffalo; but they are not commonly ſeen in the cultivated parts of the empire, except the hyæna and the jackal, which come in herds of ſix, eight, and often more, into the villages at night, and are very rapacious. They will kill dogs and aſſes, even within the houſes; nor are they greatly alarmed at the ſight of a man or the ſound of fire-arms. The people of the country dig pits for them, and lying in ambuſcade, when one is entrapped, ſtun him with clubs, or pierce him with their ſpears. The jackal is harmleſs, but his hideous cry ſounds to a great diſtance. To the animals already enumerated we may add the elephant, the rhinoceros, the camelopardalis, the hippopotamus, and the crocodile. Elephants are ſeen in large herds of four or five hundred, and it is ſaid that even 2000 of them are ſometimes ſeen together. They are hunted on horſeback; the hide is applied to many uſeful purpoſes, and the fleſh is much eſteemed for food. The buffalo is not found tame in Sondân: the wild one is hunted by the Arabs, and uſed as food. The hippopotamus is killed for his ſkin, which, being very tough, makes excellent ſhields and whips; and alſo for his teeth, which are ſuperior to ivory. The horn of the rhinoceros is a valuable article of trade, and is carried to Egypt, where it is ſold at a high price, and uſed for ſabre hilts and various other purpoſes. The antelope and the oſtrich are very common. The civet cat is common here; and leopards, though common in a certain diſtrict, are not found near the ſeat of government. The Arabs hunt them, ſtrip off the ſkin, which they ſell, and often eat the fleſh; imagining that it generates courage and a warlike diſpoſition. The other quadrupeds are the jerboa or mus jàculus, the abelang or ſimia Æthiops, the porcupine or hiſtrix cieſtria, and the kandar, or ſimia cynamolgos. The birds are the oriental dotterel, Guinea fowl, Egyptian quail, white-headed vulture, green peroquet, common pigeon, red partridge, owls, though not common, and columba turtur, very common. The white-headed vulture is exceedingly ſtrong, and very long-lived. The fiſh in the river Ada conſiſt of nearly the ſame ſpecies with thoſe of the Nile in Upper Egypt: they are caught in wicker-baſkets, and uſed for food. The chameleon abounds in Dar-Fûr, and alſo the viverra ichneumon, and almoſt all the ſpecies of lizard are ſeen here. Of ſerpents, the coluber hayé of Egypt, the coluber vipera, and the anguis colubrina, were the only ſpecies ſeen by Mr. Browne. The Fûrians have not the art of charming them, like the Egyptians and Indians. The white ant, or termites, is very numerous, and exceedingly deſtructive; a bull's hide is no ſufficient defence againſt it. The common bee alſo abounds, but they have no hives; and the wild honey is commonly of a dark colour and unpleaſant taſte. The locuſt of Arabia, gryllus, is very common, and is frequently roaſted and eaten, particularly by the ſlaves.

Of metals, the number found in the diſtrict viſited by Mr. Browne is ſmall; but to the ſouth and weſt, thoſe of almoſt all deſcriptions are to be met with. Copper of the fineſt quality, and iron, are very common either in Fûr or its vicinity. Silver, lead, and tin, are brought hither from Egypt. Of gold, in the countries to the eaſt and weſt, the ſupply is abundant. Alabaſter and various kinds of marble

exiſt

exiſt within the limits of Fûr. The rocks chiefly conſiſt of granite. Of ſtone adapted to building, or convertible into lime, there is either none, or the quantity muſt be extremely ſmall. Foſſile ſalt is common within a certain diſtrict; and there is a ſufficient ſupply of nitre, but it is applied to no uſe. A quantity of ſulphur is brought by the Arabs from the ſouth and weſt. The characteriſtic marks of thoſe trees which moſt abound in Dar-Fûr are their ſharp thorns, and the ſolid unperiſhable quality of their ſubſtance. Of the vegetables, which are very various, we can only ſelect the following, *viz.* the ſolanum ſanctum, or night-ſhade, uſed for food, two kinds of beans, which are ſtrung and uſed as ornaments by the women, the common onion, garlick, water-melon, cucumber, the gourd uſed for food when freſh, and ſerving for drinking veſſels and other purpoſes, the colocynthis, very common, the uſhar, a plant ſo common as to cover whole plains, and uſed under mats and goods to guard them from the depredations of the white ant; hemp much cultivated, rice, cayenne-pepper, ſeſamum uſed for food, and by the great for fattening their horſes, Mahreik and dohn, the holcus dochna of Forſkal, which are the baſis of their proviſion, particularly the latter, and tobacco, which ſeems to be of native growth.

The government is a kind of deſpotic monarchy, ſimilar to that of other countries, in which the Mahometan religion is profeſſed; the ſovereign of Dar-Fûr ſpeaks in public of the ſoil and its productions as his perſonal property, and of the people as little elſe than his ſlaves. The only perſons to whom he pays any great attention are his ſoldiers. His power in the provinces is delegated to officers, who poſſeſs an authority equally arbitrary. On the death of the monarch, the title deſcends of right to the eldeſt of his ſons; though the ſucceſſion is often diverted under various pretences.

The rainy ſeaſon in Dar-Fûr is called "Harif;" and this is of great importance to the country. The changes of the wind are not periodical, but inſtantaneous. With a ſoutherly wind the greateſt heat prevails, and with a ſouth-eaſt wind the greateſt quantity of rain falls. The breeze from the north and north-weſt is moſt refreſhing; and the hot and oppreſſive winds, which fill the air with thick duſt, blow conſtantly from the ſouth. The harveſt is conducted in a very ſimple manner. The women and ſlaves of the proprietor are employed to break off the ears with their hands, leaving the ſtraw ſtanding, which is afterwards applied to buildings and various other uſeful purpoſes. They are then carried away in baſkets. When thraſhed, which is awkwardly and incompletely performed, they expoſe the grain to the ſun till it becomes quite dry; and then dig a hole in the earth, the bottom and ſides of which are covered with chaff to exclude the vermin. This cavity is filled with grain, which is covered firſt with chaff and then with earth. When it is wanted for food, they grind it, and boil it in the form of polenta; and eat it either with freſh or ſour milk, or, more frequently, with a ſauce made of dried meat pounded in a mortar, and boiled with onions, &c. The Fûrians uſe little butter. As a ſubſtitute for bread, cakes of the ſame material are baked on a ſmooth ſubſtance prepared for the purpoſe, which are very thin and not unpalatable. Theſe are eaten with the above-mentioned ſauce, or with milk, or merely with water; but in whatever form the grain be uſed, the rich cauſe it to be fermented before it be reduced to flour, which gives it a very agreeable taſte. They alſo eat the dohn raw, moiſtened with water, without either grinding it or ſubjecting it to the operation of fire.

In the beginning of the wet ſeaſon, or "Harif," the king goes out with his meleks and the reſt of his train, not only to obſerve the ſowing of the ſeed, but to take part in the operation, by making ſeveral holes with his own hand. Whether this uſage be antecedent to the introduction of Mahometaniſm into the country, is not known; but as it is attended with no ſuperſtitious obſervance, it would rather ſeem to belong to that creed. In order to make ſome eſtimate of the population of the country, Mr. Browne directed his attention to the war levies. Hence he concludes, that the number of perſons within the empire cannot much exceed 200,000. In the whole country there are only eight or ten towns of great population. Among the people of Dar-Fûr the Arabs are very numerous; they lead a wandering kind of life in the frontiers, and breed camels, oxen, and horſes; and they are not in ſuch a ſtate of abſolute dependence as to contribute effectually to the ſtrength of the monarch in war, or to his ſupplies in peace. After the Arabs we may mention the Zeghawa, which once formed a diſtinct kingdom, whoſe chief went to the field wiah a thouſand horſemen from among his own ſubjects. The Zeghawa ſpeak a different dialect from the people of Fûr. We muſt then enumerate the people of Bêgo or Dageou, who are now ſubject to the crown of Fûr, but are a diſtinct tribe, which formerly ruled the country. Kordofân, which is now ſubject to Fûr, and a number of other ſmaller kingdoms, as Dar-Berti, &c. &c. Dar-Rugna, which has a king, who is, however, dependent, but more on Bergoo than on Fûr. What are the numbers of each it is not eaſy to aſcertain.

The buildings of the Fûrians are very plain and ſimple. A ſlight roof ſhelters them from the ſun and rain; the walls are built of clay, and the people of higher rank cover them with a kind of plaſter, and colour them red, white, or black. The apartments are of three kinds; one is called a "donga," which is a cube commonly formed in the proportion of 20 feet by 12. The four walls are covered with a flat roof, conſiſting of light beams laid horizontally from ſide to ſide; over this is ſpread a ſtratum of uſhar, or ſome other light wood, or coarſe mats; a quantity of dried horſe's or camel's dung is laid over this, and the whole is finiſhed with a ſtrong and ſmooth coating of clay. The roof has a ſlight obliquity, having ſpouts to carry off the water. The "donga" is provided with a door, conſiſting of a ſingle plank, hewn with the axe, as the plane and ſaw are unknown. It is ſecured by a padlock, and thus conſtitutes the repoſitory of all their property. The next apartment is called a "kournak," which is ſomewhat larger than the donga, having no door, and having no other roof but thatch, like our barns, compoſed of kaſſob, the ſtraw of the maize, and ſupported by light rafters. This is cooler in ſummer than the more cloſely covered buildings, and is appropriated to receiving company, and ſleeping. The women are commonly lodged, and dreſs their food in another apartment of the ſame kind as the laſt, but round, and from 15 to 20 feet in diameter, and this is called "ſukteia." A houſe in which there are two "dongas," two "kournaks," and two "ſukteias," is conſidered as a large and commodious one, adapted to the uſe of merchants of the firſt order. A "rukkuba" (ſhed) is frequently added; and this is merely a place ſheltered from the ſun, where a company ſit and converſe in the open air. The interior fence of the houſe is commonly a wall of clay; the exterior univerſally a thick hedge, conſiſting of dried branches of acacia and other thorny trees, which ſecures the cattle, and prevents the ſlaves from eſcaping.

The troops of Dar-Fûr are not famous for military ſkill, courage, or perſeverance. In their campaigns, therefore, they

they chiefly rely on the Arabs, who accompany them, and are more properly tributaries to the ſultan than his ſubjects. In their perſons the Fûrians are not remarkable for cleanlineſs, though obſerving as Mahometans all the ſuperſtitious formalities of their religion; their hair is rarely combed, or their bodies completely waſhed. The hair of the pubes and axillæ they uſually exterminate; but they know not the uſe of ſoap, ſo that with them the poliſhing of the ſkin with unguents ſupplies the want of perfect ablutions, and real purity. An inveterate animoſity ſubſiſts between the natives of Fûr, and thoſe of Kordofân, which ſeems to be owing to their relative poſitions, Kordofân lying in the way between Dar-Fûr and Sennaar; and this is the moſt practicable communication between the former and Mecca. Nothing reſembling current coin is known in Soudân, unleſs it be ſmall tin rings, the value of which is arbitrary; gold, not being found within the limits of Fûr, is ſeldom ſeen in the market. The articles chiefly current are all ſuch as belong to their dreſs, ſuch as cotton cloths, beads, amber, kohhel, rhéa, ; and on the other hand oxen, camels, and ſlaves.

The diſpoſition of the people of Fûr appears to be more cheerful than that of the Egyptians. Prone to intoxication, but unprovided with materials or ingenuity to prepare any other fermented liquor beſides "buza," with this alone their exceſſes are committed; and this liquor they freely uſe, though it is prohibited by an ordinance of the ſultan, under pain of death. This buza has a diuretic and diaphoretic tendency, which precludes danger from their exceſs in the uſe of it. In this country dancing is a favourite and common amuſement, both among the men and women; and even the ſlaves dance in fetters to the muſic of a little drum. The vices of thieving, lying, and cheating in bargains, are very prevalent; and ſo much are they addicted to fraud, that in buying and ſelling the parent glories in deceiving the ſon, and the ſon the parent. Of the privilege of polygamy, allowed by their religion, they freely avail themſelves, ſo that the Fûrians take both free women and ſlaves without limitation. The ſultan has more than 100 free women, and many of the meleks have from 20 to 30. The females here are not under ſuch reſtraints as they are in many other countries. None attempt to conceal their faces but the wives of the great, who do it from an affectation of delicacy, more than from real modeſty; thoſe of the middle and inferior rank are always contented with the ſlight covering of a cotton cloth wrapped round their waiſt, and, occaſionally, another of the ſame form, materials, and ſize, artleſsly thrown over the ſhoulders. They never eat with the men. Some of the moſt labourious domeſtic offices in this country are performed by the women; they not only prepare the ſoil and ſow the corn, but aſſiſt in gathering it. They alſo grind it, and convert it into bread. Their clay buildings are chiefly conſtructed by the women. Their labour, however, is accompanied with a conſiderable degree of authority and influence in domeſtic concerns.

Previouſly to the eſtabliſhment of Iſlamiſm, about a century and a half ago, and kingſhip, the people of Fûr ſeem to have formed wandering tribes, in which ſtate many of the neighbouring nations remain to this day. In their perſons they differ from the negroes of the coaſt of Guinea; their hair is generally ſhort and woolly; and their complexion is for the moſt part perfectly black. But the Arabs, who live among them, and intermarry with them, retain their diſtinction of feature, colour, and language. In moſt of the towns, except Cobbé, which is the chief reſidence of foreign merchants, and even at court, the vernacular idiom is in more frequent uſe than the Arabic, and their judicial proceedings are conducted in both languages. Next to the officers of government, the "faqui," or learned man, *i. e.* the prieſt, holds the higheſt rank. Their learning, however, ſolely conſiſts in the knowledge of the Koran. The revenues of Dar-Fûr ariſe from ſeveral ſources. On all merchandize imported the king has a duty amounting in ſome inſtances to near a tenth. When the merchants of Egypt leave Dar-Fûr on their return to their own country, another tax is demanded on the ſlaves exported. All forfeitures for miſdemeanours are due to the king, and theſe amount to a conſiderable value. Every judicial proceeding is brought before the king, attended with a preſent proportioned to the rank and property of the perſons concerned. The king is entitled to a tenth of all the merchandize, and eſpecially ſlaves, brought from all quarters, and in caſe of an expedition to procure ſlaves by force, this tenth becomes a fifth. At a particular time of the year, when a ceremony called "leathering the kettle-drum," takes place, all the principal people muſt attend with preſents, which furniſh a very conſiderable addition to the royal revenue. Preſents are cuſtomary on many other occaſions. But one of the principal ſources of revenue is the tribute of the Arabs, who breed oxen, horſes, camels, and ſheep. Moreover, every village is obliged to pay annually a certain ſum in corn, dohn, which is collected by the king's ſlaves. The king is alſo the chief merchant in the country; and he diſpatches, with every caravan to Egypt, a great quantity of his own merchandize, and employs his ſlaves and dependants to trade for him.

The people of Fûr are repreſented as uſing many ſuperſtitious ceremonies at the "leathering of the kettle-drum;" among others, it is ſaid, they put to death in the form of a ſacrifice a young boy and girl. Even to this day many idols are worſhipped by the women of the ſultan's haram; and the mountaineers offer a kind of ſacrifice to the deity of the mountains, when they are in want of rain. For further particulars we muſt refer to Mr. Browne's ample and intereſting account of Dar-Fûr, and the adjacent countries, in his "Travels in Africa, &c. from the year 1792 to 1798."

DARGAN, a town of Aſia, in the country of Charaſm, ſituated on the Gihon.

DARGASIN, a town of Perſia, in the province of Irac-Agemi; 48 miles N.E. of Amadan.

DARGASP, a town of Perſia, in the province of Segiſtan, ſeated on the river Hinmand.

DARGEL, a river of the county of Wicklow, in Ireland, which falls into the Iriſh ſea at Bray. In its courſe it paſſes through ſome very romantic glens, one of which, in the demeſne of lord viſcount Powerſcourt, is peculiarly ſtriking, and is much frequented. In the neighbourhood is a very fine fall of water, which is generally viſited at the ſame time. An excurſion to the Dargel and water-fall never fails to delight the lovers of pictureſque ſcenery, and deſcriptions of them may be found in moſt of the travels through Ireland.

DARGIDUS, in *Ancient Geography*, a river of Aſia, in Bactriana; which had its ſource in mount Paropamiſus, and after a northern courſe diſcharged itſelf into the Oxus.

DARGIES, in *Geography*, a ſmall town of France, in the department of the Somme; 6 miles S. of Poix.

DARGOMANES, in *Ancient Geography*, a river of Aſia, in Bactriana, which ran into the Oxus; ſome have ſuppoſed that it is the Morga or Marou of modern times.

DARGUN, or DRAGUN, in *Geography*, a ſmall town of Germany, in the duchy of Mecklenberg Schwerin, in the diſtrict of Roſtock, with an ancient ducal palace, which was originally a convent of Benedictine monks, founded in 1149.

DARIC, in *Antiquity*, a famous piece of gold, firſt coined, as ſome have ſaid, by Darius the Mede, about 538 years

B. C.; probably during his ſtay at Babylon, out of the vaſt quantity of gold which had been accumulated in the treaſury: but as others ſay, by Darius ſon of Hyſtaſpes, who began his reign 521 years B. C. It is much queſtioned, however, whether the Athenians ever ſtruck any gold coin, while they were a free and flouriſhing people. The hiſtoriographers, indeed, tell us, the χρυσοῦς Ἀττικός was equal to the daric, and ſpeak of gold mines at Laurium; but no ancient writer mentions ſuch a coin, and all agree that the mines at Laurium were ſilver. That they had no gold, even at the beginning of the Peloponneſian war, appears from the account given by Thucydides, (lib. xi. c. 13.) of the drachma, then in the Acropolis, which conſiſted of ſilver in coin, and gold and ſilver bullion: but he would certainly have mentioned gold in coin, if there had been any. From Babylon the Perſian daric was diſperſed over the Eaſt, and alſo into Greece; ſo that this coin, which was alſo called ſtater, was the gold coin beſt known in Athens in ancient times. The ſize and weight of theſe darics have not been accurately aſcertained. Joſephus, cited by Arbuthnot, ſays they were equal to the didrachm in weight, and worth 50 Greek drachmæ. But many authors, particularly Xenophon, inform us, they were didrachms, and worth 20 ſilver drachmas. According to Dr. Bernard, the daric weighed two grains more than one of our guineas; but as it was very fine, and contained little alloy, it may be reckoned worth about twenty-five ſhillings of our money. Plutarch informs us, that the darics were ſtamped on one ſide with an archer clothed in a long robe, and crowned with a ſpiked crown, holding a bow in his left hand, and an arrow in his right; and on the other ſide with the effigies of Darius. All the other pieces of gold of the ſame weight and value, that were coined by the ſucceeding kings both of the Perſian and Macedonian race, were called darics, from Darius, in whoſe reign this coin commenced. Of theſe there were whole darics and half darics: and they are called in thoſe parts of Scripture written after the Babyloniſh captivity, adarkonim; and by the Talmudiſts, darkonoth. Greaves ſays that the daric is ſtill found in Perſia; but it is certainly very ſcarce, and perhaps of doubtful antiquity. Theſe were moſtly melted down by Alexander the Great upon his conqueſt of Perſia. There is one of them in lord Pembroke's cabinet, which weighs 129 grains, and ſhews them to have been didrachms on the Eubœic or Attic ſtandard. Suidas in Δαρεικός. Bernard de Ponder, &c. p. 171. Prideaux's Conn. vol. i. p. 182, &c. Phil. Tranſ. vol. lxi. part 2. art. 48. Pinkerton's Eſſ. on Medals, vol. i. ſect. 17.

DARIAUSA, in *Ancient Geography*, a town of Aſia, in the interior of Media.

DARIDNA, a town of Paphlagonia. Steph. Byz.

DARIEN, in *Geography*, a poſt-town of America, in M'Intoſh county and ſtate of Georgia, near the heights of which the north channel of Alatamaha river flows, about 20 miles above Sapalo iſland, and 10 below fort Barrington: 47 miles S.S.W. of Savannah. N. lat. 31° 23′. W. long. 80° 14′.

DARIEN, *Gulf of*, the mouth of a large river, or an arm of the ſea, in a province of South America, of the ſame name, running up into the land for a conſiderable diſtance, and opening into the Caribbæan ſea, or Spaniſh main; about N. lat. 8°, and W. long. 76° 30′. In this gulph are three iſlands of conſiderable ſize, *viz.* Golden iſland; another, the largeſt of the three, and the iſland of Pines, beſides ſome ſmaller ones.

DARIEN, *Iſthmus of*, a province of the vice-royalty of New Granada, in South America; and the northern part of Terra Firma; extending on both ſides of the gulf of the ſame name; and from the proximity of the city of Panama and a conſiderable coaſt on that bay, reaching as far as the diſtrict of Zinu, with a length of ſhore on the Caribbæan ſea. It is bounded on the north by the Caribbæan ſea, or Spaniſh main, on the eaſt by the province of Carthagena, on the ſouth by the bay of Panama, Choco, and the country of Popayan, and on the weſt by Veragua and part of the Pacific ocean. It is ſometimes called Terra Firma Proper, to denote that, however narrow this iſthmus, in the part of it which adjoins to or includes Panama, ſometimes called the Iſthmus of Panama, it was firm land, or belonged to the continent: or rather, becauſe the name was applied indifferently to this and the adjacent province of Veragua in North America, aſſigned as a dukedom to Colon or Columbus, and diſcovered by that great navigator to be certainly continental, when he explored the harbour of Portobello, on his fourth voyage in 1502. This province, which is the largeſt of thoſe in Terra Firma, is about 260 miles in length, and about 80 miles in medial breadth, forming a kind of bow or creſcent about the great bay of Panama, in the Pacific ocean, or South ſea. Its breadth is only about 37 miles from Portobello to Panama, the two chief towns of the province. This neck of land, which, as it were, binds together the continents of North and South America, is ſtrengthened by a chain of lofty mountains ſtretching through its whole length, and rendering it a ſolid barrier ſufficient to reſiſt the impulſe of the oppoſite oceans. The rocky mountains here evince the impracticability of a canal; but by aſcending to a higher latitude northwards, and joining the head of Nicaragua lake to a ſmall river, which runs into the Pacific ocean, a communication might be formed between the two ſeas; and by digging 30 miles through a level low country, a tedious navigation of 10,000 miles round cape Horn might be avoided. Such a junction might in a ſeries of years wear away the ſolid parts of the iſthmus, and form a broad ſtrait between the oceans; in which caſe the gulf ſtream, being turned into a different channel, might ceaſe, and a voyage round the world be much expedited. Neither of theſe oceans fall in at once upon the ſhores, but are intercepted by a great many valuable iſlands, that lie ſcattered along the coaſt, both in the bay of Panama, and in the gulf of Darien. The mountains of Darien are covered with almoſt inacceſſible foreſts. From the tops of ſome of theſe the Spaniards firſt diſcovered the South, or Great Pacific ocean, in the year 1513, and called it the South ſea, becauſe they croſſed the iſthmus from the North ſea; though in reality the Pacific ocean lies weſt of the main land of America. Valleys in that moiſt climate, where it rains two-thirds of the year, are marſhy, and ſo frequently overflowed, that the inhabitants find it neceſſary, in many places, to build their houſes upon trees, in order to elevate them at ſome diſtance from the damp ſoil, and the odious reptiles generated in the putrid waters. Large rivers run down with an impetuous current from the high grounds. In a region thinly inhabited by wandering ſavages, ſingularly wild and ferocious, the hand of induſtry has done little or nothing to mitigate or correct theſe natural diſadvantages. Although ſome of the rivers which water this country are moderately large, yet few of them are navigable, on account of the bars and ſhoals at their mouths. On the N. coaſt the rivers are generally very ſmall, for as they moſtly riſe from the main ridge, which lies near the ſhore, their courſe is very ſhort. The river of Darien, indeed, is very large; but its depth at the entrance does not correſpond to the extent of its mouth, though farther in it is of ſufficient depth. But from thence to Chagre, through the whole length of this coaſt, the rivers are little better than brooks.

brooks. Some of the rivers of this province bring down gold duſt, and on the coaſt are valuable pearl fiſheries.

This province might be of great importance to the Spaniards; and, indeed, its ſituation on both in the North and South ſeas, the gold ſands of its rivers, the treaſures of Peru, brought hither and imported into Old Spain, have induced ſeveral adventurers to make attempts for framing advantageous ſettlements at Panama, Portobello, &c. But the country is extremely hot, and the low lands are inundated with continual rains; ſo that the country is ſingularly unhealthy. Portobello, though in many reſpects an advantageous ſituation, is nearly ruined: nor have the Spaniards, though ſufficiently diſpoſed to avail themſelves of advantages that preſented themſelves, been able to form any permanent eſtabliſhments either on the gulf of Darien on the Caribbæan Sea, or that of San Miguel in the Pacific. On the contrary, all the ſtations have been withdrawn, exeept a little fort, which protects the gold mine of Cana, on the frontiers of Choco; and the little garriſon, which comes from Panama, is changed every month. The only products were ſome cotton and tobacco. In 1786 the viceroy of New Granada ſent an expedition againſt the ſavages of Darien, but the Spaniſh troops could not bear the climate. The Indians are ſuppoſed to amount to 30,000 perſons, without chiefs, and acknowledging no authority, ſo that it is impoſſible even to form a laſting treaty.

About 10 years after Columbus had diſcovered the main land of America, the Spaniards ſeriouſly attempted to eſtabliſh a ſettlement in the country. In purſuance of theſe attempts, a feeble colony ſettled in the year 1510, at Santa Maria de Antigoa, on the gulf of Darien, under the command of Vaſco Vagnez de Balboa, who gained the confidence of his countrymen by his diſtinguiſhed courage and conduct. See BALBOA.

For an account of the expedition of the Scots to this province, ſee *Scotch Darien* COMPANY and CALEDONIA.

DARII, in *Logic*, a mode of ſyllogiſms in the firſt figure, wherein the major propoſition is an univerſal affirmative, and the minor and concluſion particular affirmatives. *E. gr.*

DA "They who ſpeak well of every body have many friends."
RI "Some ſpeak well of every one."
I "Therefore ſome have many friends."

DARION, in *Ancient Geography*, a town of Phrygia. Steph. Byz.

DARIOVIGUM, afterwards called *Veneti*, a town of Gaul, in the ſouthern part of Armorica. Cæſar ſays, that this town, which was ſituated on a point of land ſurrounded by the ſea, twice a day, was rich and powerful, and that it had the command of the ſea, and of the whole commerce of Armorica. He took it with difficulty, deſtroyed it, and ſold the inhabitants by public ſale. It was the capital of the *Veneti*.

DARISTANE, a town of Perſia, the inhabitants of which were called *Daritæ*.

DARITIS REGIO, a country of Media.

DARIUS I., in *Biography*, king of Perſia, was the ſon of Hyſtaſpes, a commander under Cyrus the Great; and by Cambyſes he was made governor of the province of Perſia. When Smerdis uſurped the throne, Darius aſſociated himſelf with ſix other perſons, in order that they might deſtroy the tyrant. They ſucceeded; he was killed by the hand of Darius. Afterwards they agreed that the ſeven ſhould repair to the city, and he whoſe horſe firſt neighed ſhould be proclaimed ſole ſovereign. Darius, it is thought, uſed ſome ſpecial means to obtain the crown, and he was accordingly raiſed to the empire of Perſia, B. C. 521. On his acceſſion he married the two daughters of Cyrus, and other wives: and divided the whole empire into twenty governments, and appointed a certain tribute to be paid by each, that of Perſia only excepted. Darius was guilty of ſome cruelties; but he is celebrated in hiſtory for the permiſſion which he gave to the Jews to reſume the rebuilding of their temple, which had been interrupted by the malicious inſinuations of the Samaritans.

In the early part of his reign the Babylonians revolted, nor was it in the power of Darius with all his force to take their city, to which he laid ſiege; at length Zopyrus, one of his principal officers, in zeal for his ſovereign cut off his ears and noſe, and pretending that it was a puniſhment inflicted upon him by the king, went over to the enemy, and obtained their confidence, which he employed to betray the gates of the city to the Perſian army. Darius exerciſed extreme cruelty on the conquered, but beſtowed on his officer Zopyrus the moſt magnificent rewards. Darius next engaged in an expedition againſt the Scythians: he marched with a vaſt army to the Thracian Boſphorus, which he croſſed by a bridge of boats, and after reducing Thrace, advanced to the Danube, which he croſſed, and entered Scythia, but he was obliged to return without gaining any material advantages. Darius is ſaid to have conquered India; but his triumphs did not extend, probably, far into the country. The ſucceſſes of this ſovereign were various; in ſome inſtances his ambition was completely checked, in others he was glad to withdraw his armies with great loſs. In an expedition againſt Greece the enterpriſe was committed to Mardonius, who marched through Thrace into Macedonia, which ſubmitted to his arms; but as he was proceeding ſouthward, his fleet was almoſt wholly ruined by a ſtorm, ſo that he was obliged to return ingloriouſly into Aſia. Darius did not, however, abandon his deſign: he ſent a powerful army, with orders to ſack the cities of Athens and Eretria, and to ſend him all the ſurviving inhabitants in fetters. The Perſians took the iſle of Naxus, and city of Eretria; but they were defeated at Marathon by the Athenians and Plateans, commanded by the celebrated Miltiades. Their fleet was alſo completely unſucceſsful in an attempt to ſurpriſe Athens. He now reſolved to go into Greece himſelf, and iſſued orders to all his ſubjects in the ſeveral provinces of the empire to accompany him in his expedition; but after he had ſpent three years in making the requiſite preparations, a new war was occaſioned by the revolt of Egypt. He then determined to ſend part of his forces againſt the Egyptians, while he marched with the remainder into Greece. When every thing was ready, and Xerxes his ſon declared heir-apparent to the crown, Darius fell ſick and died, in the thirty-ſixth year of his reign. This happened in the year B. C. 485. This ſovereign was endowed with many good qualities: his wiſdom, juſtice, and clemency are warmly commended by the ancients; and when he is compared with the generality of eaſtern deſpots, he may be entitled to the praiſe of juſtice and humanity.

DARIUS II. ſurnamed Ochus, and alſo Nothus, was one of the natural ſons of Artaxerxes Longimanus. He aſcended the Perſian throne in the year 423 B. C. His hiſtory as a ſovereign is but a deſcription of ſucceſſive revolts, terminating in the defeat and death of thoſe who excited them. He died in the 20th year of his reign, and was ſucceeded by his ſon Arſaces, who aſſumed the name of Artaxerxes, and received the appellation of Mnemon from the Greeks, on account of his extraordinary memory. It is related of Mnemon, that while attending upon his father in his laſt hours, he aſked how he could beſt perform the duties of government, to which Darius replied, that he had himſelf

conſtantly acted, to the beſt of his knowledge, in obedience to the dictates of juſtice and religion.

Darius III. named Codomannus, was placed on the throne by Bagoas the eunuch, who had murdered Arſes, the youngeſt ſon of Artaxerxes Ochus. Codomannus did not, however, fully anſwer the expectations of Bagoas, and he reſolved to deſtroy him alſo by poiſon; but the plot was diſcovered, and the perfidious eunuch was obliged to drink the fatal cup himſelf. The whole of this prince's reign is that of a ſtruggle againſt the Macedonian invaſion, the events of which will be found in another part of our work. See Macedonia and Persia. Darius did not take the command of his army in perſon till Alexander advanced into Cilicia. He then proceeded to meet him in all the pomp of royalty; but with a force ill adapted to contend with ſuch an enemy. He reſolved nevertheleſs to hazard a battle, contrary to the advice and opinion of his Greek allies. The battle at Iſſus was fought, and Darius took the command, but fled with ſuch precipitation, that he left behind him his bow, ſhield, and mantle. His camp was plundered, and his mother, wife, and children fell into the power of the conqueror. In vain after this did Darius ſupplicate for an accommodation: Alexander went on in the career of victory, and in a ſecond pitched battle, at Gaugamela, Darius again fought, and again diſgracefully fled. He now loſt Babylon, Suſa, Perſepolis, and all his treaſures, and ſought for perſonal ſafety at Ecbatana; but his misfortunes had alienated the minds of his ſubjects, and he was ſeized by Beſſus, governor of Bactria, who aſſumed the royal authority in his ſtead. Alexander cloſely purſued the uſurper and his captive beyond the Caſpian Straits. Here Darius determined to remain; but his reſolution coſt him his life: he was wounded by his own ſubjects, and left weltering in his blood. Of Polyſtratus, a Macedonian, he beſought a little water, which being brought to him, he deſired that his acknowledgments and thanks might be conveyed to Alexander for his kindneſs and attention to his family, with an earneſt exhortation that he would avenge his death on the traitors. Darius immediately breathed his laſt in the arms of Polyſtratus. This was in the 330th year B. C. being the 50th of the monarch's age, and the 6th of his reign. When his enemy Alexander beheld his rival dead, he is ſaid to have wept over him, to have covered the body with his own cloak, and ſent it to be embalmed, and interred with the remains of the Perſian monarchs. Univerſal Hiſtory.

Dark-Chamber. See Camera-*Obſcura*.

Dark-*Rays*, in *Philoſophy*, are certain emanations from the ſun, which have been recently diſcovered. They are not perceptible to our eyes, but they are manifeſted by their effects. Dr. Herſchel, and Mr. Ritter, are the diſcoverers of theſe emanations. The former of thoſe gentlemen obſerved, that when the rays of the ſun are refracted by a glaſs priſm, and form the coloured ſpectrum upon any ſurface, a thermometer placed beyond the ſpectrum is elevated by the heat of certain rays or emanations, which are by no means viſible; ſo that in fact, if the expreſſion be allowable, there is an inviſible ſpectrum of *calorific* rays, independent of the viſible ſpectrum of coloured rays, formed by the priſmatic refraction of ſolar light. Dr. Herſchel traced the extent of the former, and endeavoured to aſcertain the various intenſities of heat in different parts of it. But a more particular account of theſe inviſible calorific rays will be found under the articles, Solar *heat*, and Rays *of heat*.

Mr. Ritter, on the continent, and, ſoon after, Dr. Wollaſton in England, unknown to each other, diſcovered that the luminous ſolar rays are accompanied with certain other inviſible rays or emanations, which are only cognizable by their chemical effects upon certain ſubſtances, ſuch as muriate and nitrate of ſilver. Theſe rays are more refrangible than the violet rays of the coloured ſpectrum. Dr. T. Young, ſpeaking of theſe inviſible rays of Ritter, in a paper which is to be found in the Phil. Tranſ. for the year 1803, ſays, "I was deſirous of examining the effect of their reflection, from a thin plate of air, capable of producing the well known rings of colours. For this purpoſe I formed an image of the rings, by means of the ſolar microſcope, with the apparatus which I have deſcribed in the journals of the Royal Inſtitution; and I threw this image on paper dipped in a ſolution of nitrate of ſilver, placed at the diſtance of about nine inches from the microſcope. In the courſe of an hour, portions of three dark rings were very diſtinctly viſible, much ſmaller than the brighteſt rings of the coloured, and coinciding very nearly, in their dimenſions, with the rings of violet light that appeared upon the interpoſition of violet glaſs. I thought the dark rings were a little ſmaller than the violet rings, but the difference was not ſufficiently great to be accurately aſcertained; it might be as much as $\frac{1}{30}$ or $\frac{1}{40}$ of the diameters, but not greater. It is the leſs ſurpriſing that the difference ſhould be ſo ſmall, as the dimenſions of the coloured rings do not by any means vary at the violet end of the ſpectrum, ſo rapidly as at the red end."

It appears then, that the ſolar light conſiſts of three different emanations, or of three different kinds of rays; *viz.* the viſible coloured rays, the inviſible calorific rays, and the inviſible rays which are only diſcernible by their chemical effects upon certain ſubſtances. All theſe emanations are intermixed with each other in the direct rays of the ſun; but, being differently refrangible, they are ſeparated from each other by the glaſs priſm, and their preſence is manifeſted by their peculiar properties.

Dark-*Tent*, a portable camera obſcura, made not unlike a deſk, and fitted with optic glaſſes, to take proſpects of landſcapes, buildings, fortifications, &c. See Camera *Obſcura*.

DARKEHMEN, in *Geography*, a ſmall town of Pruſſia, in that part of Eaſtern Pruſſia which is called Lithuanian Samland, in the diſtrict of Inſterburg, remarkable for its woollen cloth manufactures, and for a colony of Saltzburghers, who ſettled in the year 1732.

DARKNESS means the abſence or the want of light. In common language we conſider ourſelves as being in darkneſs, whenever objects that are pretty near to us, cannot be diſtinguiſhed from each other; but perfect darkneſs does not eaſily occur; and it is owing to this that ſeveral animals can ſee in what we call darkneſs; *viz.* the eyes of thoſe animals are ſo formed as to be able to ſee with very little light. But it appears from the experiments of M. le Cat and others, that no animal can ſee in perfect darkneſs where no light is emitted, even from any phoſphoreſcent body; and ſuch phoſphoreſcence may ſometimes proceed even from the animal itſelf.

The inquiries concerning the nature of darkneſs are ſo intimately connected with thoſe of light, (for the one is the want of the other,) as not to demand any particular examination in this place. The grand queſtion is, whether light is an emanation of matter from the luminous body, or is the propagation of a certain movement through a peculiar ſubſtance conſtantly diſperſed throughout the univerſe. Whence it follows, that darkneſs either is a total privation of light, or a ſtate of quieſcence in that matter which, when put in motion, produces the phenomena of light. The preſent ſtate of philoſophical knowledge ſeems to render it more than probable, that light is a real ſubſtance thrown out in every direction

rection from the luminous bodies; this queſtion, however, will be particularly examined under the article LIGHT.

DARKSVILLE, in *Geography*, a town of America, in Maryland, containing 132 inhabitants.

DARLING ISLAND, is the largeſt of two iſlands at the entrance of lake Simcoe, in Upper Canada.

DARLINGTON, a market and borough-town in the county of Durham, England, is ſituated on the ſide of a hill, which ſlopes to the river Skerne, over which is a bridge of four arches. The name is ſuppoſed to be derived from *Der* or *Dar*, an ancient appellation of the river, *Inge*, the Saxon term for a meadow, and *ton*, a town or village. It is a place of remote antiquity. In the time of the Saxon king Ethelred, a nobleman named Stere, the ſon of Wulf, obtained permiſſion of the king, that Darlington, with its appendages, ſhould be reſtored to St. Cuthbert. To which the king, the archbiſhop of York, and Aldwine, biſhop of Durham, became witneſſes. And in the ſurvey, contained in "the Balden Buke," Darlington is particularly noticed. It is a large populous trading town, and borough by preſcription; conſiſting of ſeveral well built ſtreets, iſſuing from a central ſquare; and makes a clean and reſpectable appearance. Amongſt its buildings, the greateſt ornament is the church, which ſtands at the ſouth-weſt angle of the market place. It is ſaid to have been erected by biſhop Hugh Pudſey, about the year 1160, who alſo built a manſion-houſe near it, and inſtituted a college for a dean, and three ſecular canons. The church is a ſpacious ſtructure in the form of a croſs, with a tower crowned with a ſpire, which riſes to the height of one-hundred and eighty-feet. The tower ſprings from uniform arches in the centre, ſupported by cluſtered columns; but the arches of the nave and aſles are irregular in ſhape and ſize. The weſt door is highly finiſhed with arches, having alternate cylindric and octagonal pilaſters. In this church were four chantries amply endowed. The endowment of one, called Marſhal's chantry, was, in the time of Elizabeth, granted by the crown for the foundation of a free grammar-ſchool. The charter was granted 15th of June 1567, and a portrait of the royal founder was placed in the ſchool by the late George Allan, eſq. F.S.A.; as a memorial of his gratitude in having received his early education there. The epiſcopal palace, being in a decayed condition, is now leaſed for the purpoſe of a workhouſe. Darlington is conveniently ſituated near a river, and has a market well ſupplied, and proviſions cheap. Here is a very flouriſhing manufactory of worſted ſtuffs, ſuch as morreens, tammies, &c.; another of linens of different deſcriptions, particularly diapers, huckabacks, and checks. The manufacture of cotton has lately been introduced, under the direction of Mr. John Murrell, and promiſes to add to the population and reſources of the place. The abundance of water gives facility to the means of manufacturing, by the opportunity it affords of erecting machinery. Here is a mill for ſpinning wool, another for ſpinning hemp; and here was erected the firſt mill for grinding optical glaſſes in the kingdom. This was an invention of the late ingenious John Kindrew, a native of this place. Here is a ſociety for the improvement of agriculture; and an act was obtained about the year 1767 for cutting a navigable canal from Stocton, by Darlington, to Wurſton; but owing to a powerful oppoſition, it was never put into execution. According to the returns under a late act, Darlington contained 945 houſes, and 4670 inhabitants. Its market for wool, corn, cattle, and other proviſions, is on Mondays; and it has four annual fairs. The town ſends two members to parliament; and the living is a perpetual curacy. At Oxenhall, about three miles from Darlington, are ſome deep cavities, vulgarly called *Hell-Kettles*. Of their origin the Chronicles of Tinemouth priory give this account: "A. D. 1179, upon Chriſtmas-day at Oxenhall, in the outſkirts of Darlington, in the biſhopric of Durham, the earth raiſed itſelf up to a great height, in the manner of a lofty tower, and remained all that day until the evening, as it were fixed and immoveable, when it ſunk down with ſuch a horrid noiſe, that it terrified all the vicinity, when the earth abſorbed it, and there formed a deep pit." The diameter of the largeſt is not leſs than a hundred feet, and of the leaſt ſeventy-five, whilſt the depth is from ſix to nineteen feet; they have been conſidered by ſome to be ſhafts of neglected coal mines; by others, places where marle has been dug; but with more probability by the authors of the "Beauties of England and Wales," ſalt pits; and the name derived from the Britiſh word *hal*, an alkali, whence *halen*, ſalt; and *kiddle* or *kidle*, a dam, *i. e.* Hal-Kiddles. The riſing of the earth above ſtated may have been occaſioned from ſome exploſion of inflammable ſubſtances beneath the ſtrata. In 1805 was diſcovered a ſulphureous ſpring in the vicinity, of ſtrong medical powers; and it is now much frequented by perſons labouring under ſcorbutic and other complaints. Hutchinſon's Hiſtory of Durham, 3 vols. 4to.

DARLINGTON, a diſtrict of South Carolina, bounded S. and S.W. by Lynche's creek; about 35 miles long, and 21 broad.

DARLINGTON, a townſhip of America, in the county of Durham, Upper Canada, lying to the weſt of Clarke, and fronting lake Ontario.

DARMADIJERA, a town of Aſia, in Thibet; 3 leagues N. of Sarangpour.

DARMSTADT, a handſome town of Germany, and capital of the grand duchy of Heſſe Darmſtadt, one of the members of the confederation of the Rhine, and the ordinary reſidence of the grand duke. It is ſituated on the river of the ſame name; 18 miles S. of Frankfort on the Mayn, 21 S.E. of Mayntz, 24 N.E. of Worms, and 36 N.W. of Heidelberg. N. lat. 49° 51'. The palace is a very ſtately building, and there is a houſe built on purpoſe for military evolutions, ſufficiently capacious to admit 1500 men to perform their manual exerciſe, and accommodated with ſixteen ſtoves. See HESSE DARMSTADT.

DARNALL, a river of Wales, which runs into the Wye; 3 miles N.W. of Rhayadr Gowy.

DARNEL, in *Botany*. See LOLIUM.

DARNEL, in *Agriculture*, the name of a troubleſome weed, which is frequently met with among wheat, rye, and other crops. See LOLIUM *perenne*.

DARNEL, *Annual*, a name applied ſometimes to white darnel (*lolium arvenſe*), and what, in the ſouthern diſtricts, is often improperly termed crup. It has much ſimilarity to the red darnel, and is often miſtaken for ray, or rye-graſs, though the ſpike is much longer and paler. It is likewiſe annual, while the ray-graſs has an abiding root. The ſeeds of this troubleſome weed ripen at the ſame time with the grain, and are very injurious to wheat crops. They ſhould be carefully prevented from being ſown with the ſeed.

DARNENSIS, in *Ancient Geography*, an epiſcopal town of Africa, in Libya.

DARNETAL, in *Geography*, a ſmall town of France, in the department of the Lower Seine, not far from Rouen, remarkable for its excellent cotton manufacture, particularly of red and white printed, and of handkerchiefs of different ſizes.

DARNEY, a ſmall town of France, in the department of the Voſges, chief place of a canton, in the diſtrict of Mirecourt. It has 1033 inhabitants: but the canton contains a population of 9643 individuals, in 19 communes,

upon

upon a territorial extent of 265 kiliometres. Darney lies 24 miles W. of Remiremont.

DARNI, in *Ancient Geography*, a people of Irelānd, placed by Ptolemy N. of the Voluntii.

DARNIGHEIM. in *Geography*, a town of Germany, in the circle of the Upper Rhine, and county of Hanau-Munzenburg; 3 miles W. of Hanau.

DARNIS, in *Ancient Geography*, a town of the Cyrenaica, a little ſouth of the promontory of Drepanum.

DAROACANA, a town of Aſia, in the country of Paropumiſus ſituated between the chains of Caucaſus.

DAROCA, in *Geography*, a ſmall, tolerably built, walled town of Spain, in the province of Arragon, on the river Xiloca, ſituated in a ravin between two hills, S.S.W. of Saragoſſa. Its fortifications are decayed. To the weſt are mountains reckoned among the higheſt in Spain; and to the north-eaſt, the country is barren; but the environs of the town are fertile. It contains many religious houſes, and about 2860 inhabitants.

DAROMA, in *Ancient Geography*, a name given by Euſebius and Jerom to a canton of Paleſtine, extending from the north to the ſouth, from the town of Eleutheropolis, about 20 miles on the ſide of Arabia Petræa, and from eaſt to weſt from the lake Aiphaltites to Berſabea or Beer-ſheba.

DARORE, in *Geography*, a town of Hindooſtan, in the country of Dowlatabad; 95 miles N.W. of Beder.

DARQUE, in *Rural Economy*, a term ſignifying the quantity of peats one man can caſt, and two wheel in the courſe of a day.

DARRÆ, in *Ancient Geography*, a people of Arabia Felix. Ptolemy.

DARREIN, in *Law*, a corruption of the French dernier, laſt, and uſed in the like ſenſe: as darrein continuance, (ſee CONTINUANCE); darrein preſentment (ſee ASSISA *darrein preſentment*.)

DARRO, in *Geography*, a river of Spain, which runs through the city of Grenada, and joins the Xenil, a little below it.

DARRYFIELD, a town of America, in the ſtate of New Hampſhire; 15 miles S. of Concord.

DARSA, in *Ancient Geography*, a town of Piſidia, ſituated, according to Livy, near Cormaſa, N.W., near the mountains inhabited by the Solymi.

DARSINI, in the *Materia Medica of the Ancients*, a name given by ſome to cinnamon. It is generally uſed by Avicenna, Serapion, and the reſt of the Arabian phyſicians.

DARSIS, in *Medical Writers*, is uſed for an excoriation of the ſkin. Blancard.

DART, in *Aſtronomy* and *Geometry*. See SAGITTA.

DART, in *Geography*, a river of Devonſhire, in England, is the principal of ſeveral ſtreams which take their riſe in the extenſive wild, called Dart-moor. Like the ancient Tigris, its name is derived from one of its moſt diſtinguiſhing features, the rapidity of its courſe. This characteriſtic it long retains, after it has left the ſource at Gedleigh, as it deſcends into the plain to the weſt of Aſhburton; where it glides, in placid beauty, by the caſtle and church of Totneſs. It is navigable for ſmall veſſels from its mouth to about one mile above this town. A little below, receiving the tide, it rolls in majeſty between lofty hills, winding its ſtream at the feet of their rocky baſes; and paſſing the town and caſtle of Dartmouth, empties itſelf into the ſeas in the road of Torbay.

DART, in a *Military Senſe*, means a ſmall ſpear, or javelin, much in uſe among the ancients, and yet ſeen among many of the more barbarous nations; eſpecially where the uſe of gunpowder is little known. The Caffrees of South Africa are extremely expert in throwing the dart, called by them *Aſſagai*, and on many occaſions have diſplayed ſuch accuracy in this particular, as has ſurpriſed our moſt adroit rifle-men. The dart in uſe among the ancients was of two kinds; *viz.* ſpear-headed, that is, without barbs; or bearded, like the generality of arrows. The former were often attached to a long cord, which enabled the thrower to recover his weapon, where it miſſed the aim, or when it could be withdrawn from a fleſh-wound. Moſt darts have iron heads; but the Americans, particularly in the leſs frequented tracts of that immenſe continent, as well as the inhabitants of ſome parts of Africa, uſe only a hard wooden ſtaff, ſharpened at the point, and a little chared by means of fire; others uſe fiſh-bones, flints, ſea-ſhells, &c. in their darts as well as for their arrowe. We find the dart to be every where very ſimple, and ordinarily from three to five feet in length. During the American war, the regular troops, on either ſide, uſed to be greatly annoyed by theſe miſſiles; which the Indian allies threw during the night at the out-centinels and videttes. Though darts are not ſupplied with wings or feathers, as arrows uſually are, they fly with great force; and, by that vibratory motion, peculiar to this claſs of weapons, make very extenſive wounds, often to a great depth, and attended with uncommon inflammation.

DARTFORD, in *Geography*, is a market town in the hundred of Axton and lathe of Sutton, in the county of Kent, England. The name is derived from the river Darent, on which it is ſituated. The manor was anciently a demeſne of the Saxon king; and, at the time of the Norman ſurvey, belonged to the conqueror. Iſabella, ſiſter to king Henry III., was here married by proxy to the emperor Frederic, in the year 1235; and Edward III., in 1331, held a tournament at Dartford. The moſt remarkable event in hiſtory, reſpecting this place, was the inſurrection under Wat Tyler, in the fifth year of king Richard II.; owing to the inſolence of a tax-gatherer, on which occaſion the people of this town were incited to riſe, to revenge the affront. Rapin erroneouſly ſtates the inſurrection to have begun at Deptford. Edward III. founded a nunnery at Dartford in the year 1355, and placed it under the government of four preachers. Its annual revenues at the diſſolution, according to Dugdale, amounted to 380*l.* 9*s.* 0$\frac{1}{2}$*d.* Henry VIII. converted it into a royal reſidence. It is called the place-houſe, and a large embattled gate-way of brick is yet remaining. The church ſtands near the river, and is a ſpacious edifice, conſiſting of a nave, chancel, and aiſles, with an embattled tower at the weſt end. On the north ſide of the chancel is a mural monument, commemorative of ſir John Spielman, a German, who, in the reign of Elizabeth, firſt introduced the manufacture of paper into this kingdom.

A branch of the Roman road, called Watling-ſtreet, paſſed through this town. The principal ſtreet is broad; from which branch off two others at right angles; in which are many good ſhops, and a bridge over the river, that, about thirty years ago, was widened and rendered more commodious at the expence of the county. The flouriſhing ſtate of the town has chiefly ariſen from the different mills which have been erected here for manufacturing gun-powder and paper. The original paper-mill, erected by ſir John Spielman, about half a mile above the bridge, occupied the ſite of the preſent powder-mills; and another mill, at a ſhort diſtance below, ſtands where Geoffroy Box of Liege erected, as early as the year 1590, a mill for ſlitting iron bars into rods. The town has a well-ſupplied market weekly, on Saturday, and a fair on the 2d of Auguſt. The number of houſes, as appears by the returns made under the late act of 1800, amounted

amounted to 468; occupied by 2406 inhabitants. See Haſted's Hiſt. of Kent.

DARTMOOR, in the county of Devon, England, is a large waſte and foreſt, extending from Cheyford, near the banks of the Tamar, to Taviſtock, in the vale of Exeter. The length is about twenty miles, and the breadth fourteen; and includes between two and three hundred thouſand acres of open, uncultivated lands. The ſurface is wildly and wonderfully varied. It ſwells in bold eminences from fifteen to eighteen hundred feet high, and again deſcends into hollow glens and cavities. Approaching from the ſouth and ſouth-eaſt, the eye is bewildered by viewing an extenſive tract, exhibiting ſudden hills, called *torrs*, ſurfaces covered with immenſe rugged rocks, and vaſt maſſes of granite, which lie ſcattered around, as though precipitated from the declivities into the vallies beneath. So confuſedly are theſe huge fragments ſtrewed, and ſo varied their appearance, that they have been compared to ſtones ejected from volcanoes, and wrecks of primæval mountains, torn in pieces by the "war of elements." In the higher parts of the moor, to the north-weſt, are large tracts of ſwampy land, exceedingly dangerous to cattle, which depaſture the ſcanty herbage; but yield a conſtant ſupply of fuel to the poor cottagers, from the immenſe beds of peat, which lie beneath the ſurface. The inhabitants are called *moormen*, who keep a few ſheep and cattle on the moor, and look after the flocks and herds of others. The right of depaſturage belongs to different intereſts. The foreſt, ſtrictly ſo called, is the property of the prince of Wales, as parcel of the duchy of Cornwall; but the outſkirts are appendant to the ſurrounding manors: ſome of which claim a right by preſcription of common within the foreſt, by paying a ſmall annual ſum to the duchy, called *venville* or *fenfield* money.

Though, as the name ſuggeſts, it was once well clothed with timber, the only remaining natural wood is an aſſemblage of dwarf ſcrubby oaks, interſperſed with mountain-aſh trees, willows, and underwood. Within a few years, ſome thouſands of acres have been grubbed up, and numerous young plantations formed. Much land has alſo been converted into tillage by the command of his royal highneſs, under the direction of colonel Tyrwhit. *Cruckern Tor* has long been celebrated as the place where the ſtannary-courts, or parliaments, were held for this county; whence Mr. Polwhele conjectured, that it had been a ſeat of Britiſh judicature prior to the Roman invaſion.

On this moor there is now erecting a large priſon, which is intended to be appropriated to thoſe unfortunate perſons who are captured in times of war. The building is upon an immenſe ſcale, and is erecting from the deſigns of Mr. Alexander, a ſcientific architect. At various places on this extenſive tract, are the ſhafts of ſeveral exhauſted and neglected tin mines; and in the vicinity of Taviſtock are ſome now working. See Polwhele's Hiſtory of Devonſhire; alſo the Beauties of England and Wales, vol. iv.

DARTMOUTH, is a borough, ſea-port, and market town, in the county of Devon, England; 30 miles diſtant from Exeter, and 203½ weſt from London. It formerly was the property of Judhael de Totneſs, to whom the manor was granted by the Conqueror. The town firſt ſent members to parliament in the time of Henry I.; but not regularly till the reign of Edward III., who granted it a charter of incorporation; under which authority it is governed by a mayor, recorder, two bailiffs, and twelve common-council men, with other inferior officers. In the corporation is veſted the right of election, and the power of creating burgeſſes. This place was deſtroyed by fire in the reign of Richard I., and again in the reign of Henry IV. In both inſtances it was by French incendiaries, who eſcaped with little loſs; but attempting it a third time, in the year 1404, they were intercepted by the peaſantry and women; and the whole party either killed or taken, with their leader, Monſ. de Coſtell. The town originally conſiſted of three villages, Clifton, Dartmouth, and Hardneſs; and, though united by buildings, yet in many reſpects, as to local regulations, they were diſtinct. From the natural ſituation of the place, a craggy hill, many of the ſtreets are aukward, and moſt of them incommodiouſly narrow, and the lower tier of houſes frequently communicates with thoſe above by flights of ſteps. The principal one which faces the quay, is occupied by the merchants. Dartmouth has three churches, and a meeting-houſe for diſſenters. St. Clement's church is ſituated upon a hill above the town, and having a tower 70 feet high, forms an excellent ſea-mark. Here are three charity ſchools for the education of poor children.

The river Dart, opening into a fine eſtuary, forms an excellent and ſafe harbour, ſufficiently capacious to admit five hundred ſail of ſhipping. The entrance is defended by a caſtle, and two fortified platforms; but the fortreſs is not large, and few guns are mounted. A number of veſſels are employed in the pilchard-fiſhery, and the town has an export trade from Newfoundland to the Mediterranean; whence it imports wine, oil, fruits, &c. The number of ſhips belonging to this port is about 350, which gives employment to upwards of 3000 men; a certain number of whom the proprietors are obliged by law to ſelect from landſmen, by which means the trade becomes an excellent nurſery for the navy. The regular market is on Friday, but a well ſupplied fiſh-market is held every day, except Sunday. By the returns under the late act, the number of houſes was 460, and inhabitants 3412.

To the north of the harbour lies Torbay, the celebrated and general rendezvous of the Britiſh grand fleet; where, in unfavourable weather, it generally comes to an anchor, and rides in ſafety during the ſtorm. At the lower part of the bay, on the finely-wooded ſhore, is the ſtately manſion of George Carey, eſq. called Tor Abbey, formerly a religious houſe, founded by William de Bruer, in the time of king John; part of the ruins yet remain. And in the pariſh is Kentſhole, a ſeries of caverns, connected by ſubterraneous paſſages, about 1100 feet from the entrance, through one of which paſſes a rivulet.

DARTMOUTH, a town of America, in the ſtate of New Hampſhire, and county of Grafton, N.W. of the foot of the white mountains; 33 miles N.E. of Haverhill, and 87 W. of Portſmouth. In 1790, it contained 111 inhabitants, and was incorporated in 1772.—Alſo, a thriving ſea-port town in the county of Briſtol, and ſtate of Maſſachuſetts, ſituated on the W. ſide of Accuſhnet river, 62 miles ſoutherly of Boſton, incorporated in 1664, and containing 2660 inhabitants. N. lat. 41° 37′. W. long. 70° 52′.—Alſo, a town of Elbert county in Georgia, ſituated in the peninſula formed by the confluence of Broad and Savannah rivers, two miles from fort James, Dartmouth, a mile below Charlotte fort. The town and fort derive their names from James, earl of Dartmouth, who obtained a grant and powers to the Indian trading company in Georgia to treat with the Creeks for the territory called the "New Purchaſe," ceded in diſcharge of debts due to the traders. This treat contains about 2,000,000 acres, lying upon the head of the great Ogechee, between the banks of the Savannah and Alatamaha, touching on the Oconee, including all the waters of Broad and Little rivers. This territory comprehends excellent fertile land, well watered by many rivers, creeks, and brooks.

DARTMOUTH *College*. See COLLEGE.

DARTOS, in *Anatomy*, a ſuppoſed muſcular expanſion, deſcribed as exiſting between the integuments of the ſcrotum and

and the teſtes. It is well known that the application of cold to the ſurface of the body produces a corrugation of the ſcrotum; and this motion was aſcribed by the older anatomiſts to muſcular fibres exiſting in the ſituation juſt alluded to. The more accurate inveſtigations of the moderns have decided, that this ſuppoſed muſcular dartos is nothing but ſimple cellular texture, which being entirely free from fat, and thereby poſſeſſing a ſtringy and fibrous appearance, and often having a reddiſh colour from the numerous blood-veſſels, whoſe ramifications it contains, contracts an appearance ſomewhat reſembling that of muſcular fibres. The motion taking place under the circumſtances of cold applied externally, &c., ſeems to be analogous to what occurs in the ſurface of the body in general; where a contracted ſtate of the integuments is produced, together with a peculiar roughneſs of the ſkin, giving riſe to the appearance called cutis anſerina, and taking place independently of any muſcular contraction.

DARU, in *Botany*, a name given by Avicenna and Serapion to a ſpecies of turpentine tree, which the latter author calls the lentiſk. This grew up to a very large tree, and bore a much larger and more beautiful fruit than the common turpentine-tree.

Daru, in *Geography*, a town of Perſia, in the province of Kerman; 90 miles N. E. of Sirgian.

DARVERNUM, in *Ancient Geography*. See Durovernum.

DARWAR, or Danwar, in *Geography*, a conſiderable fortreſs of Hindooſtan, in the country of Sanore, one of Tippoo's frontier towns, towards the dominions of the Paiſhwah; 88 miles S. of Viſiapour, and 90 E. N. E. of Goa. N. lat. 16° 5′. E. long. 75° 9′.

DARWEN, a river in England, in the county of Lancaſter, which runs into the Ribble, near Preſton.

DARWENT. See Derwent.

DARWIN, Erasmus, in *Biography*, equally famed as a phyſician and a poet, was a native of Elton, near Newark, Nottinghamſhire, where he was born December 12, 1731. After going through the uſual ſchool education, under the Rev. Mr. Burrows, at the grammar-ſchool at Cheſterfield, with credit, he was ſent to St. John's College, at Cambridge. There he only continued until he took his bachelor's degree in medicine, when he went to Edinburgh, to complete his ſtudies; which being finiſhed, and having taken the degree of doctor in medicine, a profeſſion to which he was always attached, he went to Litchfield, and there commenced his career of practice. Being ſent for, ſoon after his arrival, to Mr. Inglis, a gentleman of conſiderable fortune in the neighbourhood, who was ill with fever, and in ſo dangerous a ſtate, that the attending phyſician had given up the caſe as hopeleſs, the doctor had the good fortune to reſtore him to health. This gave him ſo high a degree of reputation at Litchfield, and in the neighbouring towns and villages, that his competitor, who was before in conſiderable practice, finding himſelf neglected, and nearly deſerted, left the place. Dr. Darwin ſoon after married Miſs Howard, the daughter of a reſpectable inhabitant of Litchfield, by which he ſtrengthened his intereſt in the place. By this lady he had three ſons, who lived to the age of manhood; two of them he ſurvived; the third, Dr. Robert Waring Darwin, is now in conſiderable practice as a phyſician at Shrewſbury. In 1781, our author having married a ſecond wife, removed to Derby, where he continued to reſide to the time of his death, which happened on Sunday the 18th of April, 1802, in the ſeventieth year of his age. Six children by his ſecond lady, with their mother, remain to lament the loſs of him.

The doctor was of an athletic make, much pitted with the ſmall-pox. He ſtammered much in his ſpeech. He had enjoyed an almoſt uninterrupted good ſtate of health, until towards the concluſion of his life, which he attributed, and reaſonably, to his temperate mode of living, particularly to his moderation in the uſe of fermented liquors. This practice, he recommended ſtrenuouſly to all who conſulted him. Miſs Seward, from whoſe Memoirs of the Life of Dr. Darwin theſe notices are principally taken, gives him the credit of having introduced habits of ſobriety among the trading part of Litchfield, where it had been the cuſtom to live more freely, before he went to reſide there.

His frequent journies, into the country on profeſſional buſineſs, contributed alſo in no ſmall degree to the preſervation of his health and his faculties, which latter remained unimpaired to the day of his death. His death was ſudden, occaſioned by a fit of what he was uſed to call angina-pectoris, which he had ſeveral times experienced, and always relieved by bleeding plentifully.

As Dr. Darwin was a votary to poetry, as well as medicine, he occaſionally ſent his effuſions in that way, to one or other of the monthly publications, but without his name, conceiving, from the example of Akenſide and Armſtrong, that the reputation he might acquire by his poetry, would operate as a bar to his advancement in the practice of medicine. His "Botanic Garden," in which he celebrates what he calls the Loves of the Plants, the firſt of his poems to which he put his name, was not publiſhed until the year 1781, when his medical fame was ſo well eſtabliſhed, as to make it ſafe for him to indulge his taſte in any way he ſhould chuſe. Beſides, the poem was ſo amply furniſhed with notes, containing the natural hiſtory, and accounts of the properties of plants, that it did not ſeem very alien from his profeſſion. The Botanic Garden is compriſed in two parts. In the firſt the author treats of the Economy of Vegetables, in the ſecond of the Loves of the Plants. The novelty of the deſign, the brilliancy of the diction, full of figurative expreſſions, in which every thing was perſonified, rendered the poem, for ſome years, extremely popular. But the fame which it acquired has in a great degree ſubſided, and it is now little noticed. It is probable, that an ingenious little poem, the Loves of the Triangles, publiſhed in a monthly journal, which is a happy imitation of the Darwinian manner, contributed to its decline.

In 1793, the author publiſhed the 1ſt volume of "Zoonomia, or the Laws of organic Life," 4to. The 2d volume which completed the author's plan, was printed in the year 1796. As the eccentric genius of the author was known, great expectations were formed of this work, the labour we were told of more than twenty years. It was to reform, or entirely new model, the whole ſyſtem of medicine, profeſſing no leſs than to account for the manner in which man, animals, and vegetables are formed. They all, it ſeems, take their origin from living filaments, ſuſceptible of irritation, which is the agent that ſets them in motion. Archimedes was wont to ſay, give me place to ſtand on, and I will move the earth. Such was his confidence in his knowledge of the power of the lever. Our author ſaid, give me a fibre ſuſceptible of irritation, and I will make a tree, a dog, a horſe, a man. "I conceive," he ſays, Zoonomia, vol. i. p. 492, "the primordium, or rudiment of the embryon, as ſecreted from the blood of the parent, to conſiſt in a ſingle living filament, as a muſcular fibre, which I ſuppoſe to be the extremity of a nerve of loco-motion, as a fibre of the retina is the extremity of a nerve of ſenſation; as, for inſtance, one of the fibrils which compoſe the mouth of an abſorbent veſſel; I ſuppoſe this living filament, of whatever form it may be, whether ſphere, cube, or cylinder, to be endued with the capacity of being excited into action, by certain kinds of ſtimulus. By the ſtimulus of the ſurrounding fluid in which it is received from

from the male, it may bend into a ring, and thus form the beginning of a tube. This living ring may now embrace, or abſorb a nutritive particle of the fluid in which it ſwims, and by drawing it into its pores, or joining it by compreſſion to its extremities, may increaſe its own length or craſſitude, and, by degrees, the living ring may become a living tube. With this new organization, or accretion of parts, new kinds of irritability may commence," &c.; whence, ſenſibility which may be only an extenſion of irritability, and ſenſibility further extended, beget perception, memory, reaſon, and in ſhort all thoſe faculties which have been, it ſeems, erroneouſly attributed to mind, for which, it appears, there is not the ſmalleſt neceſſity; and as the deity does nothing in vain, of courſe ſuch a being does not exiſt. It would be uſeleſs to enter into a further examination of the Zoonomia, which has long ceaſed to be popular; thoſe who wiſh to ſee a complete refutation of the ſophiſms contained in it will read with ſatisfaction, "Obſervations on the Zoonomia of Dr. Darwin, by Thomas Brown, Eſq." publiſhed at Edinburgh in 8vo. in 1798. In 1801, the author publiſhed Phytologia, or the Philoſophy of Agriculture and Gardening; but the public, tired with the reveries of the writer, let this large book of 600 pages in 4to. paſs almoſt unnoticed. As little attention was paid to a ſmall tract on female education, which had little indeed to attract notice. "It is," Miſs Seward obſerves, "a meagre work, of little general intereſt, thoſe rules excepted which are laid down for the preſervation of health." It is however harmleſs, a character that can by no means be accorded to the Zoonomia, as may be gathered from the ſtrictures we have thought it neceſſary to paſs on that work. Seward's Memoirs of the Life of Dr. Darwin; alſo Medical Commentaries and Annals.

Darwin, Mr. Charles, one of the ſons of Dr. Eraſmus Darwin, who died at Edinburgh the 15th of May, 1778, while proſecuting his ſtudies in medicine, deſerves to be noticed, for having diſcovered a teſt, diſtinguiſhing pus from mucus, for which a gold medal was adjudged him by the univerſity. "As the reſult of numerous experiments," he ſays, "when any one wiſhes to examine the matter expectorated by his patient, let him diſſolve a portion of it in vitriolic acid, and another portion of it in cauſtic alkaline lixivium, and then add pure water to both ſolutions; if there is a precipitation in each ſolution, it is clear the expectorated matter is pus; if there is no precipitation, the matter is ſimply mucous. Mr. Darwin left an unfiniſhed eſſay on the retrograde motion of the abſorbent veſſels of animal bodies in ſome diſeaſes. This was, ſome time after the death of the young man, publiſhed by his father, together with the diſſertation for which he had obtained the prize medal.

DASÆ, in *Ancient Geography*, a town of Arcadia, the mines of which contributed to the aggrandizement of Megalopolis; which lay N.E. of it.

DASCHITZ, in *Geography*, a town of Bohemia, in the circle of Chrudim; 7 miles N.N.E. of Chrudim.

Daschitz, or *Datſchitz*, a town of Moravia, in the circle of Iglau; 6 miles N. of Zlabins.

DASCILITIDES, in *Ancient Geography*, a lake of Aſia Minor, in Myſia; which, according to Plutarch, was near Cyzicum. This lake belonged partly to the Byzantins, and partly to the Cyzicenians, according to Strabo. It was alſo called *Aphnites*.

DASCON Sinus, a gulf ſo called by Diodorus, which lay on the eaſtern coaſt of Sicily, near Syracuſe.

DASCUSA, a town of Aſia, ſeated on the banks of the Euphrates, having 38° 15′ of latitude.

DASCYLIUM, Diaskileo, a town of Aſia in Bithynia, ſituated near the lake Daſcilitides. Steph. Byz. mentions four other towns of this name; one founded ſoon after the city of Troy; another in Ionia; a third of Caria; and a fourth on the confines of the Eolide and Phrygia.

DASHUR, in *Geography*, a town of Egypt; 15 miles S. of Cairo.

DASSARATÆ, in *Ancient Geography*, a people placed by Plutarch towards the confines of Macedonia and Illyria, near the river Lycus.

DASSAWN, in *Geography*, a river of Hindooſtan, which runs into the Betwha; 16 miles W. of Raat.

DASSDORF, a ſmall town of Saxony, in the principality of Saxe-Weimar.

DASSEL, a ſmall town of the kingdom of Weſtphalia, in the late principality of Hildeſheim, which was aſſigned as an indemnity to Pruſſia by the treaty of Luneville, and loſt again by Pruſſia at the peace of Tilſit. Daſſel is ſituated in a deep vale on the Spoling, which not far from thence flows into the river Ilme, in a fertile diſtrict called the Hundeſruck.

DASSEN, an iſland in the Atlantic, near the coaſt of Africa, between the Cape of Good Hope and Saldanha bay. S. lat. 33° 26′. E. long. 72°.

DASTARGEDA, or Artemita, in *Ancient Geography*, *el-Melik*, a town of Aſia, on the left bank of the river Delas, north of its mouth in the Tigris, and S.W. of Apollonia. Choſroes, king of Perſia, had a palace in this town, which he preferred to that of Cteſiphon. This palace was deſtroyed by Heraclius.

DASTIRA, a town of Armenia Major. Strabo.

DAST-Surab, in *Geography*, a town of Perſia, in the province of Farſiſtan; 70 miles S. of Schiras.

DASYMMA, a ſuperficial inequality of the inner part of the eye-lids, accompanied with a redneſs. Blancard derives it from δασυς, *hirſutus*.

DASYPUS, in *Zoology*, a genus of mammalia, in the bruta family. They have no tuſks; the grinders are ſhort, cylindrical, and from ſeven to eight in each jaw; and the body covered with a bony ſhell divided into zones. Theſe are the armadillo of Engliſh writers.

There is only a ſmall number of ſpecies in this genus, and thoſe are chiefly inhabitants of South America. They are readily diſtinguiſhed from all other quadrupeds, by the ſingular bony covering or ſuit of banded armour with which nature has at once protected and adorned theſe curious animals; their ſhelly coat being of conſiderable ſtrength, and ſo admirably contrived as to accommodate itſelf to every poſture and motion of the body. The armadillos are of a gentle diſpoſition, and inhabit ſubterraneous retreats or burrows, which they eaſily excavate by means of their large and ſtrong claws. They feed on roots, melons, potatoes, grain, fleſh, inſects, and worms, in queſt of which they wander abroad chiefly in the night time, as they reſt during the day in their burrows and hiding-places. As they are themſelves conſidered excellent food, they are ſought after, and dug out of their ſubterraneous cavities, and ſold for the table. They are, however, only the young armadillos which are in requeſt for this purpoſe; for as they grow old, the fleſh acquires a ſtrong muſky ſcent, which renders them very diſagreeable. When attacked, the armadillos roll themſelves up into the form of a ball, and are thus ſecured in an effectual manner from ordinary accidents. They are ſaid to drink frequently, and often grow extremely fat; they are alſo repreſented to be extremely prolific, producing a brood of ſeveral young every month, or at leaſt three or four times in a year. The ſpecies are diſtinguiſhed principally by the number of zones or bands.

Species.

TRICINCTUS. Bands three, moveable; toes five. Houtt. *Cataphractus ſcutis duobus, cingulis tribus*, Briſſ. *Tatou*, Redi. *Tatu ſ. armadillo orientalis*, Seba. *Tatu apara*, Marcgr. Three-banded armadillo.

This may be conſidered as one of the moſt elegant ſpecies of armadillo; its colour is a clear yellowiſh-white; the head, ſhoulders, and poſterior part of the body are coated with regular hexagonal diviſions, curiouſly ſtudded or tuberculated on the ſurface, and the zones of the body are extremely diſtinct; the tail is thick and ſhort; the legs are covered with hexagonal diviſions or ſegments, ſimilar to thoſe on the ſhoulders, but ſmaller; the ears are rather large; and the claws ſmaller than in moſt other ſpecies. This kind is a native of Brazil, and feeds on fruits and poultry.

QUADRICINCTUS. Bands four. Gmel. *Cataphractus*, Briſſ. *Chæloniſcus*, Column.

An uncertain ſpecies, by ſome conceived to be a variety of the former.

SEXCINCTUS. Bands ſix; feet five-toed; Linn. Schreber, &c. *Tatu et tatu-paba Braſilienſibus*, Marcgr. *Encouvert ou tatou à ſix bandes*, Buff. Six-banded armadillo.

Reſembles daſypus tricinctus, but is furniſhed with ſix bands inſtead of three; the tail is very thick at the baſe, and ſhort in proportion to the animal; the claws large and ſtrong. The general colour is reddiſh-yellow. It infeſts plantations in South America; is eatable, and feeds on fruits and roots. A ſuppoſed variety of this kind, in the Britiſh Muſeum, having eight inſtead of ſix bands, may probably prove to be a diſtinct ſpecies.

SEPTEMCINCTUS. Bands ſeven; toes on the anterior feet four: poſterior feet five. Linn. *Tatus quadrupes peregrina*, Geſn. Seven-banded armadillo.

Inhabits India and South America; and is believed to be a variety of the nine-banded armadillo.

OCTOCINCTUS. Bands eight; ſhields two. Schreber. *Cataphractus ſcutis duobus, cingulis octo*, Briſſ.. *Aiatochtli*, Hernand. *Tatouette ou tatou à huit bandes*, Buff. Eight-banded armadiilo.

This kind inhabits Brazil, and is eſteemed delicious. The ſhields are ſprinkled with prominent white knobs; belly whitiſh; ſuppoſed to be a variety of the following ſpecies:

NOVEMCINCTUS. Bands nine; anterior feet four-toed; poſterior feet five-toed. Linn. *Tatus*, Geſn. *Cachicame, ou Tatou à neuf bandes*, Buff. Nine-banded armadillo.

The fleſh of this ſpecies is delicate. The cruſt on the ſhoulders, rump, and head marked with ſix-ſided figures. It inhabits South America.

DUODECIMCINCTUS. Bands twelve; toes five. *Daſypus unicinctus*, Linn. *Tatu ſeu armadillo africanus*, Seba. *Kabaſſou ou tatou à douze bandes*, Buff.

The length of this animal from the noſe to the tail is about a foot, and the tail nearly ſeven inches long. An armadillo, ſuppoſed to be a variety of this, is mentioned by Pennant under the name of the greater twelve-banded armadillo, which meaſures from the tip of the noſe to the tail two feet ten inches, and the tail twenty inches. The head in both kinds is remarkably blunt, and the ears large.

18-CINCTUS. Bands eighteen. *Cirquincon, ou Tatou à dix-huit bandes*, Buff. Eighteen-banded armadillo. Penn.

Deſcribed by Grew in the laſt century under the name of the weazel-headed armadillo, from a ſpecimen in the muſeum of the Royal Society.

It appears to be allied to the twelve-banded armadillo, and does not ſeem to be figured by any author except Grew.

DASYS, Δασυς, denſe, thick, cloſe, rough, in Prorrhet. and Coac. is an epithet for a tongue condenſed, contracted, and exaſperated with heat and dryneſs, as it happens in phrenſies. James's Med. Dict.

DATA, in *Mathematics*, certain things, or quantities, ſuppoſed to be given, or known, in order, from them, to find out other things or quantities, which are unknown, or ſought for. A problem, or queſtion, generally conſiſts of two parts; data and quæſita.

Euclid has an expreſs treatiſe of data; wherein he uſes the word for ſuch ſpaces, lines, and angles, as are given in magnitude, or to which we can aſſign others equal.

From the primary uſe of the word data in mathematics, it has been tranſplanted into other arts; as philoſophy, medicine, &c. where it expreſſes any quantity, which, for the ſake of a preſent calculation, is taken for granted to be ſuch, without requiring an immediate proof for its certainty; called alſo the given quantity, number, or power. And hence alſo ſuch things as are known, from whence either in natural philoſophy, the animal mechaniſm, or the operation of medicines, we come to the knowledge of others unknown, are now frequently in phyſical writers called data.

DAT-AL-SAMIN, in *Geography*, a town of Arabia, 250 miles of Cathem.

DATAMES, in *Biography*, a diſtinguiſhed military commander, who firſt ſerved among the guards of Artaxerxes Mnemon, and was afterwards employed in the war againſt the Caduſians. In this buſineſs he gained ſo much credit, and ſo high a name, that he was appointed governor of that part of Cilicia which borders upon Cappadocia. Datames was afterwards appointed to reduce Thyus, who had revolted againſt the king: he performed the duty, and took his opponent priſoner, who was a very tall and ſtout man, and of a terrible aſpect. He cauſed him to be dreſſed in the robes of a ſatrap, and decorated with a gold chain and bracelets, and at the ſame time, putting himſelf into the ruſtic attire of a huntſman, with a club in one hand, and a cord in the other, to which Thyus was faſtened, led him into the royal preſence as if he were a wild beaſt. The king was highly pleaſed with the incident, and appointed Datames to be chief in the Egyptian war; but while preparations were making, he was ordered to go in queſt of Aſpis, who had revolted from his allegiance. The ſucceſs and high merit of Datames excited the envy of the courtiers, who combined to ruin him. Datames, apprized of their intentions, reſolved to be before hand with them, by quitting the king's ſervice, and making himſelf independent. His own ſon was the firſt to carry the news to court of his father's rebellion. The king ſent againſt him a very numerous army, but it was unſucceſsful, and the moſt it could extort was the nominal ſubmiſſion of Datames, who in every engagement proved himſelf the ſuperior. Artaxerxes could not be reconciled to the rebellious general, and as he found himſelf incapable of conquering him, he determined to adopt the means of treachery, by which he finally accompliſhed his end. Datames was aſſaſſinated by the hands of Mithridates, who, in concert with the king, pretended to be an open enemy of his ſovereign, while he was ſeeking the means of performing what lay neareſt his heart. Cornelius Nepos.

DATE, an addition, or appendage, in writings, acts, inſtruments, letters, &c. expreſſing the day and month of the year, when the act, or letter, was paſſed or ſigned; together with the place where the ſame was done.

The word is formed from the Latin datum, given, the participle of do, I give. The Latins uſually ſay dabam, I gave.

In writings of importance the date ſhould be written in words

words at length; dated or given at London this twenty-ſixth day of March, in the year of our Lord one thouſand ſeven hundred and fifty. In letters, the date is uſually in figures; London, March the 26th, 1750.

An antedate is a falſe date, prior to the real time when the inſtrument was paſſed, or ſigned.

A poſt-date, is that poſterior to the real time, &c.

Our ancient deeds had no dates, but only the month and year, to ſignify that they were not made in haſte, or in the ſpace of a day, but upon longer and more mature deliberation. The king's grants began with theſe words, "Præſentibus & futuri, &c." but the grants of private perſons with "Omnibus præſentes literas inſpecturis, &c."

A deed is good though it mentions no date, or hath a falſe date: or even if it hath an impoſſible date, as the 30th of February; provided the real day of its being dated or given, that is, delivered, can be proved. Blackſt. Com. vol. ii. p. 304.

DATE, *Dactylus*, the fruit of the palm-tree. See PHŒNIX.

The word is formed of dacte, and that of dactylus, finger; as being round and oblong, reſembling a finger's end.

This fruit is gathered in autumn, before it is ripe; and bears a near reſemblance to our bullace; being of a green colour, and very ſharp and aſtringent. When ripe, it becomes ruddy, having a hard, longiſh ſtone, cloven at bottom, and encompaſſed with a thin white pellicle, or ſkin.

The huſk, or covering of the date, called by the ancients elate, or ſpatha, when the fruit is in its growth, is variable; having as many changes of colour as the fig has. Some dates are black, ſome white, ſome brown; ſome again are round like apples, and very big. Ordinarily they are oblong, fleſhy, yellow, ſomewhat bigger than the thumb's end, and ſome are very agreeable to the taſte. Some are no bigger than a chich-pea, and others as big as a pomegranate. The beſt are thoſe called royal dates. There is alſo another ſort called caryotæ, which are very good. Some of them have ſtones, and others none.

Our dates are brought us from Egypt, Syria, Africa, and the Indies. Among the Egyptians and Africans they make a principal article of food. They never come to full maturity in Italy, or the moſt ſouthern parts of Spain; and yet there are tolerable dates in Provence; which do not keep, but breed worms. The beſt come from Tunis and Perſia.

DATE-*palm*, in *Botany*. See PHOENIX.

DATE *plum*. See DIOSPYROS.

DATES, *Land of*. See BILEDULGERID.

DATHOLITE. The colour of this mineral is greyiſh and greeniſh-white, paſſing into mountain-green. It occurs in maſs, and cryſtallized in ſmall rectangular tetrahedral priſms with truncated angles. It is tranſlucent. Its luſtre internally is ſhining, between vitreous and reſinous. Its fracture is ſmall and imperfectly conchoidal. It preſents large and coarſe granular concretions. It is conſiderably hard. Sp. gr. 2.98.

It is compoſed, according to Klaproth, of

36.5	Silex
35.5	Lime
24.	Boracic acid
4.	Water.
100.	

It has been recently diſcovered by Eſmark, at Arendahl in Norway.

DATHTHA, in *Ancient Geography*, a town of Aſia, in the interior of Media. Ptolemy.

DATISCA. in *Botany*, baſtard hemp. Linn. Gen. 530. Schreb. 700. Willd. Sp. Pl. v. 4. 823. Juſſ. 445. Gærtn. t. 30. Claſs and order, *dioecia decandria*. Nat. Ord. uncertain.

Gen. Ch. Barren fl. *Cal.* of five equal, linear, acute leaves. *Cor.* none. *Stam.* Filaments about 15, very ſhort; anthers oblong, obtuſe, much longer than the calyx. Fertile fl. *Cal.* ſuperior, of two teeth, erect, minute, permanent. *Cor.* none. *Piſt.* Germen oblong, inferior; ſtyles three, ſhort, cloven; ſtigmas ſimple, oblong, ſhaggy. *Peric.* Capſule priſmatic, three-pointed, with three valves and one cell. *Seeds* numerous, ſmall, ranged along three, four, or five linear, parallel ribs in the capſule.

Eſſ. Ch. Barren fl. Calyx five-leaved. Corolla none. Anthers fifteen, oblong, nearly ſeſſile. Fertile fl. Cal. of two teeth. Cor. none. Styles three. Capſule inferior, triangular, three-horned, pervious, of one cell, with many ſeeds.

Of this genus there are two ſpecies. D. *cannabina*, (Cannabis lutea fertilis; Alpin. Exot. t. 298.) has a ſmooth ſtem, and grows in Crete. It is perennial, herbaceous, ſeveral feet high, with much of the habit of hemp, ſee CANNABIS; but the flowers are yellow and more conſpicuous than thoſe of that uſeful plant. Leaves alternate, pinnate, jagged. It flowers after midſummer, and is propagated by parting the roots in autumn, as well as by ſeeds; but the latter can only be perfected when the barren and fertile plants are cultivated together, whence Linnæus drew one proof of his doctrine of the ſexes of plants. See his Diſſertation on that ſubject, publiſhed in Engliſh, Lond. 1786, 8vo. D. *hirta*, a larger ſpecies, with a hairy ſtem, is found in Pennſylvania. This differs little in general appearance from the former.

DATISI, in *Logic*, a mode of ſyllogiſms in the third figure, wherein the major is an univerſal affirmative, and the minor and concluſion are particular affirmative propoſitions. E. gr.

DA "All God's friends are kings."
TI "Some of God's friends are poor."
SI "Therefore, ſome poor are kings."

DATIVE, in *Grammar*, the third caſe in the declenſion of nouns; expreſſing the ſtate or relation of a thing, to whoſe profit or loſs ſome other thing is referred.

It is called dative, becauſe uſually governed by a verb implying ſomething to be given to ſome perſon. As, commodare Socrati, to lend to Socrates; utilis reipublicæ, uſeful to the commonwealth; pernicioſus eccleſiæ, pernicious to the church; viſum eſt Platoni, it ſeemed to Plato, &c.

In Engliſh, where we have properly no caſes, this relation is expreſſed by the ſign to or for.

DATOS, or DATON, in *Geography*, a town of Europe, which, after having belonged to Thrace, was transferred to the king of Macedonia, when the empire was extended on that ſide; it was ſituated near mount Pangæa, on a craggy hill, having a foreſt to the north, and to the ſouth a lake or marſh, at a ſmall diſtance from the ſea; to the eaſt there were defiles, and to the weſt, a fertile and pleaſant plain, which extended as far as Strymon. Fabulous tradition ſays, that Proſerpine was gathering flowers here when ſhe was forcibly carried away by Pluto. This place was proverbially rich, on account of the mines of gold in its territory. It was at firſt called *Cremides*, from the fountains that abounded in the hill on which it was built; and afterwards, as is ſaid, Calliſtratus the Athenian gave it the name of Datos. When Philip, king of Macedon, took poſſeſſion of it, he fortified

it, and called it Philippi. It became famous for the battle fought under its walls between the troops of Brutus and Caſſius, and for thoſe of Octavius. The territory, on which are ſeen the ruins of Philippi, is now called *Philipp-ghi*, Φιλλιππε γη, that is, the land of Philippi.

DATTEAH, a town of Hindooſtan, in the circar of Gohud; 96 miles S. of Agra.

DATURA, in *Botany*, thorn-apple (from the American name of this plant, of ſimilar ſound, made claſſical by Linnæus from *do, dare, daturus*, becauſe it is *given* as a ſtimulant). Linn. Gen. 98. Schreb. 3. Willd. Sp. Pl. v. i. 1007. Juſſ. 125. Claſs and order, *pentandria monogynia*. Nat. Ord. *Luridæ*, Linn. *Solaneæ*, Juſs.

Gen. Ch. *Cal.* of one leaf, inferior, tubular, five-angled, five-toothed; its baſe permanent. *Cor.* of one petal, funnel-ſhaped; tube cylindrical, about as long as the calyx; limb dilated, plaited, with five angles, and five little acute teeth. *Stam.* Filaments five, equal, awl-ſhaped, inſerted into the tube of the corolla, and ſhorter than its limb; anthers oblong, flattened, obtuſe. *Piſt.* Germen ovate, ſuperior; ſtyle thread-ſhaped, ſtraight; ſtigma obtuſe, of two plates. *Peric.* Capſule ovate, ſtanding on the baſe of the calyx, of two cells and four valves; receptacles tranſverſe with reſpect to the partitions, dilated, dotted. *Seeds* numerous, kidney-ſhaped.

Eſſ. Ch. Corolla funnel-ſhaped, plaited. Calyx tubular, angular, partly deciduous. Capſule ſuperior, of two cells and four valves.

D. *ſtramonium*, common thorn-apple, Engl. Bot. t. 1288. Curt. Lond. faſc. 6. t. 17. though originally a native of America, is now a frequent weed on dunghills and cultivated ground in various parts of Europe. It is an annual, of rank growth, and of a fœtid ſmell when bruiſed. Leaves flaccid, ovate, ſinuated, alternate. Flowers ſolitary, ſtalked, white, fragrant at certain times. Fruit very ſpinous. Its qualities are narcotic and dangerous. D. *faſtuoſa*, purple thorn-apple, from the Eaſt Indies, is cultivated in our ſtoves for the ſake of its flowers, which are handſome, fragrant, purple without, white within, and often furniſhed with a triple corolla. D. *arborea*, tree thorn-apple, is a magnificent arboreſcent ſpecies, a native of Peru and Chili, whoſe white flowers expand only at night, when they are very fragrant. Each is often two feet in length, and we have ſeen 150 open at a time on one tree. Leaves oblong, nearly entire. Capſules ſmooth. It is eaſily cultivated in a bark ſtove, where it ſoon becomes a weed. Six or ſeven more ſpecies are known.

DATURA, in *Gardening*, compriſes plants of the herbaceous flowery annual kind; of which the ſpecies moſtly cultivated are the common thorn-apple (D. *ſtramonium*), the blue thorn-apple (D. *tatuta*), the purple thorn-apple, (D. *faſtuoſa*), the hairy thorn-apple (D. *metel*), and the tree thorn-apple. Theſe are moſtly tall growing plants not very difficult of culture.

Method of Culture.—Theſe are plants which are propagated annually, by ſowing the ſeeds of the two firſt or hardy ſorts in the clump-borders, or other places where the plants are to remain, in patches of four or five together, covering them in to the depth of nearly half an inch. When the plants are up, the weakeſt ſhould be removed, ſo as to leave only one or two of the ſtrongeſt in each place; but the ſeeds of the latter or tender ſorts ſhould be ſown in the ſpring ſeaſon, as the latter end of March or beginning of the following month, either on a hot-bed covered by frames and glaſſes, or in pots, and managed as other tender annuals, admitting air to them freely in their early growth, and when ſome inches high, removing them into ſeparate pots, replunging them in the hot-bed, ſo formed as to draw them up to a pretty tall growth. When the weather becomes ſettled warm, as about June, they may be removed into the open air, being previouſly hardened in a gradual manner by due expoſure, either in the pots, or planted out in the borders or other places, with balls of earth about their roots. The two firſt kinds are the beſt ſuited to the laſt method of management.

Both the firſt and ſecond ſpecies are adapted to the large borders of pleaſure-grounds, where they have a good effect in mixture with others of a ſimilar growth; but the firſt is ſometimes troubleſome as a weed. The other kinds, from the beauty of their flowers, produce a pleaſing variety in aſſemblage with other potted annual plants.

DATURA *Stramonium*, in the *Materia Medica*. The whole of this plant is powerfully narcotic and poiſonous. It was firſt introduced into medicine by Dr. Stoerck, and employed by him in ſeveral caſes of mania with ſucceſs. It is occaſionally employed in epileptic and other convulſive diſorders, ſometimes with obvious advantage. The preparation commonly uſed is the inſpiſſated juice, of which, if recent and well prepared, the firſt doſe ſhould be not more than a quarter of a grain, which may be ſlowly increaſed till it produces ſome degree of vertigo, headach, and difficulty of ſwallowing. A remarkable degree of dilatation of the pupils and inſenſibility to light alſo attend the uſe of this powerful remedy, on which account ſome have ſuggeſted to employ it as a preparative to operations on the eye, where fixity and dilatation of the pupils are deſirable; but we do not know whether this has actually been put in practice.

DAVA, or USPO, in *Geography*, a province of Japan.

DAVACA TERRÆ, a portion of land in Scotland, ſo called; et apud priſcos Scotos, dawach of land, quod continent quatuor aratra terræ, quorum unum quodque trahitur octo bobus.

DAVALLIA, in *Botany*, a genus of dorſiferous ferns, named by Dr. Smith in the Memoirs of the Turin Academy, in honour of Mr. Edmund Davall, F. L. S. late of Orbe, in Switzerland, a moſt acute and intelligent botaniſt, whoſe illuſtrations of Swiſs plants, though left at his death, in 1798, in an incomplete ſtate, may one day be found worthy of being communicated to the public. Sm. in Mem. de l'Acad. de Turin, v. 5. 414. t. 9. f. 6. Tracts, 245, t. 1. f. 6. Swartz, Fil. 130. Claſs and order, *cryptogamia filices*: ſect. *Annulatæ*. Nat. Ord. *Filices dorſiferæ*.

Eſſ. Ch. *Capſules* in roundiſh, ſeparate dots, near the margin. *Cover* like a ſcale, from the ſurface, diſtinct, ſeparating outwards, terminating a vein.

The habit of this genus is firm, poliſhed, and compact, not tender, membranous, and expanſive like a *trichomanes* or *adiantum*. The *involucrum* or cover is often lunate, always ſolitary, at each round congeries of capſules, and each capſule is embraced by a genuine, diſtinct, jointed ring.

Sp. 1. D. *heterophylla*. Sm. Tracts, 250. Sw. Fil. 130. (Humata ophioglоſſa; Cavan. Leccion, 273). Barren fronds ovate, acute, undivided, entire; fertile ones linear-lanceolate, ſinuated, many-flowered. Found in Sumatra, and alſo in the Nicobar, and Ladrone iſlands. *Roots* creeping, branched, round, ſcaly. *Fronds* about half an inch or an inch aſunder; the barren ones on ſhort ſtalks, ſimple, ovate, acute, undivided, entire, ſmooth, about an inch and a half long, with a midrib and many fine veins; fertile ones above twice as long, but narrower, ſinuated like the leaf of a *pedicularis*, each lobe bearing ſeveral ſpots of fructification, every one of which is concealed by its own kidney-ſhaped *cover*. 2. D. *pinnatifida*.

Sw. Fil. 130. (Humata pinnatifida; Cav. Lecc. 273). Barren fronds ovato-lanceolate, acute, undivided, entire; fertile ones lanceolate, pinnatifid. *Cav.* Gathered by Louis Née in the Ladrone iſlands. We know it only from Cavanilles's deſcription. The barren *fronds* are ſaid to be more than two inches long, the fertile ones much longer, with linear ſegments. 3. D. *pectinata*, Sm. Tracts, 249. Frond lanceolate, pinnatifid, pectinated; ſegments obtuſe, undulated, many-flowered; the lowermoſt auricled, or half pinnatifid. A native of Malacca, the Nicobar iſlands, and Otaheite. Its ſize and habit reſemble *polypodium vulgare*, but the great number and horizontal regularity of the ſegments, which are very deep, approach, though imperfectly, to the beautiful *polypodium criſpum, ſtruthionis pennam referens*, Plum. Fil. t. 82. which Linnæus confounds with his P. *ſtruthionis*. Each lobe is furniſhed with a double row of fructifications, eſpecially in the upper parts. The *covers* are ſemicircular. The loweſt lobes of each frond are always more or leſs auricled on the lower ſide at the baſe; ſometimes they, and ſome of the next, are deeply pinnatifid. 4. D. *contigua*, Hedw. Fil. faſc. 4. Sw. Fil. 130. (Trichomanes contiguum; Forſt. Prod. 84.) Frond linear-lanceolate, pinnatifid; ſegments linear, obtuſe, ſomewhat cut. Sw. A native of the iſlands of the Pacific ocean, of which we have ſeen no ſpecimens. 5. D. *pinnata*. Cav. Lecc. 277. Frond pinnate. Leaflets linear, alternate, crenate. Stalk triangular. Cav. Found by Louis Née in Chili, as well as in the Philippine iſlands. The *ſtalk* is triangular with a longitudinal furrow, reaching to the ſummit of the plant. *Leaf* a foot long, compoſed of alternate, undulated leaflets, ſix inches long, and two lines broad, but narrower towards the point. Near every inciſion are one or two globoſe dots of fructification, each with a cup-like *cover*, which is not ſo long as broad, and adheres to the leaf by its baſe and ſides. Cav. 6. D. *falcata*. Sm. Tracts, 249. Sw. Fil. 13? Frond pinnate. Leaflets lanceolate, ſomewhat ſickle-ſhaped, undulated, many-flowered, unequally heart-ſhaped at the baſe. In the Linnæan Herbarium, but from what country is unknown. The *frond* is long and narrow. *Leaflets* very numerous, alternate, crowded, ſeſſile, about an inch long, lanceolate, bluntiſh, wavy, ſomewhat curved upwards. *Dots* numerous, each with a ſemicircular flat *cover*. Plumier's tab. 63. ſeems to be a different plant, and probably an *aſpidium*. 7. D. *pedata*. Sm. Tracts, 248. (Adiantum repens; Linn. Suppl. 446. Humata trifoliata; Cav. Lecc. 273. according to Swartz.) Frond with five angles, three-cleft and pinnatifid; the end of its ſegments crowded with fructifications. A native of the Mauritius, and of the Ladrone iſlands. *Root* long, creeping, and ſcaly. *Fronds* on upright ſcaly ſtalks, two or three inches long, each frond with five unequal angles, and compoſed of three, more or leſs diſtinct, leaflets, which are thick, poliſhed, ſtriated beneath; the central one moſt pinnatifid and acute. *Dots* ſmall, crowded near the points of the lobes, and each with a rounded cloſe cover. 8. D. *hirſuta*. Sw. Fil. 131. (Trichomanes hirſutum. Thunb. Jap. 339; but not of Linnæus.) Frond bipinnate, hairy. Leaflets confluent, lanceolate, ſickle-ſhaped, crenate on the upper edge. Sw. Grows in Japan. *Frond* with its ſtalk clothed all over with very ſhort denſe hairs; doubly pinnatifid, and a ſpan long. *Leaflets* alternate, lanceolate, bluntiſh, gradually ſhorter upwards, pinnatifid; their lobes lanceolate, crenate. *Dots* ſolitary in each notch. Thunberg. 9. D. *adiantoides*. Sw. Fil. 131. (D. domingenſis; Spreng. Sw. Filix arboreſcens adiantoides major; Plum. Fil. 7. t. 6.) Frond doubly compound. Leaflets lanceolate, pointed, pinnatifid, crenate. Dots round, almoſt marginal, with a cup-ſhaped cover. A native of Hiſpaniola and Jamaica. A beautiful fern, whoſe *leaflets* are ſometimes variouſly pinnatifid, the lobes being occaſionally rounded and ſhort, as in Plumier's figure, and at other times elongated and acute, on the ſame leaflet. The *dots* are numerous, ſo near the edge as to approach the character of a *Dickſonia*, but their *cover* is truly ſolitary, ſhort, broad, and very thin, ſeeming never to combine with any reflexed marginal cover. 10. D. *piloſiuſcula*. Frond thrice compound, pointed. Leaflets ovate, blunt, decurrent, crenate, hairy. Dots ſcattered, globoſe. Cover crenate. Sm. MSS. Communicated by the late Mr. Chriſtopher Smith from Honimoa and Amboyna. *Frond* large and ſpreading, rough in every part with ſhort tawny hairs, thrice compounded in an alternate order; the principal diviſions taper-pointed; the ultimate ones ovate, blunt, crenate. *Dots* ſparingly ſcattered, at ſome diſtance from the edge of the leaves, ſmall, yellowiſh, globoſe, each inveſted with a turgid, membraneous, pale brown or yellowiſh, cup-ſhaped, crenate cover. 11. D. *elata*. Sw. Fil. 131. (Trichomanes elatum; Forſt. Prod. 85. Wibelia elata; Bernhardi in Schrad. Journ. for 1801, 122. t. i. f. 2.) Frond thrice compound, pointed. Leaflets lanceolate, pinnatifid, cut, crowded, ſtraight; their ſegments with two teeth. Covers elliptic-oblong, ſhorter than the teeth. Found in the South-Sea iſlands. The *frond* is tall, repeatedly compounded, ſmooth, its ultimate leaflets crowded, ſmall, lanceolate, acute, many-ribbed, toothed; each tooth as it were cloven to lodge a dot of fructification, whoſe cover is elliptic-oblong, entire, not reaching to the points of the teeth. 12. D. *ſolida*. Sw. Fil. 132. (D. procera; Hedw. Fil. faſc. 4. according to Swartz. Trichomanes ſolidum; Forſt. Prod. 86.) Frond thrice compound, rhomboid. Leaflets ovate, auricled at the upper edge, notched. Dots ovate, not reaching to the notches. Covers abrupt. A native of the South-Sea iſlands, and of New Holland near Port Jackſon. *Root* clothed with very ſoft, narrow, curling ſcales. *Frond* near two feet high, ſmooth, firm, not poliſhed, alternately tripinnate, acute; its whole form, and chief diviſions, ſomewhat rhomboid. *Leaflets* much inclined to be dilated or auricled at their upper edge at the baſe: ultimate ones ovate or elliptical, bluntiſh, ſtrongly, but ſimply, notched or toothed. *Dots* ſolitary in each tooth, not reaching to the edge, ovate or urn-ſhaped, at length reddiſh, each with a cloſe *cover* of the ſame form, abrupt, but in ſome degree dilated and plaited at the extremity. Probably Rumphius's *Dryopteris arborea*, v. 6. t. 32. f. 1. may, as Dr. Swartz ſuſpects, be this plant; at leaſt we know none more like it. 13. D. *elegans*. Sw. Fil. 132. (Trichomanes denticulatum; Houtt. N. h. v. 2. t. 100. f. 2. Sw.) Frond thrice compound, lax, taper-pointed. Leaflets lanceolate, cut, ſerrated; each ſerrature double-toothed, embracing a ſolitary round dot. Brought by the late ſir G. L. Staunton from China. The *frond* has a lax and ſeemingly drooping habit, with a dark-green hue and poliſhed ſurface. *Leaflets* and their ſegments elongated; the latter lanceolate, decurrent, acute, ſtriated, ſerrated, each ſerrature formed of two forceps-like connivent teeth, between which ſtands the round *dot* of fructification, with a brown, orbicular, though ſomewhat abrupt *cover*, reaching to the edge of the leaf betwixt the teeth. We have a *Davallia* gathered by the late Mr. Chriſtopher Smith, on Barn iſland, in the ſtraits of Sincapore, which ſeems a variety of this with leſs connivent teeth, and not quite ſo lax a habit. Mr. Menzies alſo gathered one very like it, if not the ſame, in Otaheite. 14. D. *patens*. Sw. Fil. 132. Frond thrice compound; its diviſions nearly oppoſite, ſpreading. Leaflets lanceolate, pinnatifid; their ſegments linear, tipped with fructification, which

which extends rather beyond their points. Mentioned by Swartz as a native of the Eaſt Indies. We have met with nothing that preciſely anſwers to his deſcription, though Mr. Menzies found in Otaheite a ſpecies which comes very near it. 15. D. *pyxidata.* Cav. Leccion. 278. Frond thrice compound. Leaflets ſtalked, ſomewhat rhomboid, pinnatifid, or cut; their lower lobes unequal; their margins notched. Dots marginal, each ſurmounted by a blunt tooth. A native of the iſle of Luçon, and of New South Wales, near Port Jackſon. *Root* creeping, long, and very ſcaly. *Stalks* two to ſix inches high, ſmooth. *Frond* firm and ſmooth, ſix to twelve inches long, and half as broad at the wideſt part. The firſt, ſecond, and ſometimes third ſubdiviſions are alternate and ſtalked; the laſt elliptical, inclining to rhomboid, pinnatifid or cut, crenate, their lower lobes unequal in ſize. *Dots* ſolitary in each notch, reaching to its edge, but ſurmounted by its blunt incurved tooth. *Cover* reddiſh, ſomewhat urn-ſhaped and turgid; its margin rounded and wavy. 16. D. *caudata.* Cav. Leccion. 279. Frond twice or thrice compound, ſhining, taper-pointed. Leaflets ſtalked. Fructifications oblong. Cav. Diſcovered by Louis Née at the Philippine iſlands. Cavanilles, from whom alone we have any knowledge of this ſpecies, deſcribes it as much larger than the laſt, ſhining, as well as ſmooth, on the upper ſurface, doubly and alternately pinnate. The primary diviſions are eight inches long, two wide, with a terminal waved point, an inch and half long, ſcarcely a line broad. The ſubdiviſions are from one and a half to four inches in length, lanceolate, pinnatifid; wedge-ſhaped at the baſe. About the margin of each ſegment are three or four *dots* of fructification, larger than in the preceding ſpecies. 17. D. *cuneiformis.* Sw. Fil. 133. (D. didyma; Hedw. Fil. faſc. 4. Trichomanes cuneiforme. Forſt. Prod. 85; according to Swartz.) Frond thrice compound. Segments wedge-ſhaped, ſomewhat ovate, cut. Dots in pairs. Sw. Found in the South-Sea iſlands. 18. D. *ſetoſa.* Frond thrice compound, all over hairy. Leaflets alternate, decurrent, oblong, ſinuated. Dots ſolitary in each ſinus, briſtly. Sm. MSS. Found by Mr. A. Menzies in the Sandwich iſlands. The *frond* is perhaps two or three feet high, triply winged in an alternate order; the *leaflets* eſpecially are very regularly alternate, decurrent, oblong, bluntiſh, ſinuated ſo as to be almoſt pinnatifid. The *ſtalks* and whole *frond* are clothed with fine, briſtly, or ſhaggy, pellucid, jointed hairs. *Dots* ſolitary near each ſinus of the leaflets, round, brown, their *covers* concealed or clothed with numerous hairs like thoſe of the frond. 19. D. *aculeata.* Sw. Fil. 134. (Adiantum aculeatum; Linn. Sp. Pl. 1559. Filix ramoſa major, caule ſpinoſo, foliis ſeu pinnulis rotundis profundè laciniatis, ſeu cerefolii foliis; Sloane Jam. v. 1. 99. t. 61.) Frond thrice compound. Leaflets wedge-ſhaped, lobed, obtuſe, flat. Stalks zig-zag, with hooked prickles. Obſerved by Sloane, Swartz, and others, in Jamaica and Hiſpaniola. *Fronds* three or four feet high, triply winged, in an alternate order. *Stalks* ſlender, zig-zag, round, ſhining, beſet with little, ſcattered, hooked prickles. *Leaflets* ſmooth, alternate, divaricated, wedge-ſhaped, cut into two or three obtuſe, wedge-ſhaped lobes, at the extremity of each of which are lodged commonly two round *dots* of fructification, ſeemingly imbedded between the coats of the leaf, each with its own ſmall *cover* diſtinct from thoſe coats. 20. D. *dumoſa.* Sw. Fil. 135. (Adiantum fruteſcens, ſpinoſum et repens; Plum. Fil. 77. t. 94.) Fronds thrice compound. Leaflets wedge-ſhaped, lobed, abrupt; their extremities reflexed. Prickles of the ſtalks ſtraight. Plumier, and long ſince his time Thierry, have gathered this fern in Hiſpaniola. Linnæus confounded it with the preceding; and indeed it is difficult to ſay which he intended by his *Adiantum aculeatum*, neither of them being in his Herbarium. As the former is the moſt common and beſt known, we follow Dr. Swartz in conſidering it as the original ſpecies. The preſent plant is ſaid to creep to a great extent, not only along the ground, but over the trunks of trees, its *fronds* being very long, and ſo covered with ſpines that Plumier obſerves it looks more like a bramble than a fern. Theſe ſpines are not only vaſtly more numerous, and larger, than thoſe of the foregoing, but ſtraight, not hooked, and the principal ſtalks at leaſt are leſs zig-zag. *Leaflets* abrupt, not rounded at their extremities; and reflexed at the edge, not flat. *Dots* ſmall, covered by the reflexed edge of the leaf. 21. D. *fumarioides.* Sw. Fil. 135. (Acroſtichum aculeatum; Linn. Sp. Pl. 1530. Trichomanes aculeatum; Sw. Prod. 137. Davallia aculeata; Hedw. Fil. faſc. 4., according to Swartz.) Frond thrice compound. Leaflets wedge-ſhaped, deeply cut into linear ſegments. Dots ſolitary. Prickles of the ſtalks hooked. Dr. Swartz and the younger Hedwig have moſt happily determined the genus of this fern, which was altogether miſplaced in *Acroſtichum*, and which is cloſely related to the two laſt ſpecies. Linnæus very negligently quotes the ſame ſynonym of Sloane for this and his *Adiantum aculeatum.* Both are natives of Jamaica. The name *fumarioides*, though a jumble of Latin and Greek too uſual among botaniſts, admirably expreſſes the habit of this delicate fern, whoſe foliage recalls the idea of our *Fumaria capreolata.* The deflexed hooks of the ſtalks diſtinguiſh it from the laſt, and more reſemble D. *aculeata*, but the narrow, linear ſegments of the leaflets, with one *dot* of ſeed-veſſels only near the point of each, make it evidently and ſufficiently diſtinct from both. 22. D. *canarienſis.* Sm. Tracts, 246. (Trichomanes canarienſe; Linn. Sp. Pl. 1562. Jacq. Ic. Rar. v. 1. 200. Polypodium luſitanicum; Linn. Sp. Pl. 1556.) Frond thrice compound, with three principal branches. Ultimate ſegments lanceolate. Dots ſolitary. A native of Portugal, the Canary iſlands, and the country about Algiers, where, as we are informed by M. Durand, it grows on the cork tree. It is frequent in our green-houſes, being cultivated with little trouble in a pot, and almoſt always covered with fructification. The appearance of the thick rough bare roots has given it the name of hare's-foot fern. The evident abſurdity of confounding this with the genus *Trichomanes*, both on account of its habit and character, firſt led the writer of this article to conſider the genera of this tribe, and to attempt a new method of diſtinguiſhing them, by the cover of their fructification, which has ſince been univerſally adopted and carried by various writers to great perfection. The *fronds* of this ſpecies are about a foot high, almoſt as broad as long, being divided into three principal branches, and thoſe twice or thrice pinnate; the ultimate ſegments are lanceolate, ſomewhat elliptical, entire, ſuch as bear fruit dilated and cloven. *Dots* ſolitary, round, orange-coloured. *Cover* cup-ſhaped, more or leſs crenate. 23. D. *retuſa.* Cav. Leccion. 278. Sw. Fil. 133. Frond thrice compound, broadeſt at the baſe. Branches tapering. Leaflets alternate, wedge-ſhaped, in two or three ſegments, abrupt. Dots in pairs or ſolitary. Cavanilles received this ſpecies from the iſland of Luçon. We have a ſpecimen gathered by Mr. Menzies in the Sandwich iſlands, which agrees ſo exactly with his deſcription that we have no doubt of its being the ſame. The *frond* is above three feet high, ſmooth in every part, its general outline oblong, pointed, broadeſt at the baſe, the firſt pair of *pinnæ* being the longeſt. *Stalk* and *branches* round; the latter obſcurely bordered or winged. All the *pinnæ* and *leaflets* are alternate; the latter wedge-ſhaped, narrow, entire

tire at the ſides, ſtriated, tapering down into a flattiſh ſtalk; their termination very abrupt, deeply ſplit into two or three lobes unequal in length, often with a minute point at each terminal angle. *Dots* one or two at the ſummit of each lobe, ſmall. *Cover* broad, ſhort, wavy. 24. D. *microcarpa*. Frond thrice compound, lanceolate. Leaflets alternate, wedge-ſhaped, in two or three ſomewhat elliptical ſegments, abrupt. Dots in pairs, or ſolitary, minute. Sent us by the late Mr. Chriſt. Smith from Amboyna. The whole *frond* is rather ſmaller than the laſt, and lanceolate, the *pinnæ* about the middle part being the longeſt; theſe, as well as the lower ones, are nearly oppoſite; but this may be a variable circumſtance. The ſegments of the *leaflets* differ materially from the laſt in being ſomewhat elliptical, and rather contracted at the extremity, which ſtrikes the eye at firſt ſight. The *dots*, conforming to this contraction, are very ſmall and ſhort. We cannot refer this to any ſpecies deſcribed by Swartz or Cavanilles, though it is unqueſtionably allied to ſome of the following. 25. D. *chinenſis*. Sm. Tracts, 247. Sw. Fil. 133. (D. ferruginea; Cav. Leccion, 277? Adiantum chuſanum; Linn. Sp. Pl. 1558. A. tenuifolium. La Marck Encycl. v. 1. 44. A. nigrum chinenſe, tenuitèr diviſum, pinnulis minimis obtuſis plerumque bifidis; Pluk. Phyt. t. 4. f. 1. Trichomanes chinenſe; Linn. Sp. Pl. 1562. Oſb. It. 242. t. 6?) Frond thrice compound, lanceolate. Leaflets alternate, wedge-ſhaped, in two or three ſegments, abrupt, jagged. Dots in pairs, or ſolitary, roundiſh. A native of China. *Root* tufted with a few branched ſomewhat hairy fibres. *Stalk* ſmooth, channelled in front with obtuſe edges. *Frond* about a foot high, in texture and colour like D. *canarienſis*, but lanceolate as in the laſt ſpecies, alternately thrice-pinnate. *Leaflets* wedge-ſhaped, cloven, or three-cleft, rather dilated than contracted at the extremity, which is externally jagged or toothed. *Dots* ſolitary, or in pairs, large, roundiſh. *Cover* pale, wavy, cup-ſhaped. Such is the original ſpecimen which Linnæus appears to have deſcribed twice over. The figure of Oſbeck repreſents the leaflets too much dilated and rounded, and yet it is difficult to ſuppoſe his plant different from that of Linnæus, who quotes him for the ſpecimen he deſcribed, which is intermediate in the form of its leaflets between the plates of Oſbecks and Plukenet. Cavanilles's deſcription of his *Davallia ferruginea* ſo well accords with our plant, that we cannot believe them to be different, and he himſelf preſumed either that or his *retuſa* muſt be the Linnæan *Trichomanes chinenſe*. We thus reduce three ſpecies of Dr. Swartz to one. 26. D. *gilberoſa*. Sw. Fil. 134. (D. glauceſcens; Hedw. Fil. Faſc. 4. Trichomanes gibberoſum; Forſt. Prod. 85.) Frond thrice compound, glaucous beneath. Segments of the leaflets linear, entire, gibbous, obtuſe, bearing fructification at their inner margin. A native of the South-Sea iſlands, known to us only by the ſhort characters given by Forſter and Swartz. We ſhould have ſuppoſed it a *Darea* but for the authority of the latter. 27. D. *epiphylla*. Sw. Fil. 134. (Trichomanes epiphyllum; Forſt. Prod. 85.) Frond thrice compound, taper-pointed. Leaflets deeply ſerrated and cut. Dots below the points of the ſegments. A native of the South-Sea iſlands, which we have adopted, like the laſt, from Swartz and Forſter. The latter deſcribes the fructifications as ſeated on the upper ſide of the frond, which is contrary to all example, and, from the learned Swartz's ſilence, probably a miſtake. 28. D. *glauca*. Cav. Leccion. 278. Sw. Fil. 134. Frond thrice compound, glaucous. Leaflets linear, pinnatifid, acute, alternate. Dots ſolitary, globoſe. Gathered by Louis Née, in that part of the Andes called the *Cordillera del Planchon*. Cavanilles, from whom alone we have any knowledge of this ſpecies, deſcribes it as follows. "The plant, at firſt ſight, appears like the *Trichomanes tamariſciforme*, deſcribed and figured by Jacquin, in the third volume of his Collectanea, 285. t. 21. f. 2. but is not very different from it. Our plant, without including the *ſtalk*, which is ſmooth, and marked with a longitudinal groove, is more than a foot high, by four inches in breadth. It is all over of a pale hue, and thrice pinnate, in an alternate order. The *leaflets* are linear, pinnatifid, from one to three lines long, with ſharp taper points. Each of them bears, very near the edge, a ſolitary globoſe *dot* of fructification like the point of a pin." 29. D. *clavata*. Sm. Tracts, 247. (Adiantum clavatum; Linn. Sp. Pl. 1559. A. minus, foliis in ſummitate retuſis; Plum. Fil. 75. t. 101. f. *b*.) Frond upright, alternately thrice compound. Leaflets linear, club-ſhaped, ribbed. Dots ſolitary, terminal, broader than the barren part of the leaflet. A native of the Weſt Indies. *Frond* about a foot high, with a long, ſmooth, pale ſtalk; divided into ſeveral alternate principal branches, each of which is once or twice, likewiſe alternately, pinnate. *Leaflets* alternate, undivided, half an inch long, ribbed, wedge-ſhaped, but extremely narrow, except at the very ſummit, where they are dilated to receive the *dots* of fructification, which are ſolitary, tranſverſely elliptical, with a toothed *cover*. The apex of the leaflet is alſo ſimilarly toothed and abrupt. Linnæus, at one time, confounded this with a very different fern, his *Trichomanes capillaceum*. Plum. Fil. t. 99. f. D, but it does not appear that he has any where deſcribed it as ſuch. 30. D? *trifoliata*. Sw. Fil. 133. (Adiantum trifoliatum; Linn. Sp. Pl. 1558. A. triphyllum et retuſum; Plum. Fil. 81. t. 99. f. B.) Frond pendulous, zig-zag, alternately twice compound. Leaflets ternate, linear-wedge-ſhaped. Dots ſolitary, terminal. Plumier mentions this as growing in the clefts of trees, but in what particular iſland of the Weſt Indies he does not ſpecify. Swartz mentions Hiſpaniola, yet the plant does not occur in his Prodromus. We preſume, therefore, he adopted it from Plumier, and that the latter only has ſeen it. He deſcribes it as of a moſt beautiful green, with very ſlender, black, creeping roots. *Stalks* black, ſlender, branched, zig-zag. *Leaflets* ternate from each flexure of the branches, four lines long, of a very narrow wedge-like form, blunt, the extremity "bent back ſo as to cover a little collection of fine duſt." Now, if this deſcription be correct, and it is all we have to guide us, the plant is an *Adiantum* (ſee ADIANTUM, ſp. 21.); and yet Dr. Swartz ſays, "it appears rather to belong to *Davallia* than to *Adiantum*," an obſervation to which we ſhould pay the higheſt deference, and ſuppoſe Plumier to be incorrect, if Dr. Swartz had ſeen this ſpecies himſelf, which the mark of a croſs in his book implies he has not. We are, therefore, moſt inclined to believe this plant ought to remain in *Adiantum*, and we have mentioned it here chiefly to excite the attention of travelling botaniſts, and to preſerve, as much as poſſible, the knowledge of ſo pretty and curious a vegetable production.

Dr. Swartz ſuſpects that *Trichomanes capillaceum* of Linnæus, Plum. Fil. t. 99. f. D, alſo *Adiantum trilobum*. Linn. Plum. ibid. f. C, and f. A. tenuitèr diviſum, may all be *Davalliæ*, but we have not materials either to confirm or to refute this opinion. S.

DAVANA, in *Ancient Geography*, a town of Aſia, in Meſopotamia, ſeated on a plain at ſome diſtance N.E. from the river Billicha.

DAVARA, the name of a hill of Aſia Minor, towards mount Taurus. Tacitus.

DAUBA, in *Geography*, a town of Bohemia, in the

circle of Boleſlaw; 16 miles W.N.W. of Jung-Buntzel.

DAUBE, a ſmall town of Saxony, in the circle of Meiſſen or Miſnia, remarkable for a quarry of good mill-ſtones, which are ſent at great diſtances by the Elbe.

DAUBENSEE, a lake of Germany, in the circle of Bavaria; 10 miles S. of Traunſtein.—Alſo, a lake of Swiſſerland, on mount Gemmi.

DAUBING, in *Agriculture*, a term ſignifying plaſtering with clay, in the operations of ploughing, harrowing, &c.

DAUBY, a term applied to clayey land when wet, ſignifying clammy, or ſticky.

DAUBENTON, Lewis Mary, in *Biography*, doctor in medicine, member of the Royal Academy of Sciences at Paris, and of the Royal Societies of London and Berlin, was born at Montbard in Burgundy in 1716. Having taken his degree of doctor in medicine in 1740, he went to Paris, and his diſpoſition leading him particularly to the ſtudy of comparative anatomy, he was, through the influence of his countryman, the celebrated M. De Buffon, made keeper of the royal cabinet of natural hiſtory. In this ſituation he was enabled to contribute very largely to the ſplendid natural hiſtory, firſt publiſhed by M. De Buffon, in 1749, and which has been ſeveral times reprinted: every thing relating to the anatomy both of men and animals in that work being furniſhed by Daubenton. In 1784, he publiſhed at Paris, "Inſtructions for Shepherds and Proprietors of Flocks;" and in the ſame year "A methodical View of Minerals," with their diſtinctive characters, according to a new arrangement which he had contrived; he alſo communicated to the Academy of Sciences "Obſervations on the Liquor contained in the Allantois of Animals," on ſome "Teeth and Bones remarkable for their Size," and on the "Situation of the Foramen Magnum, in Men and in certain Animals." By good fortune, or by his prudence, he not only eſcaped being maſſacred during the revolution in France, but, in 1799, he was elected member of the conſervative ſenate. He died December, in the ſame year, in the the 84th year of his age, and was honoured with a funeral oration by the naturaliſt, Lacepede. Haller Bib. Anat. General Biography.

DAUCHITÆ, in *Ancient Geography*, a people of interior Libya.

DAUCIONES, a people of Scandinavia.

DAUCUS, *in Botany*. Carrot, (Δαυκος; Dioſc.) Linn. Gen. 131. Schreb. 182. Willd. Sp. Pl. v 1. 1389. Juſſ. 224. Gærtn. t 20. Claſs and order, *pentandria digynia*. Nat. Ord. *Umbelliferæ* or *Umbellatæ*.

Gen. Ch. *Umbel* compound; concave when in fruit. *Involucrum* of ſeveral pinnatifid leaves. *Cal* ſuperior, obſolete. *Cor.* Petals five, inverſely heart-ſhaped, inflexed; the outer ones larger and radiant. *Stam.* Filaments five, capillary, ſpreading; anthers roundiſh. *Piſt.* Germen inferior, ſmall, elliptical, compreſſed, rough; ſtyles two, reflexed; ſtigmas blunt. *Peric.* none. *Fruit* ovate, hiſpid. *Seeds* two, elliptic-oblong. Central flowers of each umbel abortive.

Eſſ. Ch. Involucrum pinnatifid. Corolla ſomewhat radiant. Fruit muricated. Central flowers abortive.

D. *Carota*. Common Carrot, Engl. Bot. t. 1174. Woodv. Med. Bot. t. 161. Mart. Ruſt. t. 82. is biennial, frequent in a wild ſtate about the borders of fields, and univerſally cultivated for its eſculent root. The leaves are finely divided and ſubdivided. Stem furrowed, hiſpid, branched. Flowers white, numerous, the central one only in each umbel being of a more or leſs deep blood-red, and abortive. D. *Gingidium* is a large broader-leaved ſpecies, found in the ſouth of Europe, from which D. *lucidus*, Linn. Suppl. 179, proves not to be different. D. *Viſnaga* of Linnæus, uſed in Spain for tooth-picks, is rather a ſpecies of *Ammi*. Several new ſpecies of *Daucus* are announced in the Prodromus Fl. Græcæ by Dr. Smith, and others may be found in Desfontaines' Flora Atlantica.

Daucus, in *Gardening*, comprehends a plant of the tap rooted eſculent kind; the common carrot (D. *Carota*).

Method of Culture.—In the culture of this uſeful vegetable, a deep light ſoil ſhould be employed as much as poſſible, and when of a ſandy quality it is ſtill more advantageous. It ſhould have been well manured the preceding year, as when it is applied the ſame year, the roots are apt to be affected with the canker. Where it is made uſe of the ſame year, it ſhould of courſe be well rotted, as ſuch as has been uſed in the hot bed in forcing cucumbers, melons, &c.

In preparing the ground, it ſhould be well trenched over, at no great length of time before the period of ſowing, to the full depth of eighteen inches; the lumps being well broken and reduced, and the manure when uſed at the time completely turned in. When this buſineſs is not performed in a perfect manner, the roots are liable to ſpread in a lateral direction, and become branched, and of but little value.

The ſituation ſhould be open, and free from the droppings of trees, or other inconveniences of the ſame kind.

The ſeed for this crop ſhould always be ſuch as has been collected from plants of the preceding year, and which is perfectly freſh and well ripened: as old ſeed never anſwers well in this culture, much of it being in a ſtate incapable of vegetating in a proper manner.

The ſorts moſt proper for the different garden crops, are for the early ones the horn carrot; but for the general crop, the orange is conſtantly to be employed, not only as growing more large, but more ſtraight and handſome, and keeping better, as well as being more ſweet and pleaſant to the taſte, when dreſſed for the table.

And the other varieties may be grown where variety is wanted. Whatever ſort is made uſe of, it is of much conſequence to have genuine ſeed.

As to the times of ſowing this ſort of crops, they muſt vary according as they are wanted. When they are required in ſucceſſion, three or four different ſowings ſhould be made from January till the beginning of May; but for the principal crop, the ſowings ſhould always be performed about the latter end of January, or in the beginning of the following month. A ſowing may likewiſe be made in Auguſt, to ſtand through the winter, for producing an early ſpring crop; or early crops of this ſort may be obtained by forcing them on hot-beds. The principal crop generally becomes ready for uſe about the beginning of June.

In the ſowing of the ſeed, after the ſurface of the bed has been rendered perfectly ſmooth and even by the rake, it ſhould be diſtributed in as even a manner as poſſible over the whole, and then carefully raked in. As the ſeed is of a light and chaffy nature, a calm dry time ſhould be choſen for the purpoſe, to prevent its being blown in an irregular manner into heaps. It is alſo uſeful to rub and ſeparate the chaffy parts of the ſeed well before ſowing, and ſome think it an advantage to have ſand or dry fine mould well mixed with it. It ſhould be ſown moderately thick, eſpecially when the ſoil inclines to be heavy. In very light ſoils it is ſometimes the practice to tread in the ſeed, to prevent its riſing in heaps, raking the ſurface over afterwards; but this ſhould never be done where there is any degree of ſtiffneſs in the land. The ſowings are uſually performed

formed on beds of four or five feet in breadth; but they may be made on large plats, where it is neceſſary to have a large ſpace of them.

After the plants have attained three or four inches in growth, they ſhould be thinned out from ſix to eight inches diſtance, in proportion to the ſize that is wanted; and be kept perfectly free from weeds: this is performed by a ſmall hoe with the greateſt readineſs; but ſome thin their plants out by the hand: the former is, however, the better method, as the earth is at the ſame time ſtirred about the roots of the plants. The work is beſt done when the weather is dry. The crops ſhould afterwards be occaſionally looked over every fortnight or three weeks, to be further thinned when neceſſary, and to keep the weeds from riſing in the ground.

Where theſe ſorts of roots are much wanted at an early period while young, it is better to ſow a piece of ground for the purpoſe, than to depend upon the thinnings of the general crops though theſe may often be thinned to advantage.

The crops which were put in, in Auguſt for the following ſpring produce, ſhould be managed in the ſame way; but it will be neceſſary to protect the plants, in winter, when the weather is ſevere, by coverings of ſome light dry materials, ſuch as litter, ſtraw, &c. ſo as to prevent their tops from being injured by the froſts.

Method of Culture on Hot-beds for early Uſe.—In this method of management, crops may be provided for early uſe, where thoſe of the autumn have been injured or deſtroyed by bad weather, or other cauſes.

In this intention, the ſowings ſhould be made in the beginning of January and the following month, on hot-beds formed of dung, moulded eight or ten inches deep, and covered by frames and glaſſes. In the growth of the plants, air muſt be freely admitted, by having the glaſſes removed, except in the night-time, and when the weather is ſevere. When the plants are an inch or two in height, they muſt be thinned out to the diſtance of three or four inches, and be occaſionally ſupplied with water in a moderate proportion. When the heat of the beds declines much, linings ſhould be had recourſe to as there may be occaſion, in order to keep them in a proper ſtate of growth.

By this management theſe roots may be provided a month or ſix weeks ſooner than in the other methods.

In order to preſerve the roots of the main crops in the winter, they ſhould be taken up about November, when the ſeaſon is dry; and when ſufficiently dried in the air, and cleared from earth, and their tops cut off cloſe, be packed up in dry ſand in a dry ſhed, cellar, or other convenient place, being well covered on the top with ſtraw. In this mode they may be preſerved till March or April. If they are ſuffered to remain in the ground, they are not only liable to be deſtroyed by vermin, but to become cankery, and rotten, and of courſe much loſs is ſuſtained.

And to ſave the ſeed of theſe plants, ſome of the fineſt roots ſhould be planted out about February, in rows two feet apart, and one foot diſtant from plant to plant. They will ſhoot up to ſtem in April or the following month, flower about June, and in Auguſt the ſeed becomes ripe; then the tops ſhould be cut off when dry, expoſed in the ſun, and after becoming perfectly dry, the ſeed thraſhed out, and put up into bags to be kept in a dry place for uſe. See CARROT.

DAUCUS CAROTA, in the *Materia Medica.* Carrots either boiled and maſhed to a pulp, or merely grated fine, form an excellent poultice to be applied, without the intervention of lint, to very foul ulcers particularly of the cancerous kind, which has a great and often truly ſurpriſing effect in abating the intolerable pain, and correcting the ſhocking fœtor that attends theſe dreadful diſorders.

DAUDIE, in *Geography*, a town of Egypt; 16 miles N. of Aſhmunein.

DAUE, or DAYE, in *Ancient Geography*, a town of Arabia. Steph. Byz.

D'AVELLA, GIOVANNI, in *Biography*, a friar who publiſhed at Rome in 1657, a work in folio, entitled, "Regole di Muſica," in five treatiſes, in which are promiſed "true and eaſy inſtructions for canto fermo, canto figurato, counterpoint, ſinging, and many other new and curious things," by Giovanni d'Avella, a friar, Rome, 1657. The ſplendid promiſes in the title-page are, however, as uſual, very incompletely fulfilled. The book is full of prejudices in favour of old rules, with many that are peculiar to the author; which render what was before dark and difficult, ſtill more unintelligible. From his ignorance of hiſtory, and the muſic of the ancients, he advances innumerable abſurdities, giving the Guidonian hand not only to Boethius, but to Plato and Ariſtotle; and tells us, that "Sr. Gregory ordered that no other gamut ſhould be uſed in the church, than that of Guido," who lived 500 years after him.

The account of this worthleſs publication is given as a beacon to eager collectors of old and curious treatiſes on muſic, in whom the title may increaſe "the rage of appropriation."

DAVENANT, JOHN, an Engliſh prelate of conſiderable learning, in the ſeventeenth century, was the ſon of a wealthy merchant, and born in London. He was admitted penſioner of Queen's college, Cambridge, in 1587. Here he took his degrees, and after the death of his father accepted a fellowſhip in the college. In 1609 he took his degree of doctor in divinity, and was ſhortly after appointed lady Margaret's profeſſor, and one of her preachers. In 1614 he was elected maſter of his college. He ranked ſo highly among Engliſh divines, that he was ſent with others, by James I. in the year 1618, to the ſynod of Dort, to ſit and give their votes in that ſynod. See DORT. Dr. Davenant returned from Holland in the ſpring of the following year, and was in 1621 nominated biſhop of Saliſbury. He continued high in court-favour during the remainder of James's reign; but in 1630-1, he incurred the diſpleaſure of Charles I. for maintaining the doctrine of predeſtination, in a ſermon preached before him at Whitehall. He was ſummoned to anſwer for his conduct, and expreſſed much contrition for the offence, declaring that he would at all future times conform himſelf, as readily as any other perſon, to the royal commands. By this conduct, which was truly diſgraceful to a man of talents, he eſcaped farther trouble, and was aſſured of a reconciliation, but was never afterwards admitted to court. He died of a conſumption, April 20th, 1641. He was characterized by his contemporaries for hoſpitality, kindneſs, and much meekneſs in his deportment. He publiſhed many works, but the principal was, "A Latin Expoſition of St. Paul's Epiſtle to the Coloſſians," in folio. This is the ſubſtance of lectures read by him as lady Margaret's profeſſor. At the ſynod of Dort, he inclined to the doctrine of univerſal redemption, maintaining the certainty of the ſalvation of a certain number of the elect, and that offers of pardon were ſent not only to all that ſhall repent and believe, but to all who heard the goſpel, and that all might, if they choſe, be ſaved. Dr. Davenant was buried in the cathedral at Saliſbury. Biog. Brit.

DAVENANT, WILLIAM, a poet in the reigns of Charles I. and II. was the ſon of a tavern-keeper at Oxford, in which city he was born in 1665. He ſtudied at Lincoln college, but his ſtay there was ſhort, and his firſt ſituation in

the world was page to the ducheſs of Richmond: from hence he removed to the family of Greville lord Brooke, who would probably have become a zealous patron to the poet, had he not been deprived of life by the hand of an aſſaſſin. Mr. Davenant had, however, made himſelf ſufficiently known to bring out a play, "Albovine," in the following year, 1629, with great ſucceſs. From that time he was admitted to the familiar acquaintance of the principal wits about court, among whom, for many years, he maintained a reſpectable ſtation. In 1637 he was elected poet-laureate, and his attachment to the king involved him in the troubles of that period. He was apprehended by the parliament for a ſerious charge, but contrived to elude the vigilance of his keepers, and eſcaped to France. On account of ſome ſervices done for the king, he was made a knight, in the year 1643. This honour was conferred at Glouceſter. He ſoon after went again to France, where he embraced the Roman Catholic religion. This procured him the confidence of the queen, who had ſought a refuge there, and who ſent Davenant to England, to perſuade the king to make his peace with parliament, by giving up the intereſts of the church of England. He was unſucceſsful, and was ſeverely reprimanded by his ſovereign. Upon his return to Paris, he began his heroic poem, entitled, "Gondibert;" but he ſoon quitted his retirement, and undertook the project of carrying out a colony from France to ſettle in Virginia. The ſhip, however, in which he embarked, was taken by an armed veſſel belonging to the Parliament, and ſir William Davenant was committed a cloſe priſoner to Cowes caſtle in the iſle of Wight. In this ſituation he compoſed a part of his "Gondibert;" but in October 1650 he was removed to London for trial by a high-commiſſion court. He eſcaped with his life, but was kept two years a priſoner in the tower. Upon his releaſe from confinement, he had recourſe to a public exhibition of entertainments, as a mean of extricating himſelf from the indigence into which he had fallen. Theſe entertainments, which were at firſt a mixture of declamation and muſic, led to the reſtoration of dramatic pieces; and early in the following reign ſir William Davenant was made patentee of the company which performed in Lincoln's Inn Fields. From this period he ſpent his time in comfort and reputation. He continued to write plays till his death, which happened April 7, 1668. The complete works of ſir William were publiſhed by his widow in 1675, and dedicated to the duke of York, afterwards James II. Theſe, with the exception of "Gondibert," are now forgotton. This is an unfiniſhed poem, entitled by the author an "heroic," though he meant to aſſimilate it to the epic poems of antiquity; but it differs from them in rejecting the interference of ſupernatural agents, and making it a mere narration of human events, conducted by human characters. Sir William Davenant may be regarded as one of our firſt lyric poets, as he furniſhed the court with more maſques, with incidental ſongs and plays, during the reign of Charles II. than any other of our dramatic writers. Biog. Brit.

Davenant, Charles, the eldeſt ſon of ſir William, was born in 1656. The firſt part of his education he had at Cheam in Surry; but he finiſhed his ſtudies at Baliol college, Oxford. He ſhewed an early inclination to dramatic compoſition, and at the age of nineteen brought a tragedy on the ſtage, entitled, "Circe," which was much approved. He very ſhortly after this turned his attention to the civil law, in which he obtained a doctor's degree from the univerſity of Cambridge. He had now attained to a ſufficient degree of conſequence to be returned a member of parliament for St. Ives in 1685, and about the ſame time was joined in a commiſſion with the maſter of the revels for the inſpection of the pieces to be brought on the ſtage. He obtained other poſts of emolument in king James's reign, but it was not till after the revolution that he commenced political writer, and called the attention of the public to many intereſting pieces on the trade and revenues of the country. In the following reign he was appointed to the poſt of inſpector-general of the exports and imports, the duties of which office he performed with diligence and accuracy. He died Nov. 6th, 1714. His works are numerous: they were collected and publiſhed in five volumes 8vo. in the year 1771, by ſir Charles Whitworth, to which is annexed a copious index. "Dr. Davenant," ſays ſir John Sinclair, "is certainly a moſt valuable political author, and, conſidering that the modern ſyſtem of politics, founded on a ſpirit of commerce, on public credit, on paper circulation, and on ſkill in finance, was then, in a manner, in its infancy, he undoubtedly was a writer whoſe progreſs was more advanced than could have been expected at that time. It appears from his works that he had acceſs to official information, from which he derived many advantages. He ſeems, however, to have depended too much upon political arithmetic, or the ſtrength of figures, which ought only to be reſorted to when the fact itſelf cannot be aſcertained, being only a ſuccedaneum, when better evidence cannot be procured. He was, unfortunately, alſo a party writer, and ſaw every thing in the manner the beſt calculated to promote the views and purpoſes of his political friends at the time. Every thing they did was right, while every action of their enemies was ill-intended and ruinous. He poſſeſſed a very conſiderable command of language, and is ſometimes too prolix; but, on the whole, there are certainly very few that can rival him as a political author." Biog. Brit.

DAVENTRY, in *Geography*, is a market-town in the hundred of Faroſley, and county of Northampton, England, ſeventy-three miles N.W. from London, containing, according to the returns under the late act of Parliament, 503 houſes, and 2582 inhabitants. It is an ancient town, ſtanding in an angle between the rivers Nen and Avon, which induced Mr. Pennant to derive the name from *Dwy avon tref, i. e. the town of two rivers;* thus making it of Britiſh origin; and from the Roman encampment called *Burrow-hill*, in the vicinity, the conjecture is highly probable. It is an incorporated borough, though it has not the privilege of ſending members to parliament. The corporation conſiſts of a bailiff, twelve burgeſſes, a recorder, town-clerk, two head-wardens, and twenty common-council men. The bailiff, while in office, and the following year, acts as a juſtice of the peace, and coroner of inqueſts. Of the corporation the bailiff, ex-bailiff, with the recorder, conſtitute a quorum, and can attach for all debts under the ſum of one hundred pounds; and in criminal caſes commit the accuſed to the county gaols. The quarterly-ſeſſions are held for the pariſh as a diſtinct diſtrict. The charter was granted in the reign of king John, and confirmed by queen Elizabeth. The manor, in the time of Edward the third, was granted to the celebrated John of Gaunt, and annexed to the duchy of Lancaſter. Some veſtiges of his palace ſtill remain near Daventry park, and are called Burnt-walls. A large building, now occupied by poor people, was once a priory, which was founded about the year 1090, by Hugh de Leyceſter, for monks of the Cluniac order. This was one of the monaſteries which led to the general downfall of monachiſm in England. It was diſſolved by the permiſſion of pope Clement VII. in the ſeventeenth year of king Henry VIII; and granted to cardinal Wolſey, towards the erection of his new colleges in Oxford aud Ipſwich; but, as Stow ſays, "with fatal ſucceſs to the principal actors." The revenues were valued at the

diſſolution at 236*l.* Out of this ſum, granted to Chriſt-church, Oxford, a perpetual curacy was endowed, which is always held by a ſtudent of that college. A free-ſchool was founded here in 1576 by William Parker. The learned John Wilkins, biſhop of Cheſter, author of "An Univerſal Language," and other valuable works, was born at this place in 1614.

Daventry has a large weekly market on Wedneſdays, and four annual fairs, *viz.* on Eaſter-Monday, June the 6th, Auguſt the 3d, October the 2d, and the 27th. A little to the eaſt of the town is an ancient encampment, called Burrow-hill. It is diſpoſed in an oval ſhape, and extends about three quarters of a mile in length, by one quarter in breadth. It is defended on one ſide by a double foſs and vallum, and in ſome places by three, four, and five. On the ſouth-eaſt ſide of the hill is another encampment, which contains about an acre of land, and is ſurrounded by a ſingle foſs and vallum. Though theſe works are evidently Roman, Mr. Pennant refers them to the Britons; and both he and Mr. Gale agree to fix here the Benavenna of the Itinerary. Bridge's Hiſtory of Northamptonſhire. Pennant's Journey from Cheſter to London.

DAUGHTERS, among the *Ancients*, were more frequently expoſed than ſons, as requiring greater charge to educate and ſettle them in the world. See EXPOSING *of Children*. Thoſe who had no legitimate ſons were obliged, by the Athenian laws, to leave their eſtates to their daughters, who were confined to marry their neareſt relations, otherwiſe to forfeit their inheritance; as we find to have been practiſed likewiſe among the Jews, many of whoſe laws ſeem to have been tranſcribed by Solon.

If an heireſs happened to be married before her father's death, this did not hinder the neareſt relation to claim the inheritance, and even to take the woman from her huſband; which is ſaid to have been a common caſe. Potter, Archæol. Græc. lib. iv. c. 15. tom. ii. p. 441. See SON.

The ſons and daughters of the king of England are called the ſons and daughters of England; becauſe all the ſubjects of England have a ſpecial intereſt in them. See PRINCE.

DAUHN, or DAUN, in *Geography*, a ſmall town of France, in the department of the Sarre, chief place of a canton in the diſtrict of Prum, 33 miles W. of Coblentz. It has but 320 inhabitants, and the canton in 41 communes reckons only a population of 4790 individuals.—Alſo, a town of Germany, in the circle of the Upper Rhine, called Thaun; 12 miles S. of Simmern.

DAVIANUM, in *Ancient Geography*, *Veine*, a town of Gaul, in the province called "Secunda Narbonnenſis." It was between Seleucus to the ſouth-weſt, and Vapincum towards the north-eaſt.

DAVID, in *Biography*, king of the Jews, in many reſpects an illuſtrious character of ancient times, was the youngeſt ſon of Jeſſe, of the tribe of Judah, and was born about 1085 years before Chriſt. When Saul by his miſconduct had forfeited the crown to which he had been elected, David, who had hitherto attended principally to the buſineſs of a paſtoral life, was ſingled out by providence to ſucceed him. But we muſt trace him in the early parts of his life. He was pointed out by Samuel as heir to the throne, long before he actually took upon him the duties of government; and we are informed that he was inſpired with thoſe qualities of body and mind, that prepared him for the delicate and difficult ſcenes through which he would be called to paſs. When Saul was ſinking into a ſtate of deſpondency brought on by his vice, and by diſobedience to the divine command, David, who was a proficient in muſic, was ſent for to ſoothe the anguiſh of his wounded mind by the ſounds of his harp. By the wiſdom and prudence of his conduct he gained the king's favour, and was made his armour-bearer; כלים נשא, bearer of the inſtruments or weapons, of which there were different ſorts, *viz.* the ſhield, the target and ſpear, bucklers and ſwords. David's being armour-bearer to Saul, implies no more than that he was conſtituted one of his guards. What particular duties attached to this office it would be difficult to aſcertain; they were, however, of ſo eaſy a nature as not to preclude him from attending again to his father's domeſtic concerns. A war breaking out between the Iſraelites and Philiſtines, in which, previouſly to the deciſive engagement that was expected, the champion Goliah challenged the braveſt of his foes to ſingle combat, David was allowed to accept the challenge, and Saul would have clothed him in his own armour, but he choſe to make uſe of no other weapons than his ſtaff and ſling, in the uſe of which, like the ſhepherds of his times, he was exceedingly expert. Thus accoutred he brought the proud Goliah to the ground by a ſtone which he threw from his ſling, and he inſtantly cut off his head and preſented it to Saul. The defeat of the Philiſtines was the conſequence of the death of their leader. This exploit recommended David ſo much to the king, that he reſolved to keep him near his own perſon, appointed him to many poſts of honour, and determined upon giving him his eldeſt daughter, after he had made ſome further trial of his prudence and valour. In this ſituation he acquired the friendſhip of Jonathan, Saul's eldeſt ſon, and much eſteem among the people. (1 Sam. xviii.) Saul began to be jealous of the reputation and influence which David had among all ranks of people; and at length jealouſy degenerated into fear and hatred. He reſolved to deſtroy him, and deviſed many methods for this purpoſe, but David eluded them all. The particular circumſtance that ſerved to excite the invincible jealouſy of Saul, and to induce his determination to deſtroy him, was the following: The Philiſtines had encamped in the territories of the tribe of Judah, not far from Jeruſalem; where Saul ſeems to have continued ſome time after the rout of their army, and where David received the firſt tokens of his favour. But as Saul was returning to his own city, accompanied by David, the women came out of all the cities of Iſrael, through which they paſſed, ſinging and dancing, to meet the king, with tabrets and other inſtruments of muſic to expreſs their joy; and ſinging alternately, one chorus chanted "Saul hath ſlain his thouſands;" and the other replied, "David hath ſlain his ten thouſands." This, though probably innocently intended, filled Saul with indignation and rage; and the preference thus given to David ſeems to have excited the firſt ſuſpicion, that David was the man deſignated by Samuel, when he aſſured him, that "the kingdom ſhould be given to a neighbour of his that was better than himſelf;" for Saul ſaid in his rage, "they have aſcribed to David ten thouſands, and to me they have aſcribed but thouſands; and what can he have more but the kingdom?" From this time to the very end of his life, Saul looked on David with a malignant eye, and watched every opportunity to deſtroy him. Of this he ſoon gave David two very convincing proofs; for the very next day after theſe acclamations of the women, Saul fell into one of his mad fits of melancholy, and, as we render the words, "propheſied in the midſt of the houſe," or, as the learned Dr. Chandler tranſlates the expreſſion for critical reaſons, which he aſſigns, "howled and grumbled" in his frenzy; and as David was playing, without the leaſt ſuſpicion of danger, to divert his melancholy, Saul in an inſtant threw at him a javelin, which he had in his hand, with a reſolution to ſtrike him dead to the wall. David happily eſcaped this danger, and ran out of the room; and upon his entering it a ſecond time, Saul

threw a dagger at him, which he alſo avoided, and immediately withdrew from the king's preſence. This double deliverance alarmed Saul, and he was more than ever afraid and ſuſpicious of David, becauſe he ſaw that he was under the peculiar protection of God, whilſt he found himſelf deſtitute of his direction and favour. For this reaſon he removed David from immediate attendance upon him, and gave him a regiment, which he well diſciplined, and headed on every occaſion where its ſervice was neceſſary. In this command he behaved with ſuch remarkable prudence and circumſpection, as that Saul could find no reaſon for complaint, which, though it heightened Saul's diſtruſt of, and malice againſt him, yet ſecured him the eſteem of all Iſrael and Judah; becauſe they found him a good commander, and ſucceſsful in all the expeditions in which he employed his troops.

Saul, being thus diſappointed by David's cautious and gallant behaviour, ſent for him, and treacherouſly propoſed to give his elder daughter Merab to be his wife; hoping, that by venturing on ſome dangerous expedition againſt the Philiſtines, in order the more effectually to merit the king's daughter, he would be ſome time or other cut off in an engagement by their hands. David received the propoſal with humility and gratitude; but Saul broke his promiſe, and otherwiſe diſpoſed of his daughter. However, he gave him his ſecond daughter, Michal, with a view "that ſhe might be a ſnare to him." The condition ſtipulated on the part of Saul was, "100 fore-ſkins of the Philiſtines." David accepted the offer, and, before the expiration of the time that had been fixed, produced double the number required. The Hebrews were in a perpetual ſtate of war with the Philiſtines during the whole reign of Saul: and the only juſt reaſons that could vindicate Saul in commanding, and David in executing his command, to cut off 100 Philiſtines, were either God's order, or their being at war with the Philiſtines, or the neceſſity of it to weaken their enemies, or the ſafety of their country, the ſecurity of their liberties, or ſuch like motives; and if theſe motives concurred to juſtify David in accepting the condition of becoming Saul's ſon-in-law, by bringing the hundred foreſkins, his cutting off more of them was a yet higher ſervice to the public; and ſo far from being any breach of the rules of religion or morality, was a proof of real patriotiſm and public ſpirit; highly merited the thanks of his king and country, and rendered him more worthy of the honour intended him;—his alliance with Saul by the marriage of his daughter. David, therefore, notwithſtanding what has been ſaid by Bayle, and other writers of inferior note, to the contrary, might ſtill be "the man after God's own heart," and approving himſelf ſuch in this very inſtance; for though "God is unalterable," and always requires that we ſhould "do juſtly and love mercy;" yet it does not appear that God hath any where fixed the exact number of enemies to be killed in an expedition; nor does he require that a general ſhould ſpare an implacable enemy, invading his country, deſtroying the inhabitants of it, and determined to ſubvert the religion and liberties of it, when he hath an opportunity of deſtroying him, and when ſuch deſtruction becomes neceſſary to the preſervation and ſafety of the public. In the caſe before us, David, by the deſtruction of theſe Philiſtines, does not ſeem to have acted contrary to the rules of religion and morality, if war, in ſelf-defence, be in any inſtance allowable; for the men he deſtroyed were the enemies of his country, in a ſtate of actual war with his prince and people; and, therefore, lawful prize wherever he could lay hold of them, and in every expedition in which he was employed to haraſs and deſtroy them.

David married Michal, who affectionately loved him, and Saul obſerved with regret and vexation, that God protected him; and thus his apprehenſions and dread of David were increaſed, and his hatred and malice towards him rendered ſtill more and more implacable. Soon after this, the Philiſtines renewed their hoſtilities againſt the Hebrews. David was in the action, and his prudence and bravery became ſo remarkable, that he was deemed ſuperior to all the commanders of Saul, and highly eſteemed for his military abilities and conduct. Whilſt David was gathering freſh laurels in a ſucceſsful expedition againſt the Philiſtines, Saul fell into a freſh frenzy of jealouſy and rage; and, as David was playing upon his harp, according to his uſual practice, for the kind purpoſe of diverting his melancholy, Saul threw a javelin with ſuch force at him, which, happily miſſing him, ſtuck faſt into the wall of the room where he was ſitting. David immediately fled, and retreated to his own houſe. Saul purſued him, and appointed his guards to watch him, and to prevent his eſcape; but by the artifice and aſſiſtance of his wife, he was reſcued from this danger, and got ſafe to Samuel at Ramah. As ſoon as Saul had heard of the place of his retreat, he diſpatched, at three ſeveral times, meſſengers to apprehend him; but they were deprived, in an extraordinary manner, of the diſpoſition and power to ſeize him. Saul himſelf haſtened to Ramah, with the purpoſe of apprehending David; but his reſolution was in a ſingular manner counteracted and over-ruled; and he himſelf delivered, as it were, into the power of Samuel, and David eſcaped unhurt. This incident in his hiſtory affords a noble evidence of the innocence and loyalty of Samuel and of David; and at the ſame time a pleaſing inſtance to a generous compaſſionate mind, of the care of Providence over perſecuted virtue, and of the impotence of human malice towards thoſe whom God is determined to preſerve. David availed himſelf of the opportunity that now offered itſelf of making his eſcape to Jonathan, and of engaging his interference with Saul in his favour, in which buſineſs he acted the part of a faithful friend; and in ſo doing, incurred the reſentment of his father. Upon taking his leave of Jonathan, David went to Nob, a city belonging to the prieſts, in his way to the Philiſtines, amongſt whom he intended to take refuge from the perſecutions of Saul. Having at this place recovered Goliah's ſword, he haſtened to Achiſh, king of Gath; whoſe hoſtile deſigns he counteracted, by feigning himſelf mad. It has been ſaid, by thoſe who have calumniated the character of David, that he intended to enter into a treaty of alliance with this Philiſtine prince againſt the Hebrews; but this charge is contradicted by the attendant circumſtances; for, as he fled to Achiſh, under the apprehenſion of being aſſaſſinated by the machinations of Saul, it is plain that he never manifeſted any deſign of engaging with him againſt his king and country, becauſe he was taken up as a ſpy, and then diſmiſſed as a madman. Being ordered immediately to leave the dominions of Achiſh, he made the beſt of his way out of the territories of the Philiſtines; and, in acknowledgment of his happy deliverance, he penned the 34th pſalm. Upon his coming from Gath to the tribe of Judah, he retired to the cave of Adullam; where he was joined by his brethren, and by many others who were in diſtreſs, or in debt, or diſcontented; and ſeveral other perſons of known reputation and valour. (1 Sam. xxii. 1, 2.) In this ſituation he was grievouſly diſtreſſed with thirſt; and in order to procure water for him, three of his worthies broke through the hoſt of the Philiſtines then encamped at Bethlehem, and brought it to David; but ſuch were his ſelf-denial and forbearance, that he declined drinking it, becauſe it had been obtained for him at the hazard of the lives of his friends. The cave

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of Adullam has been repreſented by thoſe who have been diſpoſed to cenſure David's conduct, as a place of rendezvous for his followers, and he has been charged with rebellion againſt Saul. But thoſe who reſorted thither did it freely, and without ſolicitation on his part; nor does it appear that David took the advantage of this circumſtance for depriving Saul either of his life or crown. In this reſpect, Mr. Bayle himſelf has been conſtrained to do him juſtice. On this occaſion, David acted ſolely upon the principle of ſelf-preſervation and defence; he never oppoſed or diſturbed the quiet of Saul's government; he never ſolicited the tribes to join him during his life, or excited a ſpirit of diſcontent and rebellion, or popular commotions againſt him; he never entered into any conſpiracy to dethrone him; never attacked his army; never by force levied contributions upon his ſubjects to ſupport him; never joined the enemies of his country to invade it; never diſputed any of his reaſonable commands, but ſerved him faithfully whilſt he employed him; never deſerted him, or provided himſelf with guards, till forced to it by the unrelenting jealouſy and rage of his unhappy perſecutor; never took any advantage that occurred for ſeizing his perſon, or deſtroying him; but in his whole conduct, behaved with all the ſubmiſſion that became him as a dutiful ſon-in-law to his father, and a good ſubject to his prince. As a faithful ſubject, he had a natural right to protection, and to ſecure himſelf from the violence of a tyrant, by any juſt and prudent meaſures within his power. His own repeated and ſolemn proteſtations of innocence ought alſo to be admitted in his favour, more eſpecially when they are confirmed and juſtified by the teſtimony of Jonathan, and that of Saul himſelf, after his life was ſpared in the cave of Engedi. (1 Sam. xxiv. 17, 18, 19. See alſo ch. xxvi. 18. 21. 25.) From the cave and ſtrong hold of Adullam, David removed to the foreſt of Hareth, where he penned the admirable hymn recorded in the 63d pſalm.

Soon after the barbarous outrage committed by Saul upon the prieſts at Nob, under the charge of Doeg, for having harboured David, he was informed that the Philiſtines were beſieging Keilah, a city in the tribe of Judah; and having inquired of the Lord, whether he ſhould go and ſmite them, and obtaining an anſwer in the affirmative, he went thither with his men, fought with the Philiſtines, brought away their cattle, ſmote them with a great ſlaughter, and thus ſaved the city and its inhabitants. This brave and gallant action merits the higheſt commendation. "It was," as Grotius (in loc.) juſtly obſerves, "an inſtance of his great love to his country, who, though proſcribed as a rebel by the king, was ſo far from injuring his country, as that he ſerved it at the coſt of his enemies." So far was David from making any attempt to keep poſſeſſion of Keilah, that when Saul was coming againſt the city on his account, and with a view of ſeizing him as his prey, he departed to the wilderneſs of Ziph, where he concealed himſelf in the natural fortreſſes of the rocks and mountains of that deſert. Saul purſued him with a deſign of taking away his life; but he was preſerved from falling into his hands. Saul, however, was called off from the purſuit by the news of a freſh invaſion of his territories by the Philiſtines. Whilſt David was in the wilderneſs with his guards, he lay near the eſtate of Nabal, who had ſheep and goats in abundance. Inſtead of ſuffering his men to pilfer or forcibly to take away any part of Nabal's property, he reſpectfully entreated ſuch a ſupply as his circumſtances required. Nabal returned a churliſh and abuſive meſſage (1 Sam. xxiv.); ſuch as was likely to excite the juſt reſentment of David. Abigail, however, the wife of Nabal, interpoſed, and by her temper and prudence, diſarmed David of his anger, and prevented the retaliation which he was meditating. In ten days after this event Nabal ſickened and died, and Abigail ſometime after became David's wife. The intercourſe on this occaſion between David and Abigail was carried on in the moſt open and public manner, in the preſence of David's men and Abigail's ſervants, in the field where they met; and it was begun and concluded without interruption, or any private conference between them, as appears by the whole ſeries of the hiſtory, that could give them the leaſt opportunity for any criminal intercourſe. If we duly conſider the ſeveral circumſtances recited in this hiſtory, although David's paſſion and oath to deſtroy Nabal and his family are by no means to be vindicated; though the reſolution was cruel, and the oath a raſh and wicked one; yet it muſt be allowed that the provocation given him was of the higheſt nature, aggravated with the moſt outrageous circumſtances, and ſuch as no military man could help grievouſly reſenting. What man of honour and generoſity, what ſoldier at the head of his troops, what ſon-in-law of a king, and heir to his throne, would have tamely borne all this vile indignity, and unmerited calumny and abuſe? Would any partiſan, in our modern armies, put up with an affront and injury like this, and not retaliate it with a ſeverity equal to what David threatened? However, he was happily prevented from avenging himſelf according to his intention, by being brought to a juſt ſenſe of the raſhneſs and cruelty of his purpoſe, and not by any methods of wickedneſs and villainy; and nothing can be more unreaſonable than the ſuſpicion of Abigail's proſtituting herſelf to David; ſince the two expreſſions, that may have given riſe to it, are not poſſibly capable of any ſuch interpretation. The firſt, "Upon me let this iniquity be," is a form of ſpeech frequently uſed in deprecating a puniſhment which another deſerves, by transferring, as it were, the crime and puniſhment upon the perſon who pleads for the criminal. (2 Kings xiv. 9. Pſ. lv. 3. Iſ. liii. 6.) It argues a corrupt mind to pervert it to a criminal meaning; and it is obviouſly, and by the faireſt interpretation, no more than if ſhe had ſaid, "Rather let me ſuffer than him." As to the other expreſſion, "I have accepted thy perſon," (ſee Gen. xxix. 21. Job xlii. 9. Iſ. iii. 3. Prov. xviii. 5.) its meaning is; "I have accepted thy interpoſition for Nabal, and for thy ſake will not execute my intended revenge upon him."

After David had honourably diſmiſſed Nabal's wife and ſervants, he concealed himſelf in the hill Hachilah, before Jeſhimon, whither he was purſued by Saul with 3000 choſen men. David, accompanied by Abiſhai, viſited the camp of Saul in the dead of the night, and found him with Abner, and all the people round about him, faſt aſleep. Abiſhai was eager to diſpatch his enemy, but David repreſſed his ardour, and manifeſted on the occaſion the moſt glorious moderation and fortitude of mind. (1 Sam. xxvi.) Was ever reſolution more generous and loyal? One ſtroke would have fixed his mortal enemy dead on the ſpot, put an end to all his fears, and mounted him to a throne. And yet this hypocrite, this diſſembler, this rebel, traitor, bloody ambitious parricide, for theſe are the titles with which he hath been decorated, immediately ſtarts back at the propoſal of it, and the proſpect of a crown will not tempt him to a baſe, diſloyal, and impious action to obtain it. David merely ordered Abiſhai to take away the ſpear at the bolſter of Saul, and the cruiſe of water that ſtood by him, and to carry them off, as the proofs of Saul's danger, and of his own fidelity to him. The whole paſſage recording this part of the hiſtory of David and Saul, if it had been found any where but in the Bible, would have been read with pleaſure, and pointed out as worthy of admiration, for the many excellencies

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that are contained in it. Notwithſtanding Saul's promiſe to David at Ziph that he would do him no more harm, yet knowing his implacable temper, and apprehending, that the ſpirit of jealouſy and rage would return on him, David lived in a ſtate of perpetual anxiety. He therefore retired with his followers to Achiſh, king of Gath, who gave him, his family and companions, a very friendly reception, and aſſigned to him the town of Ziklag, as a permanent property for himſelf and followers. Here David was joined by ſeveral mighty men of valour, who accompanied him in his invaſion of the Geſhurites, Gezrites, and Amalekites. David's conduct on this occaſion has been ſeverely cenſured, and alſo miſrepreſented by Bayle. In mitigation of the ſeverity exerciſed by David, it has been ſaid, that the Amalekites were the ancient enemies of the Jewiſh nation, doomed, many ages before this, to deſtruction by the God of Iſrael. David, therefore, might have pleaded a divine command for exterminating the reſtleſs and inveterate enemies of his country. After the expedition now mentioned was terminated, David returns to Achiſh, and upon being aſked where he made his incurſion? David anſwers, "Againſt the ſouth of Judah, &c." which reply Mr. Bayle charges with falſhood, calling it, not very liberally, "a lie." But the anſwer was literally true, but ambiguous; for all thoſe people dwelt on the ſouth of Judah, &c. David was now in a critical ſituation; and the greateſt and beſt caſuiſts have allowed, that ambiguous anſwers are not always criminal, but ſometimes juſtifiable, eſpecially in ſuch a ſituation. (See Grotius de J. B. et P. l. iii. c. 1. §. 10, and Gronovius's note on the paſſage, paragr. 1. note 74.) Of this ſentiment were Socrates, Plato, Xenophon, Cicero, the Stoics, Ariſtotle, Quinctilian and others mentioned by Grotius, (lib. v. c. 1. §. 9, page 3 and 4.)

David, having been afterwards preſſed into the Philiſtine camp and ſervice by Achiſh, was reduced to the greateſt ſtraits, and ſcarcely knew how to conduct himſelf, conſiſtently with the confidence which that prince placed in him, the duty which he owed to his country, and his own intereſt and views, as an expectant of the crown and kingdom of Iſrael. But Providence happily extricated him from this embarraſſment (1 Sam. xxix. 1, &c.); for as the troops of the Philiſtines were paſſing in review before their principal officers, David alſo with his corps marched in the rear, under the command of Achiſh, king of Gath. This circumſtance offended the Philiſtines, and their princes were peremptorily determined not to permit David and his forces to accompany them to the engagement, ſo that Achiſh was induced to diſmiſs David and his followers. On his return to Ziklag, he attacked the Amalekites, and recovered all that they had taken away, their wives and families, and entire ſubſtance; and at Ziklag, he diſtributed his ſhare of the ſpoil partly to thoſe of the elders of Judah, who were his friends, and partly among the inhabitants of thoſe towns, which had given refuge to himſelf and his men, during the time of their perſecution by Saul; and by this act manifeſted his prudence, gratitude, and juſtice.

David now reſided among the Philiſtines, in whoſe country theſe Amelekites had committed great depredations, whilſt the Philiſtines themſelves were engaged in war with the Hebrews, and incapable of defending their own frontiers. He was their ally, obliged to act in their favour, and behaved like a ſoldier of honour, in avenging the injuries that had been done them: and we may obſerve upon the whole, that David's execution of vengeance on the Amalekites for their treacherous invaſion and unprovoked acts of violence, whilſt neither the Philiſtines nor the Hebrews could defend their territories, was a deſerved and neceſſary ſeverity. There are other circumſtances and conſiderations, ſuggeſted by the hiſtory to any impartial and candid reader, which amply vindicate David's expedition againſt the Amalekites. In this expedition he evinced his reſolution and courage, and his zeal in promoting the welfare of his country, though he was in a ſtate of actual baniſhment from it, and forced to ſeek for ſhelter in the dominions of an enemy. He was further enabled to ſecure, and ingratiate himſelf with his former friends, the elders of Judah, by the preſent which he reſpectfully ſent them; and theſe were fortunate circumſtances, as they happened juſt before the death of Saul, who, with his three ſons, were killed in battle againſt the Philiſtines, upon the mountains of Gilboa.

On the third day after David's return to Ziklag (2 Sam. i. 1.) from the ſlaughter of the Amalekites, he was informed by an Amalekite of the death of Saul and his ſons, owning himſelf to be the perſon who killed him, and preſenting David with his crown and bracelet. This wretch intended thus to ingratiate himſelf with David; but he knew not his diſpoſition, and that a crown would be unwelcome to him at the price of treaſon, and that a throne would not tempt him, if it were to be purchaſed by parricide. Could he, who himſelf thrice ſpared Saul's life, when he found it abſolutely in his power, endure the man that boaſted of having murthered him? On this occaſion he behaved with that dignity and juſtice that ſet him above all deſerved reproach, however his conduct may have been unjuſtly criminated.

Upon the death of Saul and his three ſons, David having been ordered by the oracle to go up to Hebron, the capital city of the tribe of Judah, was unanimouſly choſen and anointed king over their whole tribe. It was natural for this tribe to ſeize the opportunity of Saul's death, and to acknowledge him, whom God had pointed out to them for their king; eſpecially as he was of their own tribe, and had gained the general eſteem by his perſonal virtues, and military abilities. This tribe might further have been induced to raiſe David to the throne over them, becauſe they hoped that the ancient prophecy of Jacob (Gen. xlix. 10.) was now about to be accompliſhed. This tribe was alſo the moſt powerful and reſpectable of all the twelve; and as they had a right to chuſe their own prince, they might reaſonably have expected that the other tribes would have followed their example, and, by uniting in David, quietly have ſubmitted to the appointment of God, as they themſelves had done. David was now 30 years old (B. C. 1055); and having, on many occaſions, ſhewn his courage, fortitude, moderation, and patience, and having maintained an invincible purpoſe not to haſten his acceſſion to the throne by any acts of treaſon and violence, God now began to reward his ſingular virtue; and, from a fugitive and exile, he was made king over all the tribes, by their unſolicited and voluntary conſent; as an earneſt of what God had in farther reſerve for him;—the kingdom over all his people. Iſhboſheth, a younger ſon of Saul, was a competitor with David for the ſovereignty. It is acknowledged, that David had no pretenſion to the throne by right of inheritance, and in this reſpect Saul had no more right than David, nor Iſhboſheth than either of them; the hereditary right, if any ſuch right exiſted, being veſted in Mephiboſheth, Saul's grandſon, by his eldeſt ſon Jonathan. Iſhboſheth was the mere creature of Abner, the captain of Saul's hoſt, who, ambitious of retaining the power in his own hands, made Iſhboſheth king over Iſrael by military force; without the choice or conſent of the eleven tribes, and in direct oppoſition to the choice and conſent of the tribe of Judah, and the inclination of the whole body of the people. Iſhboſheth was, therefore, in every reſpect, an uſurper, in prejudice of the right heir;

and David, as well as every man in Iſrael, had a right to oppoſe him, and prevent his eſtabliſhment in the kingdom. The right of David to the crown was indiſputable, and the higheſt by which any man could claim it. Upon the death of Saul, the throne was vacated, and the people were at full liberty, under the direction of God, to chuſe whom they pleaſed. The tribe of Judah, as we have ſaid, unanimouſly elected David for their king, and it is highly probable, that the whole body of the nation would have concurred, if they had not not been prevented by the influence of Abner. A civil war was the conſequence of theſe rival intereſts, which laſted above ſeven years under the influence and ſupport of Abner, with the eleven tribes; but when Abner perceived that his cauſe declined, and that of David proſpered, he availed himſelf of an opportunity that occurred of bringing about a revolution in favour of David. The eaſy method by which Abner effected this revolution, and the cordial manner in which the whole nation ſubmitted to David, are a demonſtration that they approved Abner's change, and were glad to accept David for their king. For no ſooner had Abner a conference with the elders of Iſrael, and put them in mind that they had formerly deſired David for their king, and that the Lord had reſolved to deliver them from the Philiſtines, and their enemies, by the inſtrumentality of David, than all the tribes came to Hebron, all the men of war, "with a perfect heart," and all Iſrael, "with one heart to make him king;" and accordiugly anointed him king over Iſrael. In this whole affair David's conduct appears to be perfectly honourable. Joab, however, reſented David's acceptance of Abner's ſubmiſſion, and having inſulted his perſon, took leave of him, with a reſolution of deſtroying Abner.

In purſuance of this reſolution, Joab, jealous of Abner, and dreading his being ſuperſeded in the command of the army by the advancement of a rival, took the opportunity of a friendly conference treacherouſly to aſſaſſinate him. In this baſe and bloody act David had no concern; ſo far from it, that he expreſſed, in the ſtrongeſt terms, his deteſtation of the baſe act. (2 Sam. iii. 28, 29.) As ſoon as Iſhboſheth was informed of Abner's death, he deſpaired of his cauſe, and gave up all for loſt. The conteſt, however, ſoon terminated in his death; for he fell a ſacrifice to the intereſted and ambitious views of two brothers, who were captains in his guards, and who hoped, by the murder of their maſter, to recommend themſelves to David, and to obtain preferment in his ſervice. David, in juſt abhorrence of this act of treaſon, ordered the perpetrators of it to be immediately executed; and as an expreſſion of reſpect for the memory of Iſhboſheth, he ordered his head to be buried in the ſepulchre of Abner in the city of Hebron. Upon the death of Iſhboſheth, all the elders of Iſrael came to David at Hebron, preſented to him the conditions on which they advanced him to the throne, which being mutually and ſolemnly agreed to, they anointed him king, "according to the word of the Lord, by Samuel," many years before: thus ſettling the government upon a ſolid foundation, and effectually providmg for the national ſecurity and peace. On this occaſion, the hiſtorian obſerves (1 Chron. xii. 40.), "There was joy in Iſrael."

The firſt act of his reign was the ſiege and ſubſequent capture of Jeruſalem from the Jebuſites, together with the fortreſs of Sion, to which he gave the name of the city of David, (2 Sam. v. 11.) whither he transferred the ſeat of government, and where he built a royal palace, making it the metropolis of the kingdom of Iſrael. On the completion of the palace, in which he was aſſiſted by the Tyrians, who were better ſkilled in architecture than the Hebrews, he penned the ode which we have in the 30th pſalm at the dedication of it. David, finding himſelf well eſtabliſhed on the throne, and ſettled in his new-built palace, reſolved to regulate his family and court. The ſcheme he formed for this purpoſe, and the regulations he adopted, are tranſmitted to us in an ode, (Pſ. ci.) which will do honour to his memory, as a good man, and an excellent king, throughout all generations. Beſides attending to his own perſonal convenience, he ſet about enlarging and beautifying Jeruſalem, and committed the care of this public work to Joab. When his public undertakings were finiſhed, which muſt have been ſeveral years in carrying on, he penned the 87th pſalm.

His increaſing proſperity excited the jealouſy of neighbouring nations, the ancient enemies of Iſrael; ſo that ſoon after his eſtabliſhment on the throne, he was obliged to concert meaſures for reſiſting them. Of theſe enemies the Philiſtines took the lead, and kept him employed in repeated conflicts, which terminated on his part in renewed victories. As ſoon as he obtained reſt, by peace at home and freedom from all foreign wars, he devoted himſelf to the buſineſs of making ſome neceſſary regulations in religion, and of providing for the more ſtated performance of the ſolemnities of divine worſhip. With this view he transferred the ark to mount Sion at Jeruſalem. The proceſſion for this purpoſe was accompanied with vocal as well as inſtrumental muſic; and David prepared an ode, (Pſ. lxviii.) to be ſung by the chanters, the ſeveral parts of which were ſuited to the ſeveral diviſions of the march, and the whole of it adapted to ſo ſacred and joyful a ſolemnity. A circumſtance occurred as the ark had juſt arrived at the city of David, or mount Sion, which has occaſioned ſome ſevere cenſures by Mr. Bayle and others: this was his dancing before the ark. But theſe cenſures betray a total ignorance of David's manner of dancing, and the poſtures he made uſe of, which ought to have been known before he could juſtly be charged with having made himſelf ridiculous by them; becauſe perſons may dance in a very briſk and lively manner, without any poſtures that ſhall deſerve contempt; and moreover there is no word in the original, that is made uſe of to expreſs David's behaviour in this proceſſion, that either implies, or will juſtify ſuch a ſuppoſition. David was frequently, during his ſubſequent reign, engaged in wars with the Philiſtines, the Moabites, the Syrians, the Edomites or Idumæans, and the Ammonites, in which he often obtained the moſt ſplendid victories, and by which he was raiſed very high in the eſtimation of the monarchs of the eaſt. In one inſtance, that has been recorded by the ſacred writers without palliation, David's conduct cannot be too ſeverely condemned: he gave himſelf up to the ſway of uncontrouled paſſions; he ruined an innocent woman, and to complete the wickedneſs of the deed, attempted to add murder to the crime of adultery. This was the affair of Bathſheba and Uriah. Much has been ſaid in order to aggravate David's guilt on this occaſion; but we owe it to juſtice and candour duly to conſider, whether there be not, by way of contraſt, any circumſtances of alleviation in this tranſaction. A good mind will derive great ſatisfaction from being able to extenuate guilt, where it can be fairly done, which, as far as it is real, ought never to be concealed or defended. David, at the commencement of this tranſaction, ſeems not to have incurred the charge of deliberation and ſettled purpoſe. Bathſheba was unknown to him, nor was he apprized that ſhe was a married woman, when he firſt caſually ſaw her. Much as he was to be blamed, his ſin, in the firſt inſtance, had not that aggravation which it would have had, if there had been more time and leiſure for reflection, and if he had purſued his criminal inclination, after having ſeriouſly and calmly

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weighed the nature and conſequences of what he was about to do, and uſed, as too many others have done in like caſes, fraud, perfidy, and force to gratify them. Bathſheba herſelf ſeems to have too eaſily yielded to the king's inclination, and thereby rendered it almoſt impoſſible for him to ſuppreſs it. Her compliance ſeems to have been voluntary, unforced, and immediate. The firſt crime being committed, and the dreaded conſequences of it appearing, the unhappy prince found himſelf involved in difficulties, out of which he knew not how to extricate himſelf. Conſcious guilt, concern for his own character, regard for the honour of the partner of his crime, and even fear of his own and her life, the puniſhment of their adultery being death; all united to put him on forming ſome contrivance, how to conceal and prevent the ſcandal of it from becoming public. But all theſe failed him. Bathſheba at any rate muſt be preſerved. His own honour was at ſtake to prevent her deſtruction; and he ſaw but one way left to ſecure that end, which he thought himſelf obliged, at any hazard, to obtain. If Uriah lived, ſhe muſt inevitably die. She muſt have died, ſays Joſephus, (Ant. l. vii. c. 7. §. 1.) as an adultereſs by the laws of her country. Uriah could have demanded the puniſhment. The law was expreſs and peremptory. Which of the two muſt be the victim? Cruel dilemma! It is at laſt determined, that the huſband ſhould be ſacrificed to ſave the wife, whom David's paſſion had made a criminal; and if he had abandoned her to her fate, he would have been cenſured by almoſt every man, as a monſter of perfidy, baſeneſs, and ingratitude. But how was Uriah to be got rid of? Poiſon, aſſaſſination, or a falſe charge of treaſon, or ſome ſecret way of deſtruction, were methods with which the eaſtern princes were well acquainted. David was above them all, and had a kind of generoſity even in his crimes. The man he was to deſtroy was a brave ſoldier, and he cauſes him to fall in the bed of honour, gloriouſly fighting againſt the enemies of his king and country. David's conduct is indeed incapable of vindication, but the circumſtances that have been mentioned afford, in the nature of them, ſome alleviation of his crimes, and ſoften the ſeverity of the hiſtorian who deſcribes them. David having thus, by accumulated guilt, taken off the man that he dreaded ſhould live, took Bathſheba to his palace, and made her his wife, to ſkreen her from a proſecution of adultery, to ſecure her againſt the penalty of death, and in ſome meaſure to repair the injury he had done her; which, as a plurality of wives was not forbidden by that conſtitution and polity under which he lived, was the leaſt compenſation that he could make, and which he was obliged in juſtice and honour to make her. One would have thought, without adverting to the obduracy of guilt, that, after ſuch a complication of aggravated crimes, David, upon a review of his conduct, would have been ſtruck with remorſe, confeſſed his ſins to God, and earneſtly ſupplicated forgiveneſs. But the contrary appears from the hiſtory to have been the caſe. He was for a conſiderable time inſenſible and callous, ſo that Nathan the prophet was employed, by an artfully compoſed fable, to induce the king to pronounce his own condemnation, even without ſuſpecting, or intending it. Bathſheba had been juſt delivered of a ſon, the fruit of her adulterous commerce with David, and who was, in the ſtrictneſs of the letter, "conceived" by his mother "in ſin, and ſhapen in iniquity." David appears to have been fond of the child, and, in the midſt of his joy on this account, Nathan demands an audience, and executes his commiſſion. The dreadful ſentence he pronounced rouſed the conſcience of David, and from the fulleſt conviction of his offence, he immediately made this acknowledgment to Nathan, "I have ſinned againſt the Lord." The pſalms he penned on this occaſion ſhew his deep ſenſe of the guilt he had contracted, and will be a memorial of the ſincerity of his repentance throughout all generations.

Vices of ſuch enormity as thoſe of David rarely paſs unpuniſhed. David met in after-life with much affliction of the ſevereſt kind, which he would naturally impute to the hand of an avenging God for his paſt offences. Abſalom his ſon rebelled againſt him, and was ſtabbed to the heart with three darts by Joab, whilſt he was ſuſpended in the midſt of a tree; contrary to the poſitive orders of David, who was much incenſed by this act of treaſon and murder; and at the ſame time he was deſerted by many of his moſt eſteemed friends. Theſe and other circumſtances excited in the monarch the moſt lively emotions of grief, which are pathetically referred to in the ſacred writings. The latter period of David's life was diſturbed by an attempt of Adonijah to ſeize the crown, which, however, he effectually repelled, by cauſing Solomon to be conſecrated and proclaimed king during his own life.

David, having ſettled Solomon's ſucceſſion to the throne, gave him a particular charge in reference to two ſtate criminals, *viz.* Joab and Shimei. With regard to Joab, David mentions three murders, as the ground of the charge (1 Kings ii. 5, 6.) not to let him die a natural death. They were thoſe of Abſalom, Abner, and Amaſa; and the order reſpecting Joab, according to every principle of equity and juſtice, was worthy of a good king, and fit to be given in the laſt moments of his life. It has been ſaid, indeed, that David was culpable for deferring to put Joab to death ſo long, and entailing the performance of this retributive act of juſtice on his ſon and ſucceſſor. Joab, it ſhould be recollected, was too powerful a ſubject for David to bring to juſtice. He attempted it twice by diſplacing him from the office of general. But he reſtored himſelf to his command by murder and treaſon, in ſpite of David, who ſeized the very firſt opportunity, after Joab's power was broken, of ordering his execution. It ſhould be conſidered farther, that whatever Joab's paſt ſervices had been to David, and however faithful he had formerly been to him, yet he had now been engaged in a treaſonable conſpiracy againſt him, to ſet aſide the intended ſucceſſion to the crown, and had actually proclaimed Adonijah king of Iſrael, during his father's life; altogether without, and even contrary to his conſent. The order reſpecting Shimei the Benjamite was founded on his having railed at and curſed David, pelting him with ſtones, and crying out to him, "Come out, come out, thou bloody man, and thou man of Belial, &c." (2 Sam. xvi. 5—9.) This charge againſt David as a bloody man, becauſe the blood of the houſe of Saul was upon him, was a ſcandalous falſehood, and uttered in the madneſs of the paſſion and malice of a man, who, being of Saul's houſe and family, was enraged to ſee that family rejected from the throne, and David advanced to it in their ſtead. David very properly reminded his ſucceſſor, that Shimei was an implacable enemy to his perſon and family, one who was not to be truſted, and would not fail to ſhow his hatred when a proper opportunity occurred. David's direction to Solomon may be underſtood to mean, that he ſhould not put Shimei to death for having curſed him, becauſe he had forgiven him upon oath; but at the ſame time he ſhould not hold him guiltleſs; leaving it to Solomon's wiſdom to inflict a proper puniſhment upon him, provided it was not a capital one. It is certain that Solomon did not underſtand his father as ordering Shimei to be put to death; but only that he ſhould keep a watchful eye over him, and prevent him from all ſeditious practices for the future. Accordingly he ordered him to build a houſe for himſelf

ſelf at Jeruſalem, where he confined him, that he might be perpetually under his inſpection, and bound him never to go farther out of it than the brook Kidron; telling him, that "whenever he paſſed it, he ſhould ſurely die." Shimei himſelf, ſenſible of Solomon's great kindneſs to him, approved the ſentence pronounced upon him, and therefore the charge that David gave him, promiſing him, upon oath, obedience to the condition, on which his life was afterwards to depend.

David died at Jeruſalem in about the 70th year of his age, B. C. 1015, having reigned over Judah 40, and over all Iſrael 33 years. Although his character was far from being faultleſs, he had unqueſtionably many excellent qualities: he is deſcribed in the ſcriptures as "a man after God's own heart;" a phraſe which referred to the qualifications that he poſſeſſed, for carrying into effect the deſigns of Providence, and to his ſteady zeal in the worſhip of the living God, in oppoſition to the idolatry of ſurrounding nations, with which the Iſraelites had been but too often infected. "The man after God's own heart" ſtands in direct oppoſition to the character of Saul, who is deſcribed as acting fooliſhly, by breaking the commandment of God by his prophet, and rejected by him, *i. e.* deprived of the ſucceſſion to the crown in his family, on account of his folly, preſumption, and diſobedience. And it therefore means one, who ſhould act prudently, and obey the commandments of God delivered to him by his prophets, and whom, therefore, God would *thus far* approve and continue to favour. Thus the expreſſion is actually interpreted by the Chaldee paraphraſe; גבר עביד רעותיה, the man who doth my will; and by St. Paul to the Jews at Antioch, who ſays (Acts xiii. 22.) "I have found David, the ſon of Jeſſe, a man after my own heart," *who ſhall execute my will.* There are, therefore, two ſenſes which are evidently implied in this character of "the man after God's own heart;" a man, who ſhould faithfully execute the will of God, according as he was commanded, and who, on that account, and ſo far, ſhould be the object of his approbation. In one or other, or both of theſe ſenſes, the expreſſion is always uſed. David, therefore, is characterized as "a man after God's own heart;" not to denote the utmoſt height of purity in his moral character, as a private man, which by no means enters into the meaning of the expreſſion, and which in no one ſingle inſtance is intended by it; but to repreſent him as one, who, in his public character, as king of Iſrael, was fit for the purpoſes to which God advanced him, and who he knew would faithfully execute the commands he ſhould give him, by his prophets; and who, on this account, ſhould be favoured and approved of God, and eſtabliſhed, himſelf and family, on the throne of Iſrael.

The particular purpoſes for which God advanced him to the throne were, that by his ſteady adherence to the one true God, and the religion which he was pleaſed to eſtabliſh by Moſes, he might be an illuſtrious example to all his poſterity that ſhould reign after him; and here he was abſolutely without blemiſh, and "a man," in the ſtricteſt ſenſe of the expreſſion, "after God's own heart;" as he never departed from his God, by introducing the deities of other nations, or permitting and encouraging the impious rites which they performed in honour of them. There was another end of providence, in David's appointment to be king over Iſrael; that, according to God's promiſe concerning him (2 Sam. iii. 10.) he might "ſave his people Iſrael out of the hands of the Philiſtines, and out of the hand of all their enemies;" and farther, that by him he might accompliſh the more ancient promiſes (Gen. xv. 18.) which God had made to Abraham, in their full extent, of giving to his ſeed "the whole country, from the river of Egypt unto the great river, the river Euphrates." And finally, God raiſed him up to exalt the glory of his people Iſrael, and to render them a flouriſhing and happy people, by the wiſdom and juſtice of his government. (Pſ. lxxviii. 71, 72.)

"See here, then, the true portrait of "the man after God's own heart," who fulfilled all his pleaſure! A prince, who, amidſt all the idolatries of the nations around him, never wickedly apoſtatized from the worſhip of his God, and was an amiable example of a ſteady adherence to thoſe forms of religion, which God had preſcribed, to all the princes his ſucceſſors; who, though king, ſubjected himſelf to God, the ſupreme king of Iſrael, and faithfully executed the commands he received from him; who made his people triumph in the numerous victories he obtained, by the directions, and under the conduct of God himſelf; who enlarged their dominions, and put them into poſſeſſion of all the territories God had promiſed to their forefathers; and who, amidſt all the ſucceſſes that were granted him, the immenſe riches he had gathered from the ſpoils of his conquered enemies, and the ſovereign power with which he was inveſted, never degenerated into deſpotiſm and tyranny, never oppreſſed his people; but governed them with integrity, ruled over them with moderation and prudence, impartially diſtributed juſtice, left an eſtabliſhed durable peace, and fixed the whole adminiſtration, both civil and religious, upon the moſt ſubſtantial and durable foundation. In theſe inſtances he was the true vicegerent of God, on whoſe throne he ſat, and all whoſe pleaſure, in theſe great inſtances, he faithfully performed. If therefore David's private moral character was worſe than it will be ever proved to be, he might be ſtill "a man after God's own heart," in the proper original ſenſe of the expreſſion; and the attempt to prove that he was not poſſeſſed of the height of moral purity, is an impertinent attempt to prove David not to be, what the ſacred hiſtory never aſſerted him to be."

As a juſt delineation of the character of David, and of the principal events of his life, is of great importance in its connection with a due regard to the ſacred writings, and with religion, we have extended it to a conſiderable length; and we ſhall cloſe it with the following abſtract of his hiſtory, with which we are furniſhed by a learned writer: A ſhepherd youth, David, the youngeſt ſon of Jeſſe, was choſen of God to be king of Iſrael, and at his command anointed to this dignity by the hands of Samuel, a venerable prophet, in the room of Saul; who had been rejected for his diſobedience to the divine orders, in feloniouſly ſeizing to his own uſe, the prey of an enemy, which God, the ſupreme king of Iſrael, had devoted to deſtruction. He is introduced to court as a man expert in muſic, a mighty valiant man, a man of war, prudent in matters, a comely perſon, and one favoured of the Lord. By his ſkill in muſic, he relieved Saul under a melancholy indiſpoſition that had ſeized him, was highly beloved by his royal maſter, and made one of his guards. In a war with the Philiſtines he accepted the challenge of a gigantic champion, who defied the armies of Iſrael, and being ſkilful at the ſling, he ſlew him with a ſtone, returned ſafely with his head, and thus ſecured to his prince an eaſy victory over his country's enemies. The reputation he gained, by this glorious action, raiſed an incurable jealouſy and reſentment againſt him, in the mind of the king his maſter; who, after two unſucceſsful attempts to murther him, married him to his younger daughter, that ſhe might be a ſnare to him, and that he might cauſe him to fall by the hands of the Philiſtines:

tines; ſending him upon an expedition againſt them, to bring in an hundred of their foreſkins, in which he hoped he would have met with his own deſtruction. In this exalted ſtation, and amidſt the dangers that encompaſſed him, he behaved with ſingular prudence, ſo that he was in high eſteem both in the court and camp. The modeſty and prudence of his behaviour, and his approved courage and reſolution, gained him the confidence and friendſhip of Jonathan, the king's eldeſt ſon, "who loved him as his own ſoul," became his advocate with his father, and obtained from him a promiſe, confirmed by an oath, that he would no more attempt to deſtroy him. But his jealouſy returned by a freſh victory David gained over the Philiſtines; who, finding the king was determined to have his life, retired from court, and was diſmiſſed in peace by Jonathan, after a ſolemn renewal of their friendſhip, to provide for his own ſafety. In this ſtate of baniſhment, there reſorted to him companies of men, who were uneaſy in their circumſtances, oppreſſed by their creditors, or diſcontented with Saul's tyrannical government, to the number of ſix hundred men, to protect him from the violence of his unreaſonable perſecutor; whom he kept in the moſt excellent order, exerciſed in the moſt friendly ſervices, and by whoſe valour he gained ſignal advantages for his country; but never employed them in oppoſition to, or rebellion againſt the king, or in a ſingle inſtance to diſtreſs or ſubvert his government. Such was the veneration he paid him, and ſo ſacred the regard he had for his life, ſuch the generoſity of his temper, that though it was thrice in his power to have him cut off, he glorioufly ſpared him, and was abſolutely determined never to deſtroy him, whom God had conſtituted the king of Iſrael. His friendſhip with Jonathan, the king's ſon, was a friendſhip of ſtrict honour, whom he never ſeduced from his allegiance and filial duty; in him Jonathan had ſo firm a confidence, that as he knew he would be king, he promiſed himſelf he ſhould be the next perſon in dignity and authority under him; and with his friend David covenanted by oath, that "he would not cut off his kindneſs from his houſe for ever." Being provoked by a churliſh farmer, who evil treated and abuſed his meſſengers, he, in the warmth of his temper, ſwore he would deſtroy him and his family; but was immediately pacified by the addreſs and prudence of a wife, of whom the wretch was unworthy; her he ſent in peace and honour to her family, and bleſſed for her advice, and keeping him from avenging himſelf with his own hand. Being forced to baniſh himſelf into an enemy's country, he was faithful to the prince who protected him; and, at the ſame time, mindful of the intereſt of his own nation, he cut off many of thoſe, who had haraſſed and plundered his fellow-ſubjects. When preſſed by the king, into whoſe dominions he retired, to join in a war againſt his own country, and father-in-law, he prudently gave him ſuch an anſwer as his ſituation required; neither promiſing the aid demanded of him, nor tying up his hands from ſerving his own prince, and the army that fought under him; only aſſuring him in general, that he had never done any thing that could give him juſt reaſon to think he would refuſe to aſſiſt him againſt his enemies. Upon the death of Saul, he cut off the Amalekite who came to make a merit of having ſlain him; and by the immediate direction of God, who had promiſed him the ſucceſſion, went up to Hebron, where, on a free election, he was anointed king over the houſe of Judah; and after about a ſeven year's conteſt, he was unanimouſly choſen king by all the tribes of Iſrael, "according to the word of the Lord by Samuel," upon the death of Iſhboſheth, who was treacherouſly murthered by two of his own captains; whom David juſtly cut off for their perfidy, treaſon, and parricide.

As king of Iſrael, he adminiſtered juſtice and judgment to all his people, was a prince of courage, and great military prudence and conduct; had frequent wars with the neighbouring nations, to which he was generally forced by their invading his dominions, and plundering his ſubjects; againſt them he never loſt a battle; he never beſieged a city without taking it, nor, as for any thing that can be proved, uſed any ſeverities againſt thoſe he conquered, beyond what the law of arms allowed, his own ſafety required, or the cruelties of his enemies rendered juſt, by way of retaliation; enriching his people by the ſpoils he took, and providing large ſtores of every thing neceſſary for the magnificent temple he intended to erect, in honour of the God of Iſrael. Having reſcued Jeruſalem out of the hands of the Jebuſites, he made it the capital of his kingdom, and the place of his reſidence; and being willing to honour it with the preſence of the ark of God, he brought it to Jeruſalem in triumph, and diveſting himſelf of his royal robes, out of reverence to God, he clothed himſelf in the habit of his miniſters, and with them expreſſed his joy by dancing and muſic; contemned only by one haughty woman; whom, as a juſt puniſhment of her inſolence, he ſeems ever to have ſeparated from his bed. Though his crimes were heinous, and highly aggravated, in the affair of Uriah and Bathſheba, he patiently endured reproof, humbly ſubmitted to the puniſhment appointed him, atoned for his ſins, as far as he could, by a ſincere repentance, and obtained mercy and forgiveneſs from God, though not without ſome ſevere marks of his diſpleaſure, for the grievous offences he had been guilty of. A rebellion is raiſed againſt him by his ſon Abſalom, whoſe life he commanded the general to ſpare. When forced by it to depart from Jeruſalem, he prevented the juſt puniſhment of a wretch who curſed and ſtoned him. When reſtored to his throne, he ſpared him upon his ſubmiſſion, and would not permit a ſingle man to be put to death in Iſrael upon account of it. He, with a noble confidence, made the commander of the rebel forces general of his own army, in the room of Joab, whom he intended to call to an account for murder and treaſon. After this, when obliged, by the command of God, to give up ſome of Saul's family to juſtice, for the murder of the Gibeonites, he ſpared Mephiboſheth, Micah, and his family, the male deſcendants of Saul and Jonathan, who alone could have any pretence to diſpute the crown with him, and ſurrendered only Saul's baſtard children, and thoſe of his daughter by Adriel, who had no right or poſſible claim to the throne, and could never give him any uneaſineſs in the poſſeſſion of it; and thus ſhewed his inviolable regard for his oaths, his tenderneſs to Saul, and the warmth of his gratitude and friendſhip to Jonathan. In the cloſe of his life, and in the near proſpect of death, to demonſtrate his love of juſtice, he charges Solomon to puniſh with death Joab, for the baſe murder of two great men, whom he aſſaſſinated under the pretence of peace and friendſhip; and to manifeſt his care of his ſucceſſor's ſafety, and prevent any diſturbances in the beginning of his government, he charges him to have an eye on the conduct of an old turbulent rebel, and, except cutting him off, to deal with him according to his prudence, and not to ſpare him if he found any thing in him worthy of death. And as if one thing more was wanting to complete the catalogue of his noble actions, he profeſſed the greateſt regard for every appearance of virtue and holineſs, and gave the moſt ſhining and indiſputable proofs of an undiſſembled reverence for, and ſincere piety to God; ever

obeying

obeying the direction of his prophets, worſhipping him alone throughout the whole of his life, and making the wiſeſt ſettlement to perpetuate the worſhip of the ſame God, throughout all ſucceeding generations.

And as to his pſalms, they breathe the genuine diſpoſition of piety; they are wrote with a true ſpirit of poetry; the ſentiments to be found in them are often the moſt grand and ſublime, which have nothing in pagan poetry to exceed, or equal them; and which, had they been wrote on any other ſubjects but thoſe of religion, would have been regarded as the proofs of a moſt excellent genius; and his admirers would have wondered at the calmneſs and ſedateneſs of his temper, who, amidſt the multiplicity of his affairs, the variety of the perſecutions he ſuffered, the imminent dangers that ſurrounded him, and the numerous wars he was engaged in, could find any leiſure hours, or tranquil diſpoſitions, for the polite and delicate entertainments of poetry and muſic.

Theſe, Chriſtians, are the out-lines of a Jewiſh prince, whom you juſtly extol as "a man after God's own heart;" whom God himſelf called to be king over Iſrael, who faithfully anſwered the purpoſes for which God raiſed him; in whoſe family he eſtabliſhed the throne; with whom he made an everlaſting covenant; and who was the great progenitor of the Meſſiah himſelf, who now reigns over all, and "ſhall reign till all his enemies are put under his feet." Chandler's Critical Hiſtory of the Life of David, 2 vols. 8vo. paſſim.

The holy and royal pſalmiſt ſeems to have owed his riſe in a great meaſure to his muſical talents. He was firſt noticed and ſent for to Saul when troubled with the evil ſpirit, as Farinelli was to the king of Spain, to try the medical power of muſic. "And it came to paſs, when the evil ſpirit from God was upon Saul, that David took an harp and played with his hand; ſo Saul was refreſhed, and was well, and the evil ſpirit departed from him." 1 Sam. chap. xvii. v. 23. This was previous to the proof of David's proweſs in ſlaying Goliah, at which time, however, Saul did not recognize him as the muſician, who had put to flight the evil ſpirit; but inquired who he was?

If it be poſſible for muſic to operate medicinally with ſucceſs, it may be imagined a palliative, at leaſt, if not a cure, for a troubled ſpirit. The human mind, under the preſſure of affliction, or warped and agitated by the contention of warring paſſions, ſeems a fit ſubject for ſoft and ſoothing ſtrains to work upon, as powerful anodynes.

Without having recourſe to a miracle in the caſe of Saul, who had offended the Divinity by his diſobedience, the whole of David's power over the diſorder of that unfortunate prince, might be attributed to his ſkilful and affecting manner of performing upon the harp.

"And Saul's ſervants ſaid unto him, Behold now, an evil ſpirit from God troubleth thee. Let our lord command now thy ſervants which are before thee, to ſeek out a man who is a cunning player on a harp. And it ſhall come to paſs when the evil ſpirit from God is upon thee, that he ſhall play with his hand, and thou ſhalt be well. And Saul ſaid unto his ſervants, Provide me now a man that can play well, and bring him to me. Then anſwered one of the ſervants, and ſaid, Behold, I have ſeen a ſon of Jeſſe the Bethlehemite, that is cunning in playing, and a mighty valiant man, and a man of war; and prudent in matters, and a comely perſon, and the Lord is with him."

"Wherefore Saul ſent meſſengers unto Jeſſe, and ſaid, Send me David thy ſon, which is with the ſheep. And Jeſſe took an aſs, laden with bread, and a bottle of wine, and a kid, and ſent them by David his ſon unto Saul. And David came to Saul, and ſtood before him. And he loved him greatly, and he became his armour-bearer. And Saul ſent to Jeſſe, ſaying, Let David, I pray thee, ſtand before me; for he hath found favour in my ſight. And it came to paſs, when the evil ſpirit from God was upon Saul, that David took an harp, and played with his hand: ſo Saul was refreſhed, and was well, and the evil ſpirit departed from him."

It was very natural for the power of this medicine to ceaſe, when the patient had no more faith in him who adminiſtered it; but, on the contrary, regarded him with a jealous eye, as one aſpiring at his crown; and who, if he did not conſpire againſt his life, muſt look upon it as an impediment to his exaltation, and impatiently wiſh for its termination: for Saul not to have had theſe ideas forced upon his mind, he muſt have been more, or leſs, than mortal. The human paſſions, thoſe gales of life, muſt either have been annihilated, or ſublimed by angelic refinement. But the hiſtory of this prince furniſhes too many inſtances of human weakneſs and frailty, to allow us to ſuppoſe him either inſenſible, or ſuperior to his ſituation. We muſt therefore ſuppoſe his diſeaſe now to have become too powerful for ſo gentle a remedy as muſic. Nor ought we to imagine that a diſeaſe, or "an evil ſpirit from the Lord, with which he was troubled," was intended to be radically cured by human means, though it had at firſt given way to them.

Soon after David had manifeſted by this inſtance his muſical ſkill, we find him a volunteer in the army of Saul, and giving extraordinary proofs of his military proweſs, by his victory over Goliah, the champion of the Philiſtines, who had ſtruck ſuch a terror into his countrymen, that they all declined to accept his challenge, regarding him as invincible. David returning from the field of battle after his victory over the giant, was met by the women of all the cities of Iſrael, "ſinging and dancing, with tabrets, with joy, and with inſtruments of muſic." 1 Sam. xviii. 6. "And the women anſwered one another as they played, and ſaid," &c. This is an indubitable proof of a chant in dialogue, or, à dui cori, being in early uſe: and it was this which probably gave riſe to the manner of chanting the pſalms in the cathedral ſervice. Pſal. lxviii. ver. 25, the damſels play with timbrels in the proceſſion before the ark. Women, even, ſays Don Calmet, whom the apoſtle forbids to ſpeak in church, had the privilege to ſing there in company with the men. But many proofs might be alleged of a permiſſion being given for females to aſſiſt in the performance of ſacred rites. In 1 Chron. chap. xxv. where the muſical eſtabliſhments for religious purpoſes are all enumerated, we are told, that "God gave to Heman fourteen ſons and three daughters. And all theſe were under the hands of their father for ſong, in the houſe of the Lord, with cymbals, pſalteries, and harps." But Miriam, Deborah, Judith, and Anne, the mother of Samuel, are all regarded by the Jews, not only as ſingers, but as poeteſſes and propheteſſes.

In the reign of king David, muſic was held in the higheſt eſtimation by the Hebrews. The genius of that prince for muſic, and his attachment to the ſtudy and practice of it, as well as the great number of muſicians appointed by him for the performance of religious rites and ceremonies, could not fail to extend its influence, and augment its perfections: for it was during this period that muſic was firſt honoured, by being admitted in the miniſtry of ſacrifice, and worſhip of the ark; as well as by being cultivated by a king.

"And David, and all the houſe of Iſrael, played before

the lord, on all manner of inſtruments, made of firwood, even on harps and on pſalteries, and on timbrels, and on cornets, and on cymbals." 2 Sam. chap. vi. ver. 5.

This is related 1 Chron. chap. xiii. ver. 8. in nearly the ſame words:

"And David and all Iſrael played before God with all their might, and with ſinging and with harps, and with pſalteries, and with timbrels, and with cymbals, and with trumpets."

In all the tranſlations theſe inſtruments are differently named. In the Syriac we are told, that David and all Iſrael ſung before the Lord, accompanied by the cithara, pſaltery, cymbal, and ſiſtrum.

The joy which David ſhewed, upon this occaſion, in leaping, dancing, ſinging, and playing, almoſt naked, before the ark, ſeemed, in the eyes of his queen Michal, to exceed the bounds of moderation, ſo much, that when ſhe ſaw him from the window, "ſhe deſpiſed him in her heart," 2 Sam. vi. 16. and, afterwards, upbraided him, in terms not very honourable to muſicians in general.

"And Michal, the daughter of Saul, came to meet David, and ſaid, How glorious was the king of Iſrael today, who uncovered himſelf in the eyes of the hand-maids of his ſervants, as one of the vain fellows ſhameleſsly uncovereth himſelf!"

Now it is much to be feared, that by the vain fellows, the queen meant Levitical ſingers, muſicians by trade, who, perhaps, like the ancient prieſts of the Syrian goddeſs, the Galli, uſed to ſing and play in the proceſſions naked.

In the fifteenth, ſixteenth, and twenty-third chapters of the firſt book of Chronicles, there is a particular account and enumeration of all the muſicians appointed by David in the ſervice of the ark, before a temple was erected. 1 Chron. xxiii. 5. David appoints four thouſand of the Levites to praiſe the Lord with inſtruments; and chap. xxv. v. 1. the number of ſuch as were inſtructed, and were cunning in ſong, is ſaid to have been two hundred four-ſcore and eight.

And, 1 Chron. ix. 33. we are told of "the ſingers, chief of the fathers of the Levites, who remaining in the chambers, were free: for they were employed in that work day and night."

Before this time, it does not appear from the ſacred writings, that any other inſtruments than trumpets, or ſinging, than in a general chorus of the whole people, was uſed in the daily celebration of religious rites; though others are mentioned in proceſſions, and on occaſions of joy and feſtivity.

The royal pſalmiſt may well be ſtyled by the Hebrews the "Sire of Sacred Song;" as his ſublime poetical effuſions and inſpirations not only procured his nation ſuch a muſical eſtabliſhment, as ſeems not to have been equalled in the ſervice of religion in any other kingdom or empire in the world; and the canticles, hymns, and pſalms, then produced, are ſtill in reverence and uſe throughout Chriſtendom, at the diſtance of 2856 years from the commencement of this tuneful and inſpired monarch's reign.

DAVID, JOHN PETER, a native of the town of Gea, was initiated into the practice of ſurgery under M. le Cat, whoſe daughter he married, in 1764. On the death of Le Cat, David ſucceeded to the places of ſurgeon-in-chief to the hotel dieu at Paris, and profeſſor of anatomy. He was alſo member of the Royal Academy of Sciences, and author of ſeveral uſeful practical works; the titles of the moſt noted are, "Recherches ſur la maniere d'agir de la Saignee," 1763, 12mo. The ſame year he publiſhed "Diſſertation ſur ce qu'il convenient de faire, pour diminuer ou ſupprimer le lait de females;" alſo "On the Manner of treating Pregnant Women, or Cautions with the view of preventing Abortion, or the premature Birth of the Child;" and in 1771, "A Philoſophical Diſſertation on the Figure of the Earth." Haller. Bib. Eloy. Dict. Hiſt.

DAVID I., king of Scotland, was brought up in England, where he married Maud, a grand-niece of William the Conqueror. He ſucceeded his brother in 1124. The earldoms of Northumberland and Huntingdon devolved on him; but on his return to Scotland, he was welcomed with every mark of reſpect and joy. His reign was proſperous: and his attention to the adminiſtration of juſtice was truly exemplary. He decided himſelf the controverſies of the nobles, and watched with the greateſt aſſiduity over the conduct of the ordinary judges. On the death of Henry I., king of England, he vindicated the cauſe of his daughter, the empreſs Maud, and that of her ſon, who was afterwards Henry II., againſt the uſurpation of Stephen. To Stephen he refuſed the cuſtomary homage for his Engliſh eſtates, and obliged the northern nobles to ſwear allegiance to Maud. At length, in 1139, a negociation took place, and Henry was put in poſſeſſion of all the Engliſh eſtates, on condition of acknowledging the power of Stephen. Maud afterwards landed in England, and ſent her ſon Henry to Carliſle, to receive the honour of knighthood from David. The remainder of his reign was proſperous, excepting the affliction which he felt for the loſs of his only ſon. He died at Carliſle in the year 1153, after a reign of twenty nine years.

DAVID II., king of Scotland, ſon of Robert Bruce, was only five years old at the death of his father in 1329; he had, however, for political reaſons, been already betrothed to Joan, ſiſter of Edward III. of England. The earl of Murray was appointed guardian to the young king, who ſoon found a rival in the perſon of Edward, ſon of John Baliol, who, ſupported by the Engliſh, invaded the kingdom, was proclaimed king, and David, like his father, did homage as vaſſal of England. For the preſent the youthful king and his ſpouſe were ſent to France for ſecurity. The Scots made a noble ſtand for independence: the patriotic cauſe at length became triumphant, and David returned from the continent in the year 1342. He was received with joy, and made proper returns of gratitude to thoſe who had vindicated his cauſe. He now thought of revenging himſelf on England, and in 1346 he invaded the northern counties, and made great havock in his progreſs. In a pitched battle fought at Neville's-croſs near Durham, he was defeated and taken priſoner. The king was carried to London, and confined in the tower till 1357, when he received his liberty, with an acknowledgment of his right to the crown, upon condition of a large ranſom. On his return, he altered the ſucceſſion to the throne from the ſon of his eldeſt to the ſon of his youngeſt ſiſter. He employed himſelf during the remainder of his reign, in compoſing the feuds and diſorders which prevailed in his own kingdom. He was often in England for the purpoſe of negociation with Edward, who ſeems to have gained a complete aſcendancy over him; ſo that David ventured to propoſe to his ſtates, that Edward or his ſon ſhould ſucceed him. This propoſal, however, was not only rejected with indignation, but nearly occaſioned an inſurrection. His queen dying, he married a ſecond time, but had no iſſue. He died in 1371, in the 47th year of his age. Univer. Hiſt.

DAVID, EL DAVID, one of the falſe Meſſiahs of the Jews, who appeared at the end of the 12th century in Perſia; he profeſſed himſelf the promiſed Meſſiah, who was deſtined by heaven to lead them back to Judea, to re-eſtabliſh the kingdom and throne of David. His followers took up arms in his defence, and committed various acts of hoſtility. At length he was betrayed and beheaded. His enterpriſe proved highly

highly diſaſtrous to the Jews throughout the Perſian dominions, vaſt numbers of whom were plundered and butchered without any mercy, and without diſtinction of age or ſex, in revenge for the outrages which they had committed during their progreſs to the power and glory which they anticipated under their leader. Moreri.

David, Francis, a learned divine in the 16th century, was a native of Hungary. Of the place of his birth we have no account, nor are we informed under whom he ſtudied; he began life a Catholic, and employed his talents in oppoſing the progreſs of Calviniſm in Tranſylvania; he afterwards became a convert to the Lutheran faith, which he ſoon abandoned for the principles of the reformed church. He was next the advocate of Unitarianiſm in its moſt ſimple ſtate. He oppoſed Socinus in the notion of giving worſhip to Jeſus Chriſt, declaring that to invoke him was an unchriſtian error, which muſt incur the diſpleaſure of the Supreme Being; and that it was equally lawful to pray to the Virgin Mary and other deceaſed ſaints, who have at no time given evidence, either that they can hear our prayers, or beſtow any thing upon us. He is ſaid to have held ſome notions nearly allied to Judaiſm, and hence he and his party were called ſemi-Judaizers. David was perſecuted by Socinus and the ſect over which he preſided, and by their means, or at leaſt by their connivance, he was thrown into priſon, where he languiſhed for ſome years, until his death, which happened in 1579. He was author of "A Letter to the Churches of Poland, on the ſubject of Chriſt's Reign of a thouſand years upon Earth," and various other pieces. Moreri. See alſo the article Socinus in this dictionary.

David's, St., in *Geography*, is a city and ſee of a biſhop in the cantreve of Dewiſland, or land of St. Dewy, i. e. St. David, and county of Pembroke, South Wales, England. It is ſixteen miles ſouth-weſt of Haverford-weſt, and two hundred and fifty-ſeven from London. The city ſtands near the promontory of Pebidiog, the *Octopitarum* of Ptolemy, called in Engliſh St. David's head. It is a poor ill-built place, and only famous for its cathedral, which was built, according to Gyraldus, by Peter As, dioceſan, in the time of Henry II. but completed, according to Willis, in the reign of king John. It preſents at this time only the remains of its former ſplendour. The nave, conſidered as part of the original building, has ſeveral chapels and oratories in a ruinous ſtate, and containing many ancient monuments. In the choir are the tombs of Owen Tewdwr, or Tudor, and Edmund earl of Richmond, father to Henry the ſeventh. "It was this tomb, and the proud memorials of his other Tewdwr anceſtors, which induced king Henry VIII. to change the intention he had formed of removing the ſee to Carmarthen, as a more central and eligible part of the dioceſe." The modern church has been lately repaired and improved; the cieling of Iriſh oak is much admired, together with a perfect Moſaic pavement The arch-epiſcopal ſee was removed to this place from Caerleon, owing to the perſecution of the Chriſtians under the reign of Diocletian, by its biſhop, David. From that time it had ſeven ſuffragan biſhoprics, but by the encroachments of the Engliſh, the ſees were ſucceſſively alienated, the archbiſhopric reduced to a ſingle dioceſe, and by the policy of the Engliſh court, the biſhopric became ſuffragan to the ſee of Canterbury.

The members of the preſent cathedral are the biſhop, who is alſo dean, a precentor, chancellor, treaſurer, four archdeacons, eight prebendaries, ſix canons, and curſal, amounting to twenty-two, which is the number of prebends. The other members are, a ſub-chanter, four prieſt-vicars, four lay-vicars, an organiſt, four choriſters, a maſter of the grammar-ſchool, a verger-porter, ſexton, and keeper of the church; in the whole forty-one.

The epiſcopal palace is now in ruins, and the biſhop's uſual reſidence is at Abergwily, near the town of Carmarthen. St. David's has neither fair nor market. The number of inhabitants cannot be exactly ſpecified. By the returns under the late act for the cantreve, or hundred, the number of houſes was 414, and of inhabitants 1803. Near St. David's-head is the iſland of Ramſey, called in Britiſh *Ynys Devanog*, the ancient Linden of the Romans; upon which once ſtood a chapel, dedicated to Devanus or St. Devanog. The iſland, which is the property of the biſhop, abounds with rabbits, and is famous for a peculiar breed of wild ſheep, nearly reſembling the *mouflon* or the animal in its natural ſtate. Near Ramſey are ſeven ſmaller iſlands, called "*the Biſhop and his Clerks*," in alluſion to the original inſtitution of St. David's. They are little more than bare rocks, and are extremely dangerous to ſhips coming from the weſtward, when the wind blows ſtrongly in ſhore. Evans's Tour through South Wales. Brown Willis's Hiſtory of St. Davids. Malkin's Scenery of South Wales.

David's-*Iſland*, St., a pariſh in the Bermuda iſlands.

David's-*Point*, a cape on the north coaſt of the iſland of Grenada. N. lat. 12° 20'. W. long. 61° 26'.

David's-*Town*, a town of America, ſeated on the Aſſanpink river, in the ſtate of New Jerſey, and county of Hunterdon, 10 or 12 miles from Trenton. A boat navigation has been lately opened by means of three locks between theſe towns.

DAVIDE, Giacomo, in *Biography*, one of the greateſt opera ſingers, with a tenor voice, that appeared on our ſtage during the laſt century. He arrived in England after we had ceaſed to have a capital performer with a *ſoprano* voice, and ſupplied his place, performing all the firſt men's parts as long as he ſtaid in this country. When he came here his voice was perhaps not ſo good as it had been; but he was a very great ſinger, with a good figure, and an excellent actor. He was not without pathetic powers, and expreſſion; but he had ſuch a facility in running diviſions, that he rendered *bravura* every air he ſung, into which he conſtantly introduced certain curious paſſages of reſearch and ſtudy, which were probably of his own invention, and which no other ſinger could execute; ſo that by too frequent repetition, they loſt their effect, by ceaſing to ſurpriſe, and to be thought wonderful! He never let a ſimple and plain paſſage be heard, which with his fine voice and ſober expreſſion would have pleaſed more, and with leſs expenditure of notes, than by all the unintelligible and unfelt difficulties with which he could diſguiſe the original melody. In ſhort, it was one general cry, that "he ſung too much," which the Italians expreſs by two ſimple words, *canta troppo*.

We have heard nothing of him lately; and he has probably ere now retired from the ſtage, if not from this world.

DAVIDISTS, Davidici, or David Georgians, a ſect of heretics, the adherents of David George, a native of Delft, who, in 1525, began to preach a new doctrine, publiſhing himſelf to be the true Meſſiah: and that he was ſent thither to fill heaven, which was quite empty for want of people to deſerve it. He is likewiſe ſaid to have denied the exiſtence of angels, good and evil, of heaven and hell, and to have rejected the doctrine of a future judgment. He rejected marriage, with the Adamites; held, with Manes, that the ſoul was not defiled by ſin; and laughed at the ſelf-denial ſo much recommended by Jeſus Chriſt. Such were his principal errors. He made his eſcape from Delft, and retired firſt into Frieſland, and then to Baſil, where he changed his name, aſſuming that of John Bruck, and died in 1556.

He left ſome diſciples behind him, to whom he promiſed, that he would riſe again at the end of three years. Nor was he altogether a falſe prophet herein; for the magiſtrates of that city being informed, at the three years end, of what he had taught, ordered him to be dug up, and burnt, together with his writings, by the common hangman.

There-

There are ſtill ſome remains of this ridiculous ſect in Holſtein, Frieſland, and other countries, whoſe temper and conduct ſeem to diſcredit the exaggerated account which ſome writers have given of their founder. He was probably a deluded fanatic and myſtic.

DAVIDOVA, in *Geography*, a lake of Ruſſia, in the government of Toboſk, 208 miles N.N.E. of Turuchanſk.—Alſo, a town of Ruſſian Siberia, on the Lena, in the government of Irkutſch; 24 miles N.N.W. of Vercholenſk.—Alſo, a town of Ruſſian Siberia, in the government of Irkutſch, on the Kirenga: 60 miles S. of Kirenſk.

DAVID'S-HYTTAN, a ſmall town of Sweden, in the province of Daland or Dalecarlia, remarkable for its ſteel manufactory.

DAVIDSO, or Davo, an iſland of Sweden in the province of Weſtmannland, which derives its name from St. David, the firſt preacher of the goſpel in Weſtmannland, who came from England about the year 1060, and founded a convent in this place.

DAVIDSON, a county of America, in Mero diſtrict, Teneſſee, bounded N. by the ſtate of Kentucky, E. by Sumner, and S. by the Indian territory. The chief town, Naſhville, lies on the great bend of Cumberland river, and is alſo watered by the Harpith and Stones rivers. It contains 9620 inhabitants, of whom 2936 are ſlaves, and furniſhes very large timber.

DAVIEL, James, in *Biography*, a native of Barre, in Normandy, where he was born Aug. 11, 1696, ſtudied ſurgery, under his uncle at Rouen, and having completed his apprenticeſhip, he was ſent to the Hotel Dieu at Paris. The plague breaking out in 1719, at Marſeilles, he, with ſeveral other young ſurgeons, who had volunteered their ſervices, was ſent thither, furniſhed with regulations for their conduct, with the view of enabling them to eſcape the infection, and of giving ſuch aſſiſtance as art could afford to the afflicted with the diſeaſe. Daviel, who had the good fortune to eſcape being infected, had acquired ſo much credit for the intrepidity and humanity of his conduct, that, ſoon after the ſubſidence of the plague, he was appointed reader in anatomy, a poſt he continued to fill for twenty years. Having made the anatomy and diſeaſes of the eye, in a particular manner, the objects of his attention, he acquired ſo much reputation for his ſkill in performing the operation for the cataract, that perſons came to conſult him from all parts of the kingdom. He at firſt depreſſed, or couched the cataract, but not being able to ſucceed in that way, in one of his patients, he extracted the cryſtalline humour, and effected a complete cure. This was in the year 1747. The ſame year he removed to Paris, where his fame having preceded him, he is ſaid to have performed the operation, by the new method, on two hundred and ſix patients, and that it completely ſucceeded with one hundred and eighty two of the number. He was ſoon after made aſſociate of the academy of ſciences at Toulouſe, of the inſtitution of Boulogne, and of the royal academy of ſurgery at Paris. Daviel continued increaſing in reputation, until, by the failure of his health, he was incapable of attending the duties of his profeſſion. In 1760 he ſuffered a ſtroke of palſy; from that time his ſtrength declined, and in Sept. 1762, a return of the paralytic affection put an end to his life. Haller Bib. Surg. Eloy Dict. Hiſt.

DAVIES, John, born at Lanvaethley, in the iſland of Angleſey, in 1534, received his education at Oxford, where he reſided four years; but having taken his degree of bachelor in arts, he obtained leave of his friends to travel into Italy. He now attended diligently to the ſtudy of medicine, and having taken the degree of doctor in that faculty, at Sienna, he returned to his native country, and acquired conſiderable fame by his ſkill and ſucceſs in practice, which he continued to the year 1609, when he died. He left no profeſſional work, but he is ſaid to have occaſionally printed ſome poems, which have not ſurvived; and a work on the Italian and Engliſh language. Eloy Dict. Hiſt.

Davies, John, a learned Welſh divine, was born in Denbighſhire, and educated by William Morgan, afterwards biſhop of St. Aſaph. He finiſhed his ſtudies, and took the degree in arts at Jeſus college. In 1616 he took his degree of doctor in divinity, and was made canon of St. Aſaph. His character was held in high eſtimation for his deep and very accurate knowledge in the Greek and Hebrew languages, and for his acquaintance with ancient writings, and curious and rare authors. His principal works are, "Antiquæ Linguæ Britannicæ nunc communiter dictæ Cambro-Brittannicæ, a ſuis Cymræcæ, vel Cambricæ, ab aliis Wallicæ rudimenta," &c. 1621, 8vo. "Dictionarium Britannico-Latinum." 1632, folio. Among the MSS. in the Bodleian Library is preſerved a piece of Dr. Davies, entitled "Adagiorum Britannicorum Specimen." The doctor aſſiſted likewiſe William Morgan and Richard Parry, ſucceſſive biſhops of Landaff, in making the verſion of the Welſh bible, which was publiſhed in the year 1620. Gen. Biog.

Davies, Sir John, an eminent perſon, as a poet, lawyer, and political writer, was born as Chiſgrove, Wiltſhire, in 1570. He ſtudied at Queen's college, Oxford, and afterwards removed to the Temple in purſuit of the law. He was called to the bar in 1595, but on account of ſome miſconduct, occaſioned by the violence of his temper, he was expelled from that ſociety. He ſeems to have been fully aware of the raſhneſs of his conduct, and retired to Oxford, as well to correct the paſſion to which he was liable, as to devote his time to the muſes. In a poem entitled "Noſce Teipſum," he acknowledges his obligation to affliction in aiding the reformation of his temper:

> "This miſtreſs lately pluck'd me by the ear,
> And many a golden leſſon hath me taught;
> Hath made my ſenſes quick, and reaſon clear;
> Reform'd my will and rectified my thought."

By this piece he eſtabliſhed his reputation as a poet, and as a ſolid judicious thinker. In 1601, Mr. Davies very laudably made ſuch ſubmiſſion for his paſt conduct as reſtored him to his chambers in the Temple. In the ſame year he was choſen member of parliament for Corfe Caſtle, and took a ſpirited part in the debates reſpecting monopolies. On the acceſſion of king James, he was particularly noticed by his majeſty, as the author of "Noſce Teipſum;" and in 1603 he was ſent to Ireland as Solicitor General, and was ſoon after made attorney-general, and a judge of aſſize; and in 1607, the honour of knighthood was conferred on him. In Ireland he was extremely inſtrumental in conveying the benefits of equal laws to thoſe parts of the iſland which had hitherto been ſtrangers to them. On his return to England he laid before his ſovereign an account of all that had been done towards the civilization of Ireland, an object which he had much at heart, and which he purſued on going back moſt aſſiduouſly. In 1612 he publiſhed "A Diſcovery of the true Cauſes why Ireland was never entirely ſubdued and brought under Obedience of the Crown of England, until the Beginning of his Majeſty's happy Reign." This work was deemed extremely valuable, and it is remarkable that in the ſame year a parliament was convoked in Ireland, the firſt in that kingdom formed by a general repreſentation; and in this, Catholics as well as Proteſtants ſat, in almoſt equal numbers. Sir John Davies was

elected member for Fermanagh, and was chosen speaker in the house by the court party. Sir John, in his opening speech, was said to be guilty of much adulation toward the king, who had shewn him many tokens of his favour. In 1614, he published "A Declaration concerning the Title of the Prince of Wales," and in 1615, "Reports of Cases adjudged in the King's Courts of Ireland." To this volume is prefixed a very learned and eloquent eulogy on the common law of England, and a vindication of its professors. He soon after returned to England, and went several circuits as judge. He was now elected member of parliament for Newcastle-under-Line, and sat in the parliament of 1621. He died in 1626 in his fifty-seventh year, after having been lately appointed lord-chief-justice of England. The principal prose works of sir John Davies were published in one volume 8vo. 1786, under the title of "Historical Tracts," &c. Sir John Davies left two children, a son an ideot, and a daughter married to Ferdinando lord Hastings. Biog. Brit.

DAVIESIA, in *Botany*, a New Holland genus of Papilionaceous plants, with ten distinct stamens, named in honour of the Rev. Hugh Davies, F.L.S. of Beaumaris, one of the chief contributors in Welsh plants to Mr. Hudson's "Flora Anglica," as well as to the "Flora Britannica" and "English Botany" of Dr. Smith and Mr. Sowerby, and author of a paper, on four British Lichens, in the 2d vol. of the Linnæan Society's Transactions. Sm. Tr. of Linn. Soc. v. 4. 220. Ann. of Bot. v. 1. 506. Class and order, *decandria monogynia*. Nat. Ord. *Leguminosæ*, sect. 4. Juss.

Gen. Ch. *Cal.* campanulate, angular, in five various segments, without any appendages. *Cor.* papilionaceous, of five petals; standard inversely heart-shaped, broad, reflexed; wings shorter, obliquely obovate; keel rather shorter than the wings, of two petals, each with a tooth above, near the base. *Stam.* ten, enclosed in the keel; filaments awl-shaped, equal, distinct, ascending, conniving; anthers roundish. *Pist.* Germen superior, ovate, compressed; style ascending, awl-shaped, reaching to the anthers; stigma simple, acute. *Peric.* Legume compressed, of one cell, and two cartilaginous elastic valves. *Seed* solitary, kidney-shaped, compressed, much smaller than the cavity.

Ess. Ch *Calyx* angular, simple, five-cleft. *Corolla* papilionaceous. *Style* awl-shaped. *Stigma* simple, acute. *Legume* compressed. *Seed* solitary.

Sp. 1. D. *acicularis*. Sm. in Sims and Konig's Annals of Bot. v. 1. 506. "Leaves linear, revolute, pungent, straight, rough, with minute teeth. Flowers axillary, solitary." *Stem* shrubby, branched, rigid. *Leaves* sessile, scattered, numerous, linear, narrow, an inch long, revolute, rough to the touch, each tipped with a sharp spine, with a very minute pair of awl-shaped stipulas at their base. *Flowers* axillary, solitary, on very short stalks, bearing a few concave, roundish, smooth bracteas. *Calyx* divided half way down into five acute, nearly equal, teeth. *Petals* yellow, variegated with crimson. It is almost peculiar to this genus, that, in drying, the yellow turns white, and the crimson becomes a dull purplish brown. *Legume* semi-ovate, sharp-pointed, perfectly compressed, about four lines long, of a rich polished chesnut-colour. A native of New South Wales, near Port Jackson. John White, M.D. 2. D. *incrassata*. "Leaves linear-wedge-shaped, compressed, vertical, oblique, thick, spinous. Flowers axillary, solitary." Sm. MSS. Whole shrub of a thick and seemingly succulent habit. *Leaves* perfectly decurrent, scattered, vertical, rough to the touch, compressed, recurved, linear, but dilated into a sort of angle at the upper edge, by which they become wedge-shaped. *Stipulas* wanting. *Flowers* few, yellow. Found at King George's Sound, on the west coast of New Holland, by Mr. A. Menzies. 3. D. *ulicina*. Sm. in Ann. of Bot. v. 1. 506. Donn. Cant. 76. (D. ulicifolia; Andr. Repos. t. 304.) "Leaves lanceolate, flat, pungent, straight, smooth. Flowers axillary, solitary." Sm. MSS. A rather more humble and more bushy shrub than either of the former, with sessile, not decurrent, small, lanceolate, smooth leaves. *Flowers* copious, on small, bracteated, solitary stalks, yellow, with a crimson crescent-shaped spot in front of the standard, and a stain of the same hue at its back, which style of colouring seems universal in this genus, as far as we have seen, as likewise frequently in others of the same natural tribe. *Pod* ovate, pointed, flattened. Brought from Port Jackson, and long ago raised from seed by several cultivators about London, being the only real species of *Daviesia* cultivated in Britain. It thrives in sandy peat earth, with the shelter of a green-house, but must be sparingly supplied with water in winter. It flowers plentifully in May or June. 4. D. *reticulata*. "Leaves lanceolate, pungent, reticulated with veins on both sides. Stipules in pairs, within the insertion of the leaves. Flowers axillary, solitary." Sm. MSS. A small branching shrub, of which we have seen only a dried specimen, gathered by Mr. Menzies near King George's Sound, New Holland. Its numerous *leaves*, rather above half an inch long, are most elegantly reticulated on both sides with fine yellow interbranching veins. *Stipulas* intrafoliaceous, or standing within the insertion of each leaf, a very remarkable character, this being the only species, except the first, in which these organs have been observed at all, and they here approach greatly to the nature of the stipulas of the genus *Puttenæa*, as also do the bracteas of the present plant, being silky at their backs, and closely imbricated round the base of the almost sessile flower. The *calyx*, however, decides the genus, being angular, and destitute of appendages. The *legume* has not been seen. 5. D. *squarrosa*. Sm. in Ann. of Bot. v. 1. 507. "Leaves heart-shaped, pungent, reflexed, rough in the margin. Flower-stalks axillary, single-flowered, mostly solitary." A native of the country not far from Port Jackson, New South Wales, whose thick woody perennial *root* throws up numerous, slender, wand-like, furrowed, rough, slightly branched *stems*, two feet high, clothed from top to bottom with numerous, small, scattered, sessile, reflexed, heart-shaped, *leaves*, whose edges are thickened and rough, and their points spinous. From the bosom of each leaf springs one, rarely two, slender, smooth, simple *flower stalks*, about as long as the corresponding leaf, with a few concave, roundish *bracteas* about the lower part. *Flowers* solitary, smaller than in any of the former, but apparently of the same colours, with an obscurely two-lipped calyx. 6. D. *umbellulata*. Sm. in Ann. of Bot. v. 1. 507. "Leaves lanceolate, flat, pungent. Flower-stalks axillary, solitary, each bearing an umbel of about four flowers. Calyx truncated." Allied to the last in habit, and a native of the same country. *Leaves* much longer, lanceolate, spreading, nearly smooth. *Flower-stalks* shorter than the leaves, bearing a few little scattered *bracteas*, and an umbel of about four flowers, with several larger bracteas at its base. These *flowers* differ from those of D. *squarrosa*, in having the upper lip of the *calyx* singularly truncated, and not cloven. The calyx in this genus is a part of the fructification which most differs among species otherwise the nearest akin. 7. D. *corymbosa*. Sm. in Ann. of Bot. v. 1. 507. "Leaves linear-oblong, flat, unarmed. Flower-stalks axillary, in pairs, corymbose, many-flowered. Calyx regular." Gathered by colonel Paterson, near Hawkesbury river, New South Wales. It is larger than the last. *Leaves*

five or ſix inches long, reſembling thoſe of ſeveral *Mimoſæ* of New Holland, almoſt lanceolate, ſlightly oblique, entire, ſmooth, acute, but not tipped with a ſpine. *Flower-ſtalks* axillary, in pairs, corymboſe, rather unequal, one being earlier than the other, both ſhorter than the leaf. *Bracteas* one under each partial ſtalk, and ſome ſcattered. *Flowers* numerous, their calyx-teeth as nearly equal and regular as they can be in a papilionaceous flower. 8. D. *cordata*. "Leaves heart-ſhaped, claſping the ſtem, reticulated with veins. Flower-ſtalks axillary, cluſtered, corymboſe, many-flowered. Calyx truncated." Sm. MSS. This ſpecies is very remarkable for its large heart-ſhaped *leaves*, three or four inches long, claſping the very angular branches. They are firm and coriaceous, marked with a prominent net-work of innumerable veins. *Flower-ſtalks* corymboſe, unequal, four or five from the boſom of each leaf, bracteated, many-flowered. Two upper teeth of the *calyx* combined and truncated as in the 6th ſpecies. This is a native of the country near King George's Sound, and is one of the largeſt of its genus, having the habit of ſome great *Borbonia* or *Crotalaria*. 9. D. *alata*. "Stem leafleſs, winged. Umbels lateral. Calyx and bracteas fringed." Sm. MSS. A very remarkable ſpecies, found near Port Jackſon, but few ſpecimens have been brought to Europe. The adult *ſtem* is triply winged throughout, the wings ſmooth, entire, even, about a line broad, tapering down to the baſe of each branch, and only interrupted here and there by buds, ſcattered alternately along the branches. *Umbels* ſolitary from ſeveral of the upper buds, on ſhort bracteated ſtalks, moſtly five-flowered. Immediately under the rays of the umbel ſeveral larger bracteas, very remarkably jagged or fringed, and the elongated, nearly equal, teeth of the *calyx* are fringed in the ſame manner, which is one of the ſtriking peculiarities of this plant. 10. D. *juncea*. "Stem leafleſs, round, furrowed, naked. Umbels lateral. Calyx and bracteas entire." Sm. MSS. Brought by Mr. Menzies from King George's Sound. Its ruſhy habit, ſomewhat like *Spartium junceum*, the *ſtem* being round, furrowed, roughiſh, without any wings, renders it abundantly diſtinct from the laſt, to which it is otherwiſe next akin. The *bracteas* and *calyx*, moreover, are not at all fringed; the former are peculiarly concave and ribbed; the latter nearly regular, indeed, but the five teeth are ſhort, their edges very minutely downy only. *Petals* of both theſe ſpecies, as far as can be judged from dried ſpecimens, of the ſame colours as in the generality of the genus.

Propagation and Culture.—All the ſpecies are ſhrubby, and, probably, like papilionaceous plants in general, beſt raiſed from ſeeds, which, in this tribe may, for the moſt part, be kept long, and tranſported to a great diſtance. It is rather remarkable that ſeeds of D. *ulicina* only, as far as we are informed, have ſucceeded in Europe. Of the cultivation of this we have already ſpoken. It is ſaid alſo to be capable of being multiplied by cuttings, which is needleſs, as its ſeeds ripen well in our green-houſes. S.

DAVIESIA *denudata*. Venten. Choix. t. 6. See VIMINARIA *denudata*.

DAVILLA, HENRY CATHERINE, in *Biography*, a celebrated Italian hiſtorian, was born in the year 1576, in Padua. His father held a conſiderable poſt in the kingdom of Cyprus, when the iſland was captured by the Turks, by which event he was reduced to poverty. At an early age Henry was taken into France, and was ſoon after made a page at court. He entered into the military ſervice, and gave ſome ſignal proofs of courage, in which his life was often in imminent danger. In 1599, he returned to Padua at the deſire of his father, and, upon his death, Henry engaged in the ſervice of the Venetian republic, by which he was employed in duties of the higheſt import; and in theſe acquitted himſelf ſo well, and ſo much to the ſatisfaction of the ſenate, that he was permitted to ſtand next the doge, as his anceſtors, the conſtables of Cyprus, had formerly done. Notwithſtanding his various active employments, Davilla found time for literary purſuits: in 1631 he publiſhed in Italian, his "Hiſtory of the civil Wars of France." It comprehends the events of 40 years, *viz.* from the death of Henry II. to the peace of Vervins, in 1598, and is highly eſteemed for the perſpicuity of the ſtyle and arrangement, and for the fidelity and accuracy of the facts. His reflections are judicious and ſenſible, and his narrative is pleaſant and lively. In the following year he was appointed to the command of Crema, and ſet out from Venice on his journey: an unfortunate diſpute aroſe between him and the perſon who was bound to furniſh him with carriages, which terminated in the death of Davilla, who was ſhot dead by his brutal opponent in the preſence of his wife and children. Some other perſons were killed and wounded in the affray; but one of his ſons revenged the death of his father on the murderer. The beſt editions of Davilla's hiſtory are that of the Louvre in 1644; of Venice in 1733; and that printed in London in 1755. It has been tranſlated into ſeveral modern languages. Moreri.

DAVIS, JOHN, an able navigator, who has given name to a ſtrait leading to Baffin's bay, was born at Sandridge, near Dartmouth. He ſhewed at a very early age a ſtrong diſpoſition for a maritime life, and by his great aſſiduity, after he was admitted to follow the bent of his inclination, he acquired great reputation. In 1585 he was entruſted with the conduct of an expedition, for exploring a north-weſt paſſage from America to the Eaſt Indies. He proceeded to Greenland, and after paſſing the moſt ſoutherly point, he came to that ſtrait which has ever ſince borne his name. Having ſailed up the ſtrait thirty leagues or more, he returned to England. In a ſecond expedition he explored the coaſts and inlets which he had only ſeen before. And in a third, in 1587, he entered the ſtrait again, and ſailed as far as lat. 73°: he then ſailed weſtward till he fell in with American land; from the circumſtances attending theſe voyages he became ſanguine in the expectation of finding a paſſage; but the threatened Spaniſh invaſion obliged him to return home. He ſailed, 1591, to the South-ſeas, as captain of the Deſire, under the command of Mr. Cavendiſh, by whom he was charged with miſconduct in deſerting him. After this Mr. Davis made five voyages to the Eaſt Indies, in the capacity of pilot. During the laſt he loſt his life, in an engagement with ſome Japaneſe, on the coaſt of Malacca. This happened at the cloſe of the year 1605. He left behind him an account of ſome of his voyages, and other tracts. Biog. Brit.

DAVISBURG, in *Geography*, a poſt-town in Chriſtian county, Kentucky, 816 miles W. of Waſhington.

DAVIS's *Cove*, a cove on the weſt coaſt of the iſland of Jamaica; two miles N. of Green-iſland harbour.

DAVIS's *Inlet*, a river or arm of the ſea, on the E. coaſt of Labrador, the mouth being ſituate in N. lat. 56° 20'. W. long. 60° 10'.

DAVIS's *Land*. See EASTER *Iſland*.

DAVIS's *Quadrant*. See BACK-STAFF.

DAVIS's *Strait*, in *Geography*, a narrow ſea which ſeparates the north main of America from the weſtern coaſt of Greenland, running N. W. from Cape Farewell, N. lat. 60°, to Baffin's bay, in N. lat. 80°, and extending to W. long. 75°, where it communicates with Baffin's bay, which lies to the north of this ſtrait, and of the north main, or James's

iſland. It is called Davis's ſtrait, becauſe it was diſcovered in 1585 by Mr. John Davis, an experienced navigator, who viſited the weſtern coaſt of England, and explored this narrow ſea, improperly ſo denominated, becauſe it is as wide as the Baltic.

Davis *Town*, a town of America, in the diſtrict of Maine, and county of Lincoln, containing 308 inhabitants.—Alſo, a town in the ſame diſtrict, and county of Hanerek, containing 269 inhabitants.

DAVIT, in *Ship-rigging*, denotes a ſhort boom fitted in the fore-channel, and uſed as the arm of a crane to hoiſt the flukes of the anchor clear of the ſhip's ſide, till high enough to lie on the gun-wale, and faſtened by the ſhank painter.

Davit-*Guys*, are ropes uſed in the rigging of ſhips, which have an eye ſpliced in one end to the circumference of the davit-head; they are ſerved with ſpun-yarn over the ſplice, and whipt with ſpun-yarn at the other end.

Davit-*Rope*, denotes the laſhing which ſecures the davit to the ſhrouds, when out of uſe.

DAULI, in *Geography*, a town of South America, in the audience of Quito, and juriſdiction of Guayaquil.

DAULIA, in *Ancient Geography*, a town of Macedonia, in the canton of Eordetes, and near Scampis. Ptolemy.—Alſo, a country of the Phocide, which includes another diſtrict called *Tronis*.

DAULIS, a town of the Phocide, at ſome diſtance S.E. from Delphi. Homer, Pauſanias, and Steph. Byz. name it Daulis; but Polybius calls it Δαυλις, Daulium. According to Pauſanias, this town was very populous, and its inhabitants were the largeſt and moſt robuſt of any in the Phocide territory. At Daulis was a temple of Minerva, with two ſtatues of this goddeſs. It was more anciently called *Anaöris*. On the ruins of this town is a village, containing 40 or 50 houſes; and in this village is a river, which ſprings among the rocks of Parnaſſus, and which the people of the country call *Mauroneri*, *i. e.* black water, ſuppoſed to be that which the Greeks call Melas.

DAULSEN, in *Geography*, a town of Germany in the circle of Weſtphalia, and county of Verden; 4 miles N. N.E. of Verden.

DAUMA, a kingdom of Africa, in Negroland, with a town of the ſame name. N. lat. 8°. W. long. 16° 24′.

DAUMAZAN, a ſmall town of France, in the department of the Arriége, 12 miles N. W. of Pamiers.

DAUN, Leopold, Count of, in *Biography*, a celebrated general in the Auſtrian ſervice, was born in the year 1705, and intended by his father, who was an imperial general, for the church. The young man, however, was of an active turn, and deſirous of treading in the ſteps of his parent, obtained firſt an admiſſion among the knights of Malta. In the year 1740, he was made a colonel, and diſtinguiſhed himſelf in the war which Maria Thereſa ſuſtained in defence of her hereditary ſucceſſion. In the war of 1756, he was known and diſtinguiſhed as the moſt formidable antagoniſt of the king of Pruſſia: in the following year he entirely defeated the monarch, and was, on that account, highly eſteemed by the empreſs-queen. In 1758, he ſaved Olmutz by a ſeries of very judicious movements, and afterwards engaged with, and again defeated, the Pruſſian ſovereign. In 1760, when Dreſden was attacked by the king, Daun at reſt compelled him to relinquiſh his attempt, but he was, at length, owing to a ſevere wound, defeated, and obliged to quit the field. He died at Vienna in 1766, highly eſteemed as well for his private virtues, as for his military talents. Through the whole of life he was indefatigable in every thing entruſted to him: he evinced on almoſt every occaſion conſummate ſkill; but has been thought defective in the ſpirit of enterprize and deciſion, which enables a general to ſeize and improve a favourable moment. Nouv. Dict. Hiſt.

Daun. See Dauhn.

DAUNIA, in *Ancient Geography*, a country of Italy in Apulia. Pliny ſays, that it lay N. W. of Peucetia, and that it was bounded to the eaſt and north by the Adriatic ſea, to the weſt by Biſerno, the country of the Samnites and that of the Hirpini, and to the ſouth by mount Cervago, which ſeparated it from Peucetia. Its chief towns were Sipuntum, Arpi, Luceria, &c. Strabo ſays, that thoſe people were called Daunians by the Greeks, whom the Latins called Apulians.

DAUNUS, *Caravalle*, a torrent of Italy, which gave name to the country in its vicinity. Horace mentions the extreme heat of this country.

DAVOS, Davas, or Tafaas, in *Geography*, formerly a juriſdiction of the league of the ten juriſdictions, in the country of the Griſons, in Switzerland, is at preſent a diſtrict of the canton of the Griſons in the Helvetic republic. It is a long plain, a quarter of a mile broad, and gradually riſing into hills which terminate in high mountains. A clear murmuring ſtream flows through the midſt of the plain, with a gentle but lively courſe. The whole diſtrict is divided into five pariſhes, and the inhabitants are Proteſtants. The houſes, however, are ſo diſperſed as not even to form one ſingle village, properly ſo called. Near the church of St. John is a ſmall cluſter of eight or ten houſes; in the other parts the cottages are thickly ſtrewed over the plain. There are two lakes abounding in fiſh, and ſome mines of ſilver, copper, and lead ore. The pariſh of Sartig has a mineral ſpring. The country produces oats, rye, large quantities of rich paſture, yielding yearly two crops of hay. The mountains are overſpread with foreſts of fir and larch, intermixed with meadows. Above them tower the rugged Alps.

Grazing is the principal occupation of the inhabitants of the diſtrict of Davos. They alſo keep pack-horſes for the tranſport of the goods which paſs through their country from Germany and Switzerland into Italy, and they manufacture plenty of wooden wares. They ſpeak German, but their pronunciation is as defective as that of the inhabitants of the republic of the Valais.

The general diet of the Griſons uſed to be held at Davos. Coxe's Switzerland. Dictionnaire de la Suiſſe.

DAUPHIN, Dolphin, in *Aſtronomy*. See Delphinus.

Dauphin, in *Conchyliology*, the name of a ſpecies of ſhell-fiſh. It is one of the round-mouthed ſnails, or cochleæ lunares; and is ornamented with rows of indented eminences, on all the turns of the ſhell.

Dauphin, in *Geography*, an iſland in the north part of the gulph of Mexico, at the mouth of the river Mobile, five miles from Maſſacre iſland, with a ſhoal every where between them; which iſlands were ſuppoſed formerly to have been but one, and to have been known by the name of Maſſacre, ſo called by M. d'Ibberville, from a large heap of human bones, found by him at his landing. Dauphin iſland is about five leagues long, but narrow, and very barren. At the weſt end, for a diſtance of between three and four miles, is a narrow ſlip of land, with ſome dead trees; the reſt is covered with thick pines, which come cloſe to the water's edge, on the E. ſide, forming a large bluff. The French attempted a ſettlement here, and the cultivation of tobacco, which was ſaid to be equal to that of Virginia. On the S. ſide of the iſland there are remains of an old French poſt, and of ſome old houſes of the natives. In 1719 the Spaniards made a fruitleſs attempt to take it, during the ſpace of four days. N. lat. 30° 15′. W. long. 88° 10′.

DAUPHIN, a county of America, in the ſtate of Pennſylvania, formerly contained in that of Lancaſter, but erected into a ſeparate county in 1785. Its form is triangular; it is ſurrounded by the counties of Mifflin, Cumberland, York, Berks, and Northumberland, and it contains 586,400 acres. It is divided into nine townſhips, the chief of which is Harriſburg; the number of its inhabitants is 22,270. About one half of this county is cultivated; but the northern part is very rough and mountainous. In ſeveral of the mountains is found abundance of iron ore of the beſt quality; and a furnace and forge have been erected for the manufacture of pig, bar iron, &c. The firſt ſettlers were Iriſh emigrants, who were afterwards joined by a number of Germans.

DAUPHIN, a name given in the reign of Henry IV. of France to the iſland of Madagaſcar.

DAUPHIN *Creek*, a creek at the S.E. extremity of Madagaſcar, near fort Dauphin.

DAUPHIN *Fort*, a fort at the ſouth-eaſtern extremity of the iſland of Madagaſcar, in the province of Cercanoſſy. The diſtrict of the iſland about this fort is well peopled. Almoſt every village ſtands on an eminence, encompaſſed by two rows of ſtrong paliſades. Within ariſes a parapet of earth, four feet high; and large, ſtrong bamboos, placed at the diſtance of five feet from each other, form a kind of fortification which defends theſe villages, which, in ſome caſes, are ſurrounded by a foſſe, ten feet broad, and ſix feet deep. The dwelling of the chief is called "donac," and this compriſes three or four large houſes, incloſed by a particular fence. Here the chief always reſides, with his wives and children. Slaves keep guard night and day at the doors of the donac. Fort Dauphin was burnt down in the year 1655; and not rebuilt till 1663. S. lat. 25° 15′. E. long. 69° 5′. See MADAGASCAR.—Alſo a juriſdiction, fort, and ſea-port town in the N. part of the iſland of St. Domingo; containing 5 pariſhes.—Alſo a fort in the iſland of Cape Breton.

DAUPHIN *River*, a river of upper Canada, which runs into lake Winnipeg on the W. ſide, at the head of Martin's bay. N. lat. 52° 15′.

DAUPHIN is the title which the eldeſt ſons of the kings of France, and preſumptive heirs to the crown, bore, for nearly 450 years, till the year 1791, when, in order to aboliſh every the moſt remote veſtige of feodality, the national aſſembly decreed its ſuppreſſion, and ſubſtituted the appellation of *Prince royal*.

Charles Louis, the laſt dauphin, ſon of Louis XVI. and Maria Antoinetta of Auſtria, born on the 27th of March 1785, was firſt named duke of Normandy, and took the title of dauphin only after the death of his elder brother Louis Joſeph Xavier Francis, in 1790. The rejoicings which took place in France at the birth of this laſt prince in 1781, evinced ſuch a ſincere and enthuſiaſtic attachment to the royal family, that it forms the moſt ſtriking contraſt with the events which took place eleven years after. Charles Louis did not enjoy the new title of prince royal much longer than he had enjoyed that of dauphin. On the 11th of Auguſt, 1792, he was impriſoned at Paris with his royal parents in the Temple. On the 24th of September of the ſame year, the abolition of royalty in France was decreed by the convention; and after the execution of the unfortunate monarch his father, which took place on the 21ſt of January, 1793, the young prince continued a priſoner till the middle of the year 1795, when his unjuſt and cloſe confinement probably haſtened his death. His complaint is reported to have been of the ſcrofulous kind, and it does not appear that medical aid was denied him; but his comforts had been ſhamefully abridged, and his education abſolutely neglected, and moſt wilfully perverted. He expired on the 9th of June 1795, at the age of ten years two months and thirteen days. The writers of the royaliſt party in France, conſidering this prince as lawful heir to the throne, ſtyled him king ever after the demiſe of his ill fated parent, by the name of Louis XVII.; which ſee.

The title of dauphin was firſt borne in France about the year 1345, by Philip, a younger ſon of Philip de Valois, to whom Humbert III. dauphin of the Viennois, had ceded his dominions, conſiſting chiefly of the dauphiné. However, after Charles V. ſurnamed the *Wiſe*, the kings of France never conferred the appellation of dauphin on any one, but their eldeſt ſons, and preſumptive heirs of the crown. The title itſelf took its riſe about the year 1120 in Guigues IV. ſon of Guy or Guigues the Fat. Being of a warlike diſpotion, he choſe a dolphin for the creſt of his helmet; and having ſignalized himſelf by ſome exploit, he was probably diſtinguiſhed by the name of his armorial bearings, and tranſmitted this name as a new diſtinction to his deſcendants.

The ſeigneurs, or lords, of Auvergne, have likewiſe borne the appellation of dauphin; but the dauphins of Auvergne had it not till a good while after thoſe of the Viennois, and even received it from them. The manner was this: Guy VIII. dauphin of Viennois, had by his wife Margaret, daughter of Stephen, earl of Burgundy, a ſon and two daughters. The ſon was Guy IX. his ſucceſſor. Beatrix, one of the daughters, was married to the count d'Auvergne, who, according to Blondel, was William V. or rather, as Chorier and others hold, Robert VI. father of William V. This prince loſt the greateſt part of the county Auvergne, which was taken from him by his uncle William, aſſiſted by Louis the Young; and was only left maſter of the little canton whereof Vodable is the capital. He had a ſon whom he called Dauphin, on account of Guy, or Guigues, his uncle by the mother's ſide. From his time his ſucceſſors, holding the ſame petty canton of Auvergne, ſtyled themſelves dauphins of Auvergne, and bore a dolphin for their arms.

DAUPHIN, in *Mechanics*, &c. See DOLPHIN.

DAUPHINS, or DELPHINS, in *Literary Hiſtory*, a name given to the commentators on the ancient Latin authors, who were employed by order of Louis IV. of France, for the benefit of the prince, under the care and direction of M. de Montauſier his governor, Boſſuet and Huet his preceptors. They were thirty-nine in number.

DAUPHINE′, in *Geography*, one of the ſouth-eaſtern provinces of France, before the revolution of 1789. It contained the following counties, *viz.* the Gréſivaud and the Viennois, which form now the department of the *Iſère*, which ſee; the Valentinois and the Diois, which conſtitute at preſent the department of the *Drôme*, which ſee; and the Gaſſençais, Embrunais, and Briançonnais, which form now the department of the *Hautes Alpes*, which ſee. Grenoble was the capital of the whole province. The territorial extent of the Dauphiné was eſtimated at 1006 ſquare leagues, and its population at 804,800 individuals, or 800 inhabitants per ſquare league.

DAUSARA, or DOYSARA, *Dauſar*, in *Ancient Geography*, a town of Aſia, in Meſopotamia, ſeated upon the banks of the Euphrates, nearly S. of Edeſſa, and S.E. of Nicephorium.

DAUSENAS, in *Geography*, a town of the duchy of Courland; 16 miles W.S.W. of Seilburg.

DAUTONA, in *Ancient Geography*, a town of Higher Pannonia, 24 miles from Siſcia, according to the Itinerary of Antonine.

DAUW, in *Geography*, a town in the ſouthern part of the iſland of Celebes.

DAVYING, in *Agriculture*, a term applied provincially to

to the getting of marl out of the face of the cliffs on the ſea coaſts, where it is drawn up by a ſort of wince.

DAW, in *Ornithology*. See CORVUS *Monedula*: called alſo the jackdaw.

DAW, *Surinam*. See CORVUS *Surinamenſis*.

DAW, *Black and Yellow*. See ORIOLUS *Perſicus*.

DAWEL-CORONDE, in the language of the Ceyloneſe, drum cinnamon. This is called in Low Dutch, trommel cancel. The reaſon of the name is, that the wood of the tree which affords this ſpecies, when dried, is light and tough, and is uſed to make drums of. The bark is taken off while the tree is growing, and is of a pale colour. It is a very bad kind of cinnamon, and is very rarely ſold as ſuch; but the natives uſe it in medicine.

DAWES, RICHARD, in *Biography*, was born in 1708, and received the early part of his education at Market-Boſworth, Leiceſterſhire, under Dr. Blackwall, author of the "Sacred Claſſics." The higher branches of ſtudy he purſued at Emanuel college, Cambridge, where he took his degrees, and where he exhibited much enmity and rancour againſt the learned Bentley, whoſe knowledge in the Greek he affected to treat with contempt. About the year 1738, he was appointed maſter of the free grammar-ſchool at Newcaſtle-on-Tyne, to which office was annexed the maſterſhip of St. Mary's hoſpital in that town. The profound learning of Mr. Dawes did not qualify him for the diſcharge of the laborious duties of a ſchool-maſter: his temper was too irritable, and his character was ſo ſingular, that he was perpetually involved in quarrels. In about ten years he was perſuaded to reſign both places, and to accept, in exchange, an annuity of 80*l. per ann.* with which he retired; making his chief amuſement rowing a boat on the river near his houſe. He died in 1766; but as a critic and a ſcholar he had laid a broad baſis for permanent reputation. His "Miſcellanea Critica," which was publiſhed in 1745, and which has ſince been republiſhed with additions, by Mr. Burgeſs of Oxford, "contained," ſays his biographer, "a collection of grammatical remarks on various Greek authors, particularly the tragedians and Ariſtophanes; intended as a ſpecimen of what he meant to perform in an edition of all the Attic poets, with Homer and Pindar." Biog. Brit.

DAWES, SIR WILLIAM, a reſpectable prelate of the church of England, was born in the year 1671, near Braintree, in Eſſex. He received his grammar-learning at Merchant Taylors' ſchool, in London, where he made a very rapid progreſs in the learned languages; and in 1687 he was elected ſcholar of St John's college, Oxford, of which ſociety he was, in two years, made fellow. As ſoon as he ſucceeded to his father's title and eſtate, he left Oxford, and entered himſelf a nobleman in Catharine-hall, Cambridge, where he took his degree of M.A. Being at this time too young to obtain holy orders, he ſpent ſome time in viſiting different parts of his native country; and when he attained to the age of twenty-five he was ordained deacon and prieſt, and, by the royal mandate, created doctor in divinity, in order to be qualified for the maſterſhip of Catherine-hall, to which he was unanimouſly called, in 1696. To this college he was afterwards a liberal benefactor. In the ſame year he was appointed chaplain in ordinary to the king, and vice-chancellor of the univerſity. Sir William was, in the year 1698, collated to the rectory and deanery of Bocking, in Eſſex, where he obtained the reſpect and affectionate regards of all claſſes of the people. After the acceſſion of queen Anne, ſir William was appointed her chaplain, and became a favourite at court, and would have been made biſhop of Lincoln, in 1705, but for the interference of ſome perſons who had taken offence at a ſermon which he had preached on the 30th of January. But in two years after he was appointed to the biſhopric of Cheſter; and in 1713 to the archbiſhopric of York, in which he continued, an ornament to his profeſſion, till the year 1724, when he died, full of honour and eſteem. He was reckoned the moſt popular preacher of the day. His works were collected, and publiſhed in 3 vols. 8vo. 1733; to which is prefixed a life of the author. Biog. Brit.

DAWFUSKEE, in *Geography*, an iſland on the coaſt of South Carolina, which forms the N.E. ſide of the entrance of Savannah river, and S.W. ſide of the entrance of Broad-river, and admits of an inland communication between the two rivers.

DAWIDGRODEK, a town of Lithuania, in the palatinate of Brzeſc; 56 miles E. of Brzeſc.

DAWLISH, called in domeſday-book *Doulis*, is a delightful maritime village in the county of Devon, England. The name is derived from its ſituation, *Dol-is*, a compound word, ſignifying, a fruitful mead in a pleaſing dell. On the land ſide, it is nearly ſurrounded by lofty hills of varied features; and on the eaſtern ſide, the ſea, with the bold over-hanging cliffs, furniſhes ſtriking effect to its romantic ſcenery. Dawliſh formerly was an inconſiderable place, merely a cove, and inhabited by a few fiſhermen; but ſince ſea-bathing has become faſhionable, it has riſen into conſequence, as a reſpectable watering-place. For the accommodation of the viſitors, a handſome row of buildings has lately been erected on the ſtrand, and numbers of houſes in various parts of the village. This part of the Engliſh coaſt is not only inviting by its pleaſing ſcenery, but alſo much eſteemed for the ſalubrity and mild temperature of the air.

About one mile weſt from Dawliſh is Luſcombe-houſe, the ſeat of Charles Hoare, eſq. This is an elegant modern manſion, erected from deſigns by Mr. Naſh, architect, who has endeavoured to unite in the plan, the convenient and comfortable, with the beautiful and pictureſque. The grounds ſurrounding the houſe conſiſt of a ſucceſſion of hill and dale; to the weſt appears the ſteep acclivity of Haldon-hill; to the eaſt, the tower of Dawliſh church; and in the diſtant view, the foaming waters of the Engliſh channel. Beauties of England and Wales, vol. iv.

DAX, or anciently, *Acqs*, *Aquæ Tarbellicæ*, a very ancient town of France, chief place of a diſtrict of the ſame name in the department of the Landes, ſituated on the left ſhore of the Adour, 30 miles N.E. of Bayonne, as many S. by W. of Bourdeaux, 42 of Aire, and 564 S. by W. of Paris. It was, in old times, the principal city of the Tarbellians, a nation celebrated among the Aquitanians; but there is not a veſtige remaining of its antique ſplendour, except a large and deep baſon in the middle of the place, conſtantly filled with ſmoking and almoſt boiling water, which forms a rivulet that flows into the Adour.

Until the 8th of April 1802, Dax was the ſee of a biſhop under the archbiſhop of Bourdeaux. It has now a ſub-prefect, two courts of juſtice, and a regiſter-office, and is one of the 84 maritime diſtricts.

Dax is chiefly remarkable for its numerous mineral ſprings, the four moſt famed of which are on the weſt ſide of the town; three ſerve for bathing, and the fourth for drinking. The water is clear, pellucid, almoſt taſteleſs, and ſo hot that it raiſes the thermometer to 56 degrees. According to Mr. Sécondat's analyſis, the water of Dax contains only a very ſmall quantity of muriat and ſulphat of lime; and it appears certain that its efficacy is leſs to be attributed to the ſaline matters which it contains than to its natural heat, which it preſerves for a long time. The water of Dax ought therefore to be uſed at the ſpring, or ſoon after it has come from

the ſpring. It is preſcribed in caſes of rheumatiſm and gout, and is then uſed both externally and internally.

Dax contains 4398 inhabitants; its canton has an extent of 380 kiliometres, 25 communes, and a population of 13,991 individuals. The whole diſtrict reckons 8 cantons, 112 communes, a territorial extent of 2415 kiliometres, and 77,796 inhabitants. It produces corn, wine, and wood. Its principal trade is in deals, roſin, tar, wheat, wine, and brandy. Herbin. Statiſtique de la France.

DAXABON, Dajabon, or *Dababon*, called by the French *Laxabon*, a town and ſettlement of Spaniards, on the line between the French and Spaniſh diviſions of the iſland of St. Domingo. It was ſettled to prevent ſmuggling when the Spaniards had their ſhare of the iſlands. It is bounded E. by the territory of St. Yago, N. by the extremity of the bed of the great Yaqui and the bay of Manceniila, and W. by the river and little iſland of Maſſacre. It contains about 4000 perſons. The town is ſituated 400 fathoms from the E. bank of Maſſacre river, more than 80 leagues N.W. of St. Domingo, and 28 W. of St. Yago. N. lat. 19° 32′. W. long. from Paris 74° 9′.

DAXBERG, a town of Germany in the archduchy of Auſtria; 2 miles W. of Efferding.

DAXENBACH, or Taxenbach, a ſmall town of Germany in the grand duchy of Saltzburg, with an old caſtle on the river Saltza.

DAXIMONILIS, in *Ancient Geography*, a country of Pontus, ſituated towards the weſt, and watered by the river Seylax.

DAY, or Bay, in *Architecture*, one of the lights or compartments between mullion and mullion, in the great windows of the pointed ſtyle of architecture. The Saxons and early Normans built plain arched windows of a moderate proportion, as to height and width, without any mullions. But when the pointed arch was introduced, about the reign of Henry II., and the windows became long and narrow, in the form of a lancet, it was ſoon found neceſſary to place two of them together, in order to tranſmit a ſufficient quantity of light. This ſuggeſted the ſingle mullioned window with two days or bays to it. This form ſoon gave way in the larger windows to double mullions, with three days; and as architecture enlarged its dimenſions and multiplied its ornaments, particularly in the grand eaſtern and weſtern windows of cathedrals, we afterwards find theſe conſtructed with five, ſeven, and even nine principal compartments, together with an infinity of tracery-work, quatrefoils, catharine-wheels, and other ornaments. At length, in the time of Henry VIII. and his children, architects returned to the point from which they had firſt ſet out, and built plain windows without any ſtriking ornaments or diviſions.

Day, in *Aſtronomy*, a portion of time equal to that which elapſes between two ſucceſſive tranſits of the ſun over the meridian.

The word day, in the ordinary language of ſociety, is often uſed in contradiſtinction to night, without any very accurate limit being affixed to either.

Aſtronomers likewiſe conſider the day in both theſe ſignifications, but endeavour to define the term more exactly.

The *aſtronomical or ſolar day* is the interval included between two ſucceſſive noons: Noon being defined, the preciſe moment when the centre of the ſun is on the meridian. This interval has been moſt uſually adopted by civilized nations, as the true length of the day.

The aſtronomical day begins at noon, and the 24 hours into which it is divided are counted on to the following noon; but the civil day uſed by us begins at midnight, and the twelve hours are repeated twice over. Thus February 10th, 19^h reckoned aſtronomically is, according to the mode adopted in ſociety, Feb. 11th, 7^h.

From the earlieſt times men have exerted their invention to imitate and ſubdivide this period by mechanical contrivances; and ſo unexpectedly fertile have been the reſources of human ingenuity, that the original model has been ſurpaſſed in regularity, and aſtronomers have been obliged again to have recourſe to nature, to find a more uniform ſtandard to which our chronometers ſhould be referred; the aſtronomical or ſolar are days of unequal length, being longer about the ſeaſon of the ſolſtices than at the equinoxes.

The *mean ſolar day* is a period not marked out by the return of any obſervable phenomena, but an artificial interval of time diveſted of the above irregularities. This is effected by ſuppoſing the year divided into as many days as it really conſiſts of, but each of theſe days of an equal length. One of theſe imaginary days is called a mean ſolar day.

The accumulated difference of time that ariſes from adopting one of theſe meaſures in preference to the other is called the equation of time. For a more full account of the nature of this equation, ſee that article.

Siderial day is a period much uſed by aſtronomers, and is that in which the earth makes one entire revolution on its axis. Here the ſtandard afforded by nature exceeds in exactneſs any imitation that can be produced by art. Hitherto at leaſt we have had no indication from aſtronomical obſervation of any irregularity in the earth's diurnal rotation; and as theory ſuggeſts none, we uſually make it the ſtandard to which we refer all other uniform motions.

Should there exiſt, however, any minute variation in the earth's revolution on its axis, it is by no means impoſſible that clocks may be brought to ſuch a degree of perfection as to detect it.

The ſolar day is longer than the ſiderial by about four minutes. This difference ariſes from the motion of the earth in its orbit.

For if on any day the centre of the ſun and a ſtar ſhould paſs the meridian at the ſame moment, the following day, when the ſtar paſſes and completes by its paſſage a ſiderial day, the ſun will appear to have moved to the eaſtward, and will not paſs the meridian till about four minutes after the ſtar. The mean difference between a ſolar and ſiderial day is $= 3' 56''$, but this is continually varying, its maximum being $= 4' 10''$, and its minimum $= 3' 35''$. Four times in a year the days are of their mean length. Twice a year they increaſe to a maximum, and twice a year are at their minimum: for example:

In this preſent year, 1808, the ſolar day is equal to the mean day on the 11th Feb.: it continues to decreaſe till the 25th March, when it becomes 20″ ſhorter than the mean day; from this period it begins to increaſe, and on the 14th May it equals the mean day, and continually increaſes till the 21ſt June. From the 21ſt June it decreaſes till the 14th September, the mean length taking place on the 27th July. From this time it increaſes till the 22d Dec., when its length is a maximum. From Dec. they continue to diminiſh till the following March, when nearly the ſame variations again take place. Two cauſes, independent of each other, contribute to produce this irregularity in the exceſs of the ſolar above the ſiderial day, and conſequently in the total length of the day. One of theſe is the unequal motion of the earth in its orbit; the other, the inclination of the earth's axis to the plane of its orbit.

About the period of the ſummer ſolſtice, the earth is in its aphelion, and moves ſlower than at any other ſeaſon of the year. The ſolar day therefore differs leſs from a ſiderial day; for if the earth was ſtationary, they would be equal. And

if

if the earth moved in a contrary direction, the ſidireal day would exceed the ſolar day.

On the contrary, in the month of January, the earth being in that part of its orbit neareſt the ſun, moves quicker, and the exceſs of the ſolar above the ſiderial day is greater.

To explain the effect of the ſecond cauſe, it muſt be obſerved that this exceſs of the ſolar or aſtronomical day is meaſured, by reducing the apparent motion of the ſun in the ecliptic to the equator, on which circle we always meaſure the angular motion of the earth round its axis.

If we imagine two great circles of the ſphere to paſs through the ſmall arc of the ecliptic, which the ſun deſcribes in one day, and through the poles; the arc of the equator which they intercept will be the daily motion of the ſun reduced to the equator, and the time required for this arc to paſs the meridian is the exceſs of the ſolar above the ſiderial day. Now at the equinoxes this ſmall arc of the equator will be leſs than the correſponding arc of the ecliptic in the ratio of the coſine of the obliquity of the ecliptic to radius; but at the ſolſtices it is greater in the ratio of the radius to the ſame obliquity. The ſolar day is therefore diminiſhed in the firſt caſe, and augmented in the ſecond. The method of calculating the preciſe effect of theſe inequalities will be given in the article EQUATION *of Time*.

To obtain a mean day independent of theſe cauſes, we may ſuppoſe a ſecond ſun moving uniformly along the ecliptic, and traverſing the greater axis of the ellipſe, at the ſame inſtant with the true ſun: this ſuppoſition will cauſe the inequality ariſing from the proper motion of the ſun to diſappear. The inequality ariſing from the obliquity of the ecliptic may be likewiſe removed by imagining a third ſun, paſſing the equinoxes at the ſame moment as the ſecond, and moving in the equator in ſuch a manner that the angular diſtances of theſe two ſuns from the point of the vernal equinox ſhall always be equal. The interval of time, which would elapſe between two ſucceſſive tranſits of this laſt imaginary ſun over the meridian, conſtitutes a mean ſolar day.

Mean time is meaſured by the number of theſe imaginary tranſits. True time by the tranſits of the real ſun.

The unequal length of the days and nights in different climates, or in the ſame climate at different ſeaſons, is another effect of the inclination of the earth's axis to the plane of its orbit.

If the ecliptic coincided with the equator, the circle bounding light and darkneſs would always divide the equator and all its parallels into two equal parts, and there would be equal day and night every where throughout the year. But by the inclination of the axis, the equator alone remains biſected as before, and all the other circles unequally divided except on the day of the equinox. After which, one pole with its adjacent circles will be gradually plunged into total obſcurity, and the oppoſite pole with its circles brought out into conſtant light.

At the ſolſtices the portion of total obſcurity, and conſtant illumination, will extend from the poles a number of degrees equal to the obliquity of the ecliptic.

The length of the day in any latitude, at any ſeaſon, may be found by the ſolution of a right angled ſpherical triangle, in which the diſtance of the ſun from the pole, and the altitude of the pole above the horizon, form the two known ſides, and a portion of the horizon the other. The angle required is the ſemidiurnal arc or hour angle, formed by the meridian and a great circle paſſing through the poles and the centre of the riſing or ſetting ſun.

This is ſhewn (*Plate* V. *Aſtron. fig.* 43.) In the right angled triangle P ⊙ O, the polar diſtance of the ſun P ⊙, and the latitude of the place, P O, are given. The angle required ⊙ P O, or more properly its complement Z P ⊙, is the ſemidiurnal arc, or the time elapſed from ſun-riſe to noon, or from noon to ſun-ſet.

Nations have differed much from each other as to the commencement, and ſtill more in the diviſion of the day. The Chaldæans, Syrians, Perſians, and Indians began the day at ſun-riſe, and divided both the day and night into four parts. This diviſion of the day into quarters was in uſe long before the invention of hours. The Chineſe, who begin their day at midnight and reckon to the midnight following, divide this interval into 12 hours, each equal to two of ours, and diſtinguiſhed by a name and particular figure. The Romans called the time between the riſing and ſetting ſun, the natural day, and the time in the whole four and twenty hours the civil day, and this definition has been adopted in modern Europe. They began and ended their civil day at midnight, and derived this practice from their ancient juriſprudence, and rites of religion, eſtabliſhed long before they had any idea of the diviſion into hours. According to Varro, the firſt ſun-dial ſeen at Rome was brought from Catana in Sicily, in the firſt Punic war, as part of the ſpoils of that city. It was erected unſkilfully in the forum, and though it probably was not adapted to the latitude of the place, yet it was the only meaſure of hours they had for near a century afterwards. Thus it appears that the Romans learnt the diviſion of the day into hours from a dial of Greek conſtruction. The Greeks divided the natural day into 12 hours, a practice, which according to Herodotus, they derived from the Babylonians. Theſe hours were of courſe unequal at different ſeaſons of the year, varying in the ſame proportion as the length of the natural day.

Such were the hours of Polybius in the time of the Roman republic, and of Plutarch and other Greek authors, under the emperors; and ſuch they continued at Conſtantinople, when the weſtern empire was no more. Palladius, "de re ruſtica," gives the huſbandman a calendar of hours, and teaches him to diſtinguiſh them in every month of the year, by the length of a ſhadow projected by a perpendicular pole. This ſhadow decreaſes from the firſt to the ſixth hour, when it is ſhorteſt; it then increaſes again. At the firſt hour in the morning and the eleventh in the afternoon he makes it always equal. Thus when Pliny directs that apples in autumn ſhould not be gathered, *Ante horam primam* (Nat. Hiſt. lib. xv. cap. xviii.) he means till they have had an hour's ſun upon them. The nocturnal hours were reckoned in the ſame manner as thoſe of the day. Midnight was the ſixth hour of the night. It appears from a paſſage in Varro, that an officer called accenſus, uſed, by order of the prætor, to proclaim the third hour, mid-day, and the ninth hour. Theſe diviſions of the natural day into four parts were called vigils, the firſt beginning at ſun riſe, the ſecond at the third hour, the third at mid-day, and the fourth at the ninth hour. The night was in the ſame manner divided into four vigils. And throughout the Turkiſh empire at this day, time is reckoned by certain portions of the natural day, reſembling the vigils of the ancient Jews and Romans. Public clocks not being in uſe, theſe diviſions of time are proclaimed from the minarets. Their principal diviſion of the natural day is into four parts, which are unequal at different ſeaſons, and in different parts of the empire.

There can be no doubt but that men of ſcience among the ancients were acquainted with equal hours. Pliny calls them equinoxial hours. Theſe were uſed in aſtronomical calculations, for computing the length of the day in different climates and ſeaſons. In Egypt likewiſe the day was divided into unequal hours. Ptolemy marks the time of the ſame phenomenon, by theſe as well as equa hours, to accommodate

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his writings to the uſage of his country. The clock invented by Cteſibius (a celebrated mechanic of Alexandria, who lived 136 years before Chriſt) was ſo contrived as to lengthen or ſhorten the hours. About the thirteenth century, a more regular diviſion of the day into equal hours was introduced into Italy. The civil day was made to begin about the cloſe of evening twilight, and 24 equal hours are counted regularly on to the ſame time on the following evening. This mode is continued in many parts of Germany and Italy to this day. The clocks are uſually only numbered to, and ſtrike ſix, making four revolutions in one day. This method is very inconvenient, as noon and the various offices of civil life occur perpetually at a different hour, ſo that a perſon muſt conſult an almanac to know the hour of dinner. The accumulated error which the clocks are liable to, from this unſkilful mode of computation, is corrected when it amounts to a quarter of an hour. To enable the people to regulate their domeſtic concerns, a calendar is publiſhed, which announces, for inſtance, that from the 16th of Feb. to the 24th, it will be noon at a quarter paſt 18. That from the 1ſt of June to the 13th of July, it will be noon at 16. But the Italians are now gradually adopting the more improved method which has ſo long been practiſed in France, England, and the other enlightened countries of the north of Europe.

The only difference that at preſent ſubſiſts in England and France relative to the diviſion of the day is, that with us, we reckon by mean time. In France they uſe ſolar time. Our clocks ſometimes ſtrike twelve when the ſun is more than a quarter of an hour from the meridian. In France, the clocks ſtrike twelve at the moment of noon.

The French aſtronomers have lately propoſed, that the aſtronomical day ſhould commence with the civil day at midnight.

The names which have been appropriated to different days of the week in modern Europe, have been originally tranſmitted to us by the Romans: but the Northern nations have made ſome alteration, by ſubſtituting for the Roman divinities, ſuch of their own as moſt nearly reſembled them in their peculiar attributes. Thus the third day of the week, conſecrated by the Romans to Mars, was named from the Scandinavian deity Tyr. In the Daniſh and Swediſh language it is Tyrſdag, from whence our Tueſday. Tyr was an inferior deity, but preſided over battles: and Tacitus renders the name Tyr by that of Mars, and makes him inferior to Odin, whom he deſcribes under the name of Mercury.

From this Odin, or Wodin, we derive Wedneſday, anſwering to dies Mercurii. Thurſday is the day of the great god Thor, the moſt formidable of the Northern deities. The goddeſs Freya, from whom we derive our Friday, bears a ſtill greater reſemblance to Venus; and ſo ſtriking is the analogy, that ſome authors have conſidered it as more than probable that the mythology of the barbarous nations of the North had a common origin with that of the Greeks and Romans.

DAY, THOMAS, in *Biography*, an Engliſh writer of conſiderable merit, was born at London in 1748. His father dying while he was an infant, the care of his education devolved wholly upon his mother, a woman of ſtrong ſenſe, and a ſound and highly cultivated judgment, to whom our author was much indebted for that manly independence and benevolent ſpirit which he exhibited in every ſituation of life. He received the elementary parts of his education at the Charter-houſe, from whence he removed to Corpus-Chriſti college, Oxford. In 1765, he entered at the Middle Temple, and ſtudied the law ſufficiently to be called to the bar. After this he ſpent ſome years in foreign travel, rather with a view of ſtudying men and manners, than of examining the countries in a topographical view. The fruit of his reſearches into the condition of his fellow creatures, excited in him ſentiments of wretchedneſs bordering upon melancholy: but the ſtrength of his mind, and the excellent impreſſions left by a good education, enabled him to overcome the languor into which he was falling, and he became the determined foe of tyranny in every ſhape, and the zealous advocate and patron of the rights of men. In 1778, he married Miſs Milnes of Wakefield, a lady poſſeſſed of a fine underſtanding, and, at the ſame time, capable of conforming to the peculiarities of Mr. Day. He reſided, firſt at Staple-ford Abbots in Eſſex, and afterwards he took a farm near Chertſey in Surrey, in which he employed many of the neighbouring poor in experimental proceſſes. About the year 1780, he became the public opponent to the American war, the principal of which he had always abhorred; and he took a zealous part with thoſe who were contending for parliamentary reform, which he conſidered as the foundation of thoſe other political reforms which were thought by a very reſpectable body of the people to be eſſential to the exiſtence of the country. About this period, he publiſhed many political pieces in proſe and in verſe, all of which were anonymous, but they pointed out the author as an ardent friend to civil liberty, and as abhorrent to the principles of ſlavery in every quarter of the globe. But Mr. Day's name will be long dear to the young, and to thoſe who have the charge of education devolved upon them, by his "Hiſtory of Sandford and Merton," in three volumes; and his "Hiſtory of Little Jack," in one ſmall volume. The former of theſe works powerfully inculcates all the manly virtues of courage, activity, temperance, independence, and generoſity, and contains many uſeful inſtructions in the principles of ſcience. The moral of the ſtory of Little Jack, which is entertaining, and diſplays the good effects of activity, induſtry, ſobriety, and honeſty, is, that it is of very little conſequence how a man comes into the world, provided he behaves well, and diſcharges his duty when he is in it.

In the midſt of his endeavours to do good, and to promote the intereſts of his fellow creatures, Mr. Day was cut off by an unfortunate accident. As he was riding from his own to his mother's houſe, on Sept. 28, 1789, he was killed by a fall from his horſe, being only in the 42d year of his age.

In private life Mr. Day was a faithful and tender huſband, an affectionate ſon, and a generous and ſympathizing friend. He was remarkably plain in his dreſs: in the choice of his food, he was far from being nice and delicate, not, however, from the want of a very diſcriminating taſte, but becauſe he had obſerved that a faſtidiouſneſs of appetite is often productive of evil conſequences. His mode of travelling was as ſimple and unexpenſive as poſſible; the reaſon he aſſigned for which was, that the leſs he ſpent upon himſelf, the more he could afford for the wants of his fellow creatures. In conſequence of the wide range of his charity, and the unoſtentatious manner in which it was beſtowed, many of his beneficent actions are now totally unknown. Few returned from him empty-handed, for he ſaid that "he loved to give." But the private character of Mr. Day ſhall be given in the words of his widow: "The undeviating firmneſs, independence, and diſintereſtedneſs of Mr. Day's character, in an age of ſuch venality, corruption, and effeminacy as the preſent, might ſurely be conſidered as a ſingular phenomenon. As I, of all human beings, was the moſt intimately acquainted with the extraordinary and invariable ſimplicity of his life and manners, I do not ſcruple

to ſay that this, united to his patriotic ſpirit (with the opinion I entertained of his eloquence and ability), continually reminded me of thoſe great and virtuous characters of ancient times, who, deſpiſing the common objects of ambition, cultivated their farms, and yet were ever ready, when occaſion called, to exert themſelves in defence of the rights and liberties of their country. My huſband's conduct was in a great meaſure conformable to that ſentiment of Rouſſeau, "while there is one of our fellow creatures who wants the neceſſaries of life, what virtuous man will riot in its ſuperfluities." Dr. Kippis, in the Biographia Britannica, has given an intereſting analyſis of the works of Mr. Day, to which the reader muſt be referred for information on this head. "If Mr. Day's life had been continued," ſays his excellent biographer, "he would undoubtedly have exerted his talents in farther productions for the benefit of mankind. But though his premature death muſt ever be regretted, his ſurviving friends will have the conſolation of reflecting that he lived long enough to exhibit a pattern of diſintereſted virtue and ardent philanthropy, which, it is hoped, cannot be uſeleſs to the world."

Day, John, the firſt printer of muſic in England upon five lines. Before the reformation, the canto fermo in the miſſals, breviaries, &c. of the Roman church, had been printed on four lines in Gregorian notes, very ſoon after the invention of the preſs; but no prickt diſcant, or figurative muſic, was publiſhed till the firſt year of queen Elizabeth, when a choral work appeared, "**Certaine notes ſet forth in four and three partes, to be ſong at the Morning Communion and Evening Praier very neceſſarie for the Church of Chriſte to be frequented and uſed: and unto them be added divers Godly Praiers and Pſalmes, in the like forme, to the honour and praiſe of God. Imprinted at London, over Aldersgate, beneath St. Martins, by John Day.** 1560. The authors of theſe compoſitions were Tallis, Cawſton, Johnſon, Oakland, Shepherd, and Taverner.

Day, in *Law*, is frequently uſed for the day of appearance in court, either originally, or upon aſſignation. There is a day of appearance in court by the *writ* and by the *roll*; by *writ*, when the ſheriff returns the writ; by *roll*, when he hath a day by the roll, and the ſheriff returns not the writ, there the defendant, to ſave his freehold, and prevent loſs of iſſues, impriſonment, &c. may appear by the day he hath by the roll. (Co. Litt. 135.) In real actions there are *dies communes*, common days; and in all ſummonſes there muſt be 15 days after the ſummons, before the appearance; and before the ſtatute of "Articuli ſuper Chartas," in all ſummonſes and attachments in plea of land, there ſhould be contained 15 days. (Co. Litt. 134.) As to offences in B. R., if the offence be committed in another county than where the court ſits, and the indictment be removed by *certiorari*, there muſt be 15 days between every proceſs and the return thereof; but if it be committed in the ſame county where the bench ſits, they may ſit *de die in diem*; but this they will very rarely do. (Ibid.) There is a day called *dies ſpecialis*, as in an aſſiſe in the king's bench or common pleas, the attachment need not be 15 days before the appearance, otherwiſe it is before juſtices aſſigned; but generally in aſſiſes the judges may give a ſpecial day at their pleaſure, and are not bound to the common days; and theſe days they may give as well out of term as within. There is alſo a day of grace, *dies gratiæ*; and generally this is granted by the court at the prayer of the demandant or plaintiff, in whoſe delay it is; but it is never granted where the king is party, by *aid prier* of the tenant or defendant; nor where any lord of parliament, or peer of the realm, is tenant or defendant. And ſometimes the day that is *quarto die poſt*, is called *dies gratiæ*, for the very day of return is the day in law, and to that day the judgment hath relation, but no default ſhall be recorded till the fourth day be paſt; unleſs it be in a writ of right, where the law alloweth no day but the day of the return. Co. Litt. 135.

There are ſeveral *return days* in the terms; and if either of them happen upon a Sunday, the day following is taken inſtead of it: for Sunday is *dies non juridicus*: and ſo is Aſcenſion day in Eaſter term, St. John the Baptiſt in Trinity term, All Saints and All Souls in Michaelmas term, and the Purification of the Virgin Mary in Hilary term. 2 Inſt. 264.

If a fact be done in the night, you muſt ſay in law proceedings, *nocte ejuſdem diei*.

To be diſmiſſed *without day* is to be finally diſmiſſed the court; and when the juſtices before whom cauſes were depending, do not come on the day to which they were continued, whether ſuch abſence be occaſioned by death or otherwiſe, they are ſaid to be *put without day*; and may be received, or re-conſidered by re-ſummons, re-attachment, &c. (See ſtat. 1 Ed. VI. c. 7.) Alſo, by the common-law, all proceedings upon any indictment, &c. whereon no judgment had been given, were determined by the demiſe of the king, and nothing remained but the indictment, original writ, &c., which were *put without day*, till re-continued by re-attachment to bring in the defendants to plead *de novo*; though this is remedied by ſtat. 4 and 5 W. III. c. 18. 1 Ann. c. 8.; by which ſuch proceſs, &c are to continue in the ſame force after the king's demiſe, as they would have done if he had lived.

In action of treſpaſs, if the day laid in the declaration be either *before* or *after* the actual day on which the treſpaſs is committed, it is not material, if a treſpaſs be proved. (Co. Litt. 283, *a*.) But the day laid muſt be before the firſt day of that term of which the declaration is entitled; or if the treſpaſs be committed within the term, there muſt be a ſpecial memorandum of ſome particular day (if by bill), or of ſome general return-day (if in C. P. or B. R. by original writ), *ſubſequent* to the day wherein the treſpaſs was committed; and ſo as to other actions where the cauſe of action ariſes *within* the term. Jacob's Law-Dictionary by Tomlins.

Day-*Coal*, in *Natural Hiſtory*, a name given by the miners of England, and the common people who live in coal countries, to that ſeam or ſtratum of the coal which lies uppermoſt in the earth. The ſame vein or ſtratum of coal uſually runs a great way through the country, and dips and riſes in the earth in different places; ſo that this upper ſtratum, or day-coal, is, in the various parts of the ſame ſtratum, ſometimes near the ſurface, and ſometimes at many fathoms deep. The ſubterranean fires found in ſome of our coal countries principally feed on this coal, and are nearer, or farther from the ſurface, as it riſes or ſinks. Phil. Tranſ. N° 130.

Day-*Labourer*, in *Agriculture*, a perſon who works by the day.

Day-*Light*, in *Law*. In reſpect to day-light, before ſun-riſing, and after ſun-ſetting, is accounted part of the day by common law; as to robberies committed in the day-time, when the hundred is liable. 7 Rep. 6.

The law regularly rejects all fractions and diviſions of a day, for the uncertainty. 5 Rep. 1. 1 Inſt. 135.

Day-*Lily*, in *Botany*. See Hemerocallis.

Day-*Rule*, in *Law*. See Day-*Writ*, *infra*.

Day-*Work*, in *Rural Economy*, ſuch work as is performed by the day.

Day's-

DAY's-*Work*, in *Sea Language*, denotes the reckoning or account of the ſhip's courſe, during twenty-four hours, or between noon and noon, according to the rules of trigonometry. See DEAD-*reckoning*.

DAY-*Writ*, or DAY-*rule*, in *Law*, a rule or order of court, permitting a priſoner in cuſtody in the king's bench priſon, &c. to go without the bounds of his priſon for *one day*. By rule of the court of king's bench, Eaſter, 30 Geo. III. a priſoner ſhall not have day-rules, above three days in each term, and he is to return to priſon before nine in the evening. The king may grant "writ of warrantia diei" to any perſon, who ſhall ſave his default for *one day*, be it in plea of land or other action, and be the cauſe true or not; and this by his prerogative. (Br. Prerogative, pl. 142, cites F. N. B. 7.) It is againſt law to grant liberty to "priſoners in execution," by other writs than day-writs or rules. (Chan. Rep. 67.) No priſoner, committed by B. R., ought to have the benefit of the day-rule of going abroad in term-time; for their impriſonment is their puniſhment for their contempt or miſbehaviour. (2 Show. 88. pl. 80.)

DAYS *in Bank*, are days ſet down by ſtatute, or order of the court, when writs ſhall be returned, or when the party ſhall appear on the writ ſerved. See ſtat. 51 H. III. ſtat. 2 and 3. 32 Hen. VIII. c. 21. 16 Car. I. c. 6. 24 Geo. II. c. 48. And by the ſtatute "De anno biſſextili," (21 H. III.) the day increaſing in the leap-year, and the day next going before, are to be accounted but one day.

It is commonly ſaid, that the day of Niſi Prius, and the day in the Bank, are one day; but this is to be underſtood as to pleading, and not to other purpoſes. (1 Inſt. 135.) But after iſſue found for the plaintiff at the Niſi Prius, if a day be given in Bank, and the defendant makes default, judgment ſhall be given againſt him. (2. Danv. Ab. 477.)

DAYS *of Grace*. See DAY.

DAYS *of Grace*, in *Commerce*, are a number of days allowed by cuſtom for the payment of a bill of exchange after the ſame becomes due; *i. e.* after the time it was accepted for is expired.

In England, three *days of grace* are allowed: ſo that a bill accepted, in order to be paid, *e. gr.* ten days after ſight, is not to be paid till thirteen days. Throughout France, they allow ten *days of grace;* as many at Dantzic; eight at Naples; ſix at Venice, Amſterdam, Rotterdam, and Antwerp; four at Frankfort; five at Leipſic; twelve at Hamburgh; eight at Copenhagen; three at Berlin; ſix in Portugal; fourteen in Spain; thirty in Genoa, &c. Note, Sundays and holidays are included in the number of *days of grace*.

DAYS-*Man* is uſed, in ſome parts of England, for an arbitrator or judge: and it has been obſerved, that the word *day* ſignifies judgment.

DAYS *of Prefixion*. See REMEMBRANCER.

DAYS, *Fiſh*. See ABSTINENCE.

DAYS, *Dog*, *Dies caniculares*. See CANICULAR.

DAYS, *Critical*, *Dies critici*. See CRITICAL *days*.

DAYS, *Intercalary*, *additional*. See INTERCALARY *days*.

DAYA, in *Geography*, a town ſituated on the weſt coaſt of the iſland of Sumatra, on a river of the ſame name; 30 miles S. of Acheen.

DAYMAR, a town of Arabia, in the country of Omar: 220 miles S. of Maſcat.

DAYTON, a ſmall ſettlement of America, in the ſtate of Ohio, and county of Montgomery.

DEA, in *Geography*, a town of Perſia, in the province of Segeſtan, 60 miles S. W. of Kin.

DEA *Vocontiorum*, *Die*, in *Ancient Geography*, a town of Gallia Viennenſis, which belonged to the Vocontians.

DEABAGEN, in *Geography*, a town of Aſia, in the country of Candahar; 30 miles N. W. of Candahar.

DEACON, *Diaconus*, in *Eccleſiaſtical Hiſtory*, a perſon who belonged to the inferior order of miniſters in the Chriſtian church.

The word is formed from the Latin *diaconus*, of the Greek διακονος, *miniſter*, *ſervant*.

Deacons were firſt inſtituted, ſeven in number, by the apoſtles, Acts, chap. vi. which number was retained a long time in ſeveral churches. Grotius apprehends that the order of deacons in the Chriſtian church correſponded to that of eleemoſynaries in the Jewiſh ſynagogue. Their office was, to ſerve in the agapæ, and to diſtribute the bread and wine to the communicants, and diſpenſe the alms.

Their original inſtitution was to *ſerve tables*, which office included the care of the poor, and an attendance at the Lord's table. As for the care of the poor, Origen tells us (Comment. in Matt. tom. 16, p. 443, vol. 1.) that the "deacons diſpenſed to them the money of the church," being employed under the biſhop to inſpect and relieve all the indigent within their dioceſe; and as for their attendance at the Lord's table, their office, with reſpect to that, conſiſted in preparing the bread and wine, in cleanſing the ſacramental cup, and other ſuch neceſſary things, whence they are called by Ignatius (Epiſt. ad Tralles. p. 48.) "deacons of meats and cups," aſſiſting alſo, in ſome places at leaſt, the biſhops or preſbyters in the celebration of the euchariſt, "delivering the elements to the communicants." (Juſt. Mart. Apolog. 2. p. 97.) Tertullian informs us, (De Bapt. p. 602.) that the deacons preached, and, "in the abſence of the biſhops and preſbyters, baptized." In a word they were, according to the ſignification of their name, and as Ignatius calls them (ubi ſupra) "the ſervants of the churches," ſet apart on purpoſe to ſerve God, and attend on their buſineſs, being conſtituted, as Euſebius terms it, (lib. ii. cap. 1.) "for the ſervice of the public." King's Conſt., &c. of the primitive Church, p. 80.

The office of deacon was, at its firſt inſtitution, a truſt in things merely temporal, or what Jerom called "the ſervice of tables and widows." They were no other than what, in modern language, we ſhould call the church's almoners. Nor is it any objection, as Dr. Campbell ſuggeſts (Lect. on Eccleſiaſtical Hiſtory, vol. i. p. 245.) that we find both Stephen and Philip, who were among the ſeven deacons that were firſt preſented by the people to the apoſtles, exerciſing ſpiritual functions, ſuch as preaching and baptizing. This power they certainly did not derive from the ſuperintendency of the people's charities, to which alone they were choſen, with which they were entruſted, and which the apoſtles, in the very inſtitution of the office, expreſsly diſtinguiſh from the miniſtry of the word. (Acts, vi. 1—4.) Here the διακονια τραπεζων, and the διακονια λογου, are manifeſtly contraſted to each other. Stephen and Philip, on the contrary, derived their ſpiritual functions, either from that title, with which, according to Tertullian and the deacon Hilarius, every qualified perſon, in that ſtate of the church, was inveſted for promoting the common cauſe, or from the ſupernatural gifts they had received for the advancement of the faith, before their election to the deaconry, or, as ſome have thought moſt probable, from their being called of God to the office of evangeliſts. Philip is in another place, but at a later period, expreſsly called an evangeliſt. (Acts, xxi. 8.) It is worthy of notice, that his office of deacon is there alſo named, that we may not confound them, or aſcribe to the one what belonged to the other.

other. Soon after the apoſtolic age, (or perhaps ſooner,) though we have no direct information concerning it, the deacons were admitted to aſſiſt in the inferior parts of the ſacred ſervice. At preſent, indeed, in almoſt all the churches, where the three orders of biſhop, preſbyter, and deacon are found, the laſt-mentioned has no ſort of charge in that particular, which was at firſt his whole charge, and which alone gave occaſion for the inſtitution of the office; inſomuch that we cannot ſay the modern deacon is in any reſpect the ſame with the apoſtolic deacon, unleſs it be in the name. Properly the original charge of the inſtitution, of which we are informed in Acts vi. 1, is aboliſhed, though the name be retained, and applied to an office totally diſtinct. At preſent the overſight of the poor belongs, in England, to the church-wardens, who are annually elected in each pariſh by the veſtry. The deacons have no concern in it. In other churches, other methods are adopted.

By the ancient canons, marriage was not incompatible with the ſtate and miniſtry of a deacon; but it is now a long time that the Romiſh church has prohibited their marrying; and the pope only grants them diſpenſations for very important cauſes; and, after this diſpenſation, they loſe the rank and functions of their order, and return to a lay ſtate.

At Rome, under pope Sylveſter, they had only one deacon; then ſeven were appointed; then fourteen; and, at laſt, eighteen; who were called cardinal deacons, to diſtinguiſh them from thoſe of other churches.

Their office was, to take care of the temporalities of the church, to look to the rents and charities, and provide for the neceſſities of the eccleſiaſtics, and even of the pope. The collecting of the rents, alms, &c. belonged to the ſubdeacons; the deacons were the depoſitaries and diſtributors. Having thus the management of the revenues of the church in their hands, their authority grew apace, as the riches of the church increaſed. Thoſe of Rome, as being miniſters of the firſt church, preceded all others, and even at length took place of the prieſts themſelves. Doubtleſs, it was the avarice of the prieſts that made them give place to the deacons, who had the diſpoſal of the money.

The deacons rehearſed certain prayers at the holy office, which were thence denominated *diaconical*.

They took care that the people at church behaved themſelves with due modeſty and reſpect. They were not allowed to teach publicly; at leaſt not in the preſence of a biſhop or prieſt. They only inſtructed the catechumens, and prepared them for baptiſm. The doors of the church were likewiſe in their cuſtody; though, in after-times, that charge was committed to the ſubdeacons.

Theſe ſubdeacons are mentioned both by Cyprian, (Epiſt. 24.) and Cornelius, (apud Euſeb. l. vi. c. 43.) As the office of the preſbyters was to aſſiſt and help the biſhops, ſo theirs was to aſſiſt and help the deacons. And as the preſbyters, ſays lord King, (Conſt. &c. of the Primitive Church, p. 81.) were of the ſame order with the biſhop, (ſee BISHOP) ſo probably the ſubdeacons were of the ſame order with the deacons, which we may infer from the origin and riſe of theſe ſubdeacons, which might be this, that in no church whatſoever was it uſual to have more than ſeven deacons, becauſe that was the original number inſtituted by the apoſtles; and, therefore, when any church became ſo great and numerous, that this limited number of deacons was not ſufficient to diſcharge their neceſſary miniſtrations, that they might not ſeem to deviate from the apoſtolical example, they added aſſiſtants to the deacons, whom they called ſubdeacons or under-deacons, who were employed by the head or chief deacons to perform thoſe ſervices in their room, to which, by their office, they were obliged.

The office of a deacon, in the church of England, according to the form of ordination, is to baptize, preach, and aſſiſt in the adminiſtration of the Lord's ſupper; and, in ſhort, to perform all the other offices in the liturgy, which a prieſt can do, except that of conſecrating the elements of the Lord's ſupper, and pronouncing the abſolution. No perſon can be ordained a deacon under the age of twenty-three years, unleſs by a faculty or diſpenſation obtained from the archbiſhop of Canterbury: and in order to this, he muſt be provided with a title to a cure, or be a fellow or chaplain in ſome college in Cambridge or Oxford, or a maſter of arts of five years ſtanding, living at his own charge in either of the univerſities, or be admitted by the biſhop, who ordains him to ſome benefice or curacy then void. Otherwiſe the ordaining biſhop ſhall maintain him, till he is preferred to ſome eccleſiaſtical living. And by ſtat. 13 and 14 Car. II. c. 4. no perſon is capable of being admitted to any benefice or eccleſiaſtical promotion, till he be ordained a prieſt; nor is a deacon capable of a donative, but is only allowed to uſe his orders as a chaplain to ſome family, a curate to ſome prieſt, or a lecturer without a title.

DEACONESS, *Diaconiſſa*, an office probably of apoſtolic inſtitution, though we have no information concerning the occaſion and manner of it, in uſe in the primitive church, from the times of the apoſtles, though now laid aſide. St. Paul makes mention of it in his Epiſtle to the Romans, (Rom. xvi. 1.): and the younger Pliny, in a letter to Trajan, tells that prince, that he had ordered two deaconeſſes, whom he calls miniſtræ, to be tortured.

Deaconeſs was a title given to certain devout elderly women, commonly widows, who conſecrated themſelves to the ſervice of the church, and rendered thoſe offices to the women, which men could not decently do: as in baptiſm, for inſtance, which was conferred, by immerſion, on women as well as men.

They were likewiſe to look to the doors on the ſide the women were on, who were ſeparated from the men, according to the cuſtom of thoſe times. They had the care and inſpection of the poor, ſick, &c. And in times of perſecution, when a deacon could not be ſent to the women, to exhort and fortify them, a deaconeſs was ſent. See Balſamon on the eleventh canon of the council of Laodicea; and the Apoſtolical Conſtitutions, lib. ii. cap. 57. To ſay nothing of the epiſtle of Ignatius to the people of Antioch; where what is ſaid of deaconeſſes is ſuppoſed to be an interpolation.

The council of Nice ranks deaconeſſes among the clergy, though ſome hold, that their ordination was not ſacramental, but a mere eccleſiaſtical ceremony. However, it gave them a pre-eminence above the reſt of their ſex; for which reaſon the council of Laodicea forbad the ordaining of any more for the future. The office of deaconeſſes expired in the Weſtern church about the twelfth century, and in the Eaſtern about the thirteenth.

Atto of Vercell, in his eighth letter, gives the reaſon of their being aboliſhed: he obſerves, that in the firſt ages the miniſtry of women was neceſſary, in order to the more eaſy inſtructing of other women, and recovering them from paganiſm; and that they likewiſe ſerved for the more decent adminiſtration of baptiſm to the ſame: but that it was not then neceſſary, becauſe none but children were baptized; and it might now be added, becauſe baptiſm is only conferred by ſprinkling.

The number of deaconeſſes does not ſeem to have been

fixed: the emperor Heraclius, in his letter to Sergius, patriarch of Conſtantinople, orders, that in the great church of Conſtantinople there be forty deaconeſſes; whereas there were only ſix in that of the Mother of God, in the quarter of the Blachernæ.

DEACONRY, DIACONATE, the order or miniſtry of a deacon or deaconeſs. See DEACON, and DEACONESS.

DEACONRY, *Diaconia*, is alſo a name ſtill reſerved to the chapels and oratories in Rome, under the direction of the ſeveral deacons, in their reſpective regions or quarters.

To the deaconries were annexed a ſort of hoſpitals, or board, for the diſtribution of alms, governed by the regionary deacons, called cardinal deacons, of whom there were ſeven, anſwering to the ſeven regions, their chief being called the arch-deacon.

The hoſpital adjoining to the church of the deaconry, had an adminiſtrator for the temporal concerns, called the father of the deaconry, who was ſometimes a prieſt, and ſometimes a layman.

There were fourteen of theſe deaconries, or hoſpitals at Rome, which was reſerved to the cardinals. Du Cange gives us their names: as the deaconry of St. Maria in the Broad-way, the deaconry of St. Euſtachio near the Pantheon, &c.

DEAD, in *Geography*, a river of South Wales, which runs into the Nevern near Newport, in the county of Pembroke.

DEAD-BEAT *Eſcapement*, in *Horology*, conſiſts of a ſwing-wheel and pallets, ſo peculiarly conſtructed, that the hand inſerted on the arbor of the ſwing-wheel, called the ſeconds hand, remains motionleſs, or, as it were, dead, during the remainder of the pendulum's vibration, after the eſcape has taken place. It had been obſerved, that thoſe pallets which check the natural vibrations of the pendulum, and produce a backward motion of the ſeconds' hand at every vibration, called a recoil, occaſion a clock to gain time when any addition is made to the maintaining power, and the contrary; or, which is the ſame thing, that a clock with ſuch pallets will loſe time by becoming dirty. The celebrated Graham, therefore, contrived that conſtruction of the pallets and ſwing-wheel, which conſtitute the dead-beat eſcapement, with a view of obviating this defect in clock-work, which indeed it does in a great meaſure, though a ſmaller oppoſite defect is thereby produced, *i. e.* with the common dead-beat eſcapement, an addition to the maintaining power produces a retardation in the rate, and conſequently a certain quantum of acceleration is the conſequence of foulneſs in the works. We might in this place have deſcribed in detail the particulars of the dead-beat eſcapement, but that we have already referred to the article ESCAPEMENT for them, where the reader will find a deſcription of the different eſcapements; and where, from the contraſt given of the different conſtructions of the various eſcapements, he will the better comprehend their relative merits. In the mean time he may turn to the paragraph *callipering*, in the article CLOCK-*making*, and conſult *fig.* 3. of *Plate* X. of *Horology*, in the latter of which he will find a geometrical delineation of the dead-beat eſcapement for a half ſeconds pendulum, and in the former meet with a correſponding deſcription.

DEAD-*Bell*, in *Mythology*, an omen credited among the Scottiſh peaſantry, which is ſaid to be a tinkling bell in the ears, regarded by the country people as the ſecret inteiligence of the deceaſe of ſome friend.

DEAD-CHEST *Iſland*, in *Geography*, one of the ſmaller Virgin iſles, ſituated near the eaſt end of Peter's iſland, and weſt of that of Cooper's.

DEAD *Lights*, in a *Ship*, are wooden ports made to faſten in the cabin windows, to prevent the waves from breaking into the ſhip in a high ſea.

DEAD-MAN's *Bay*, in *Geography*, a bay ſituated on the eaſt ſide of Newfoundland iſland, ſouth of St. John's harbour, and N. W. of cape Spear.

DEAD-MAN's *Head*, or *Point*, a cape of England on the coaſt of Cornwall, in the Engliſh channel. N. lat. 50° 13'. W. long. 4° 48'.

DEAD-MAN's *Iſland*, one of the Magdalen iſlands. N. lat. 47° 22'. W. long. 61° 30'.

DEAD-MAN's *Eyes*, or DEAD *eyes*, in *Ship-Rigging*, are round, flat, wooden blocks, with three holes, inſtead of ſheaves, through which the laniards reeve, when ſetting up the ſhrouds or ſtays. The power gained by dead-eyes is as the number of parts of the laniards reeved through them; but, if the laniards be not well-greaſed, the power will be greatly loſt by friction, ſo that they are never applied as purchaſes, but merely for the better keeping the quantity gained of any ſhroud or ſtay, when ſet up, and are much ſtronger than blocks with ſheaves, when ſtrain lies on a ſingle pin.

DEAD-*Nettle*, in *Botany*. See LAMIUM.

DEAD-*Nettle, yellow*. See GALEOPSIS.

DEAD-*Pledge*, in *Law*. See MORTGAGE.

DEAD-*Reckoning*, in *Sea Language*, is that eſtimation, judgment, or conjecture, which the ſeamen make of the place where a ſhip is, by keeping an account of her way by the log, by knowing the courſe they have ſteered by the compaſs, and by rectifying all, with allowance for drift, lee-way, &c. according to the ſhip's trim; ſo that this reckoning is without any obſervation of the ſun, moon, or ſtars, and is to be rectified as often as any good obſervation can be had. See LOG.

DEAD-*Riſing*, a term in a ſhip for that part of her bottom, through her whole length, where the floor timber is terminated upon the lower futtock.

DEAD-*Ropes*, in a ſhip, are ſuch as are not running, *i. e.* which do not run in any block.

DEAD-*Sea*, in *Geography*. See ASPHALTITE *Lake*.

DEAD-*Sea, Chemical Analyſis of its Waters*.—The waters of the Dead ſea, or lake Aſphaltites, have been from time immemorial remarkable for their intenſe ſaltneſs, which is ſo great that no fiſh, inſect, or any living animal is found in them, and the banks are perfectly barren. The ſame intenſe ſaltneſs alſo gives ſo great a ſpecific gravity, that the human body cannot ſink in it; diving in it is impracticable; and Pococke relates, that he could lie on its ſurface motionleſs in any attitude.

A ſpecimen of this water was analyſed by Meſſ. Macquer and Lavoiſier, the account of which was publiſhed in the Memoirs de l'Academie des Sciences for 1778; and a more careful, and therefore more accurate, analyſis has lately been made by Dr. Marcet on a ſmall portion collected by Mr. Gordon of Clunie, in his travels into Paleſtine, and tranſmitted by him to Sir J. Banks. From Dr. Marcet's analyſis (publiſhed in the Philoſophical Tranſactions for 1807, part 2.) we may give the following particulars.

The water is perfectly tranſparent and colourleſs, and does not depoſite any cryſtals on ſtanding in cloſe veſſels. Its taſte is peculiarly bitter, ſaline, and pungent. Its ſpecific gravity is as high as 1.211, which is greater that that of any other known natural water of any conſiderable extent. It is however not ſaturated with ſalt, for it will diſſolve more when added to it: it is neither acid, nor alkaline, but perfectly neutralized. By chemical teſts, the preſence of lime, magneſia, muriatic, and ſulphuric acid, are readily detected.

We ſhall not here detail the particular proceſſes by which Dr.

Dr. Marcet obtained a very ſatisfactory analyſis of the contents of this water, but the reſults are the following:

A hundred grains of the water contain of

	Grains.
Muriat of lime	3.920
Muriat of magneſia	10.246
Muriat of ſoda	10.360
Sulphat of lime	0.054
	24.580

All the ſalts here mentioned are eſtimated as in a ſtate of thorough deſiccation, or that in which no water whatever is preſent, except what appears eſſential to the conſtitution of the acid at a red heat. This degree of dryneſs, however, can only be inferred with regard to the muriats by eſtimation from collateral experiments; for when thoſe are dried at 180° (above which point they loſe alſo part of their acid), they contain about $1\frac{1}{2}$ times their weight of water. The numbers here given differ ſomewhat from thoſe found by another mode of analyſis, but this difference is ſo ſmall as only to confirm and not invalidate the general accuracy of the experiments.

On the whole, therefore, it appears that the water of the Dead ſea contains about a fourth of its weight of ſalts, when in perfect deſiccation; and of theſe ſalts about $\frac{5}{7}$ths are common ſalt, and the remainder almoſt entirely a mixture of the muriats of lime and magneſia; the latter in by much the largeſt proportion.

We may add, that a ſmall quantity of the water of the river Jordan (which is the only ſtream of any conſiderable ſize that terminates in the Dead ſea) was alſo analyſed by Dr. Marcet. This is a very pure ſoft taſteleſs water, remarkably different in ſenſible properties from that of the Dead ſea; but on evaporation a minute quantity of ſalts were obtained, which were found to be a mixture of the ſame as thoſe of the lake, but in too ſmall proportion for analyſis.

Dead-*Tops*, in *Rural Economy*, a diſeaſe incident to young trees; and cured by cutting off the dead parts cloſe to the next good twig or ſhoot, and claying them over as in grafting.

Dead *Water*, is the eddy water juſt behind the ſtern of a ſhip. It is ſo called, becauſe it does not paſs away ſo ſwiftly, as the water running by her ſides doth.

If a ſhip have a great eddy following her ſtern, they ſay, ſhe makes much dead-water.

Dead-*Wood*, in *Naval Architecture*, a name given by ſhipwrights to certain blocks of timber laid upon the keel, particularly at the extremities afore and abaft, where theſe pieces are placed upon one another to a conſiderable height, becauſe the ſhip is there ſo narrow, as not to admit of the two half-timbers, which are therefore ſcored into the dead-wood, where the angle of the floor-timbers greatly diminiſhes as approaching the ſtern and ſtern-poſt. The dead-wood afore and abaft is equal in depth to two thirds the depth of the keel, and as broad as it can be, without exceeding the breadth of the keel.

Dead-*Work*, denotes all that part of a ſhip, which is above water when ſhe is laden.

DEADLY Carrot, in *Botany*. See Thapsia.

Deadly *Feud*, in our *Law Books*, a profeſſion of irreconcileable enmity till a perſon is revenged by the death of his enemy.

The word feud is derived from the German fehd, which, as Hottoman obſerves, ſignifies, modo bellum, modo capitales inimicitias. See Feud.

Such enmity and revenge were allowed by our ancient laws in the time of the Saxons; *viz.* if any man was killed, and a pecuniary ſatisfaction were not made to the kindred, it was lawful for them to take up arms, and revenge themſelves on the murderer; which was called deadly feud. And this, probably, was the original of an appeal.

Deadly *Nightſhade*. See Atropa.

DEADS, in *Mining*, is uſed to expreſs that part of the ſhelf or faſt ground which contains no ore; but which encloſes the vein or bed of the ore, like a wall on every ſide. The drifts which they ſink for the tin ore in Cornwall, are generally about three feet over, and about ſeven feet high; ſo that a man may conveniently ſtand upright at work, and manage his tools. In caſe the vein itſelf is not broad enough to allow this, as in many places it is not half a foot over, then they pick down the ſtrata that encloſe it, ſo as to make an opening of the ſame breadth. This work they call breaking up the deads. Phil. Tranſ. N° 69.

This word is alſo uſed for ſuch parcels of common looſe mould or earth, lying above the ſhelf, as uſually contain the ſhoad, which they find when they are training a load.

In the Mendip lead-mines, when a vein of ore breaks off abruptly in an earth, they call it a deading-bed; and earth without ore, they call dead-earth.

DEAF, in *Agriculture*, a term uſed to ſignify blaſted or barren, as applied to grain, nuts, &c.; thus we have deaf ears, deaf nuts, &c. ſignifying ſuch as are deſtitute of grain, kernels, &c.

DEAFFORESTED, in our *Law Books*, the being diſcharged from being foreſt: or freed and exempted from foreſt-laws. See Forest.

"Johannes Dei gratia, &c. archiepiſcopis, epiſcopis, &c. ſciatis nos omnino *deafforeſtaſſe* foreſtam de Brewood de omnibus, quæ ad foreſtam et foreſtarios pertinent. Quare volumus et firmiter præcipimus, quod prædicta foreſta, et homines in illa manentes, et hæredes eorum, ſint *deafforeſtati* in perpetuum."

DEAFNESS, in *Medicine*, imperfection or abolition of the faculty of hearing.

The cauſes of the loſs or imperfection of hearing are numerous, as will be readily conceived by any one, who conſiders the complex ſtructure of the ear: and the difficulty of diſtinguiſhing the modifications of deafneſs, as produced by theſe different cauſes, and conſequently of curing the diſeaſe, will be not leſs obvious, if the obſtacles, which nature has thrown in the way of ſuch an inquiry, be alſo taken into conſideration. The eſſential parts of the organization of the ear are ſituated within a bony caſe, beyond the reach of examination, and only one of the two paſſages, leading to it, can be brought under the eye of the obſerver. See Ear. The varieties of deafneſs have been uſually treated by writers under ſeparate heads, according to the parts of the organ, in which the cauſes were ſituated; as in the *meatus externus*, or external paſſage; the euſtachian tube, or paſſage to the internal ear; and the internal ear itſelf.

1. *Deafneſs from Diſeaſe of the external Paſſage.*—The moſt common impediment to hearing that occurs in the external paſſage to the ear, conſiſts in an unuſual accumulation and inſpiſſation of the cerumen, or wax of the ear, which is ſecreted by the glands of the paſſage. The quantity of cerumen, which may be collected without injuring the power of hearing, cannot be ſtated: it is different in different individuals, and in many perſons the quantity is naturally conſiderable. Sometimes it has been obſerved plugging up the paſſage altogether; and ſometimes forming a falſe membrane of the tympanum, or thickening the natural one. But in ordinary caſes, where the proper conſiſtence of the cerumen

remains unaltered, the functions of the organ are not much injured; whereas a ſmall portion of hardened cerumen, lodged on the membrane of the tympanum, will deprive a perſon of his hearing. The ſymptoms connected with the hardening of the cerumen are pretty well known. The patient, beſides his inability to hear, complains of noiſes, particularly a claſh or confuſed ſound, in maſtication, and of heavy ſounds like the ponderous ſtrokes of a hammer. Where the relation of theſe ſymptoms excites a ſuſpicion of the exiſtence of hardened wax, the practitioner will have recourſe to examination, by which he may reduce it to a certainty. Any means capable of removing the inſpiſſated wax may be adopted; but ſyringing the paſſage with warm water is the moſt ſpeedy and effectual, and the only expedient neceſſary.

The external paſſage is ſubject to an ulceration, which has been termed herpetic. This produces a great thickening of the integuments, and the paſſage is often ſo much cloſed, that a great degree of deafneſs enſues. The ichor, which exudes from the ulcerated ſurface, inſpiſſates in the paſſage, and not only obſtructs the entrance of ſound, but is accompanied with much fœtor. This diſeaſe is not unfrequent. It generally yields to the application of ſolutions of the metallic ſalts, as of muriated mercury in lime water; or of vitriolated zinc; or to the uſe of the unguentum hydragyri nitratum; calomel, or other alteratives being taken at the ſame time. Saunders on the Ear.

Sometimes polypous excreſcences occur in the external paſſage, and impede the hearing; or the paſſage is rendered narrow by the preſſure of the neighbouring glands, when much ſwelled; and ſometimes it is obſtructed by the preſence of extraneous ſubſtances. The cauſes, in the firſt and laſt inſtances, may be removed by mechanical means.

2. *Deafneſs from Obſtruction of the Euſtachian Tube.*—The euſtachian tube is a paſſage leading from behind the palate to the internal cavity of the ear. By permitting a free motion of the air, contained in that cavity, during the vibration of the membrane of the tympanum, it facilitates that vibration, and conſequently contributes greatly to the perfection of the faculty of hearing. Hence a very great degree of deafneſs is produced by an obſtruction of this tube. When ſuch an obſtruction has occurred, air can no longer be admitted into the cavity of the tympanum; and the included portion either is abſorbed, or it remains. In the latter caſe, the included air, incapable of yielding in any other way than by condenſation, counterbalances the pulſes excited by ſounding bodies. In the former, the preſſure of the atmoſphere will carry the membrane of the tympanum into the tympanum, as far as it will go, in which ſtate it will reſt, and cannot vibrate in any conſiderable degree. Either hypotheſis will account for the deafneſs. But it has been ſuggeſted, that, ſubſequently to the obliteration of the euſtachian tube, the included air is abſorbed, and the cavity of the tympanum filled with mucus; at leaſt the cavity was found in this ſtate in two inſtances of diſſection, where the euſtachian tube was cloſed. See Saunders on the Anatomy and Diſeaſes of the Ear, p. 42.

The obſtruction of the tube moſt frequently ariſes from ſyphilitic ulcers in the throat, or ſloughing in the cynanche maligna. The deafneſs enſues on the healing of the ulcers, that is, when the obſtruction is complete. The deſcent of a naſal polypus into the pharynx, and enlarged tonſils, have alſo been known to cloſe the tube.

If the patient blows, with his noſe and mouth ſtopped, he does not experience that peculiar ſenſation, which ariſes from the inflation of the tympanum. He ſpeaks only of the loſs of ſenſe, and complains of no particular ſymptom. The deafneſs differs in this reſpect from all other ſpecies; the patient not being haraſſed with diſtreſſing noiſes, which are falſe perceptions, ariſing from a diſeaſed ſtate of the auditory nerves, or proceeding from real impreſſions on the nerves produced by morbid cauſes in the organ.

Generally the obſtruction comes on in conſequence of ſome notable diſeaſe in the throat, and the cartilaginous extremity of the tube is moſt commonly the ſeat of it; yet it occaſionally takes place in the bony portion. It is then ſlower in its progreſs, proceeds from no obvious cauſe, and conſiſts in an inordinate oſſification, filling up the canal.

We are deſtitute of a perfect diagnoſtic ſymptom, by which we can be aſſured when deafneſs is produced by an obſtruction of the euſtachian tube. The incapability of inflating the tympanum only renders it probable; for many people who hear perfectly, are incapable of producing this ſenſation, at leaſt in a great many trials. We are therefore compelled to truſt to the patient's account. This will be ſufficient when the obſtruction has been preceded by an ulceration or diſeaſe of the throat.

We are indebted to the penetration of Mr. Aſtley Cooper, for the means of reſtoring the ſenſe of hearing, which the obſtruction deſtroys. He had obſerved in ſuppurations of the tympanum, which had injured and even deſtroyed the membrane of the tympanum, that the ſenſe of hearing was only impaired, not totally loſt, and that the degree of deafneſs, when the membrana tympani was only injured, by no means equalled that produced by the obſtructed tube. Reflecting on this, he was induced to conſider that a ſmall puncture of the membrane of the tympanum would be of trivial detriment even to a ſound ear, and in this inſtance would be the means of reſtoring to the organ the exerciſe of its functions. This happy expedient he himſelf executed with great ſucceſs, a ſucceſs fully confirmed by a ſimilar reſult of the operation in the hands of others.

The operation is performed by paſſing an inſtrument into the external paſſage, and puſhing it through the anterior and inferior part of the membrane of the tympanum. It is unneceſſary to ſtate the reaſon for making the puncture in this place; the poſition of the manubrium of the malleus evidently demands this precaution. A little crack will immediately be perceived, ſimilar to what is occaſioned by the puncture of parchment, more particularly if the tube be cloſed, as the ſound will then be more acute, from the rapid entrance of the air through a narrow aperture. The inſtrument ought not to penetrate far into the tympanum, leſt it ſhould penetrate its vaſcular lining; as the eſcape of blood into the cavity would for a ſhort time fruſtrate the operation, even if it ſhould ultimately be ſucceſsful.

When the puncture has been ſucceſsfully made, the patient is inſtantaneouſly reſtored to a perfect hearing. The effect of the operation is the immediate ſubſtitution of a ſmall hole in the membrana tympani for the euſtachian tube; and air being admitted into the tympanum, the mobility of the membrane returns, and the action of the machinery of the tympanum is re-eſtabliſhed.

The only obſtacle to the complete ſucceſs of this puncture is its tendency to cloſe. For this reaſon, it is often neceſſary to make rather a large hole in the membrane, before you can inſure the patient againſt the recurrence of the deafneſs. But a large hole diminiſhes the perfection of the ſenſe. Tenſion is the ſtate eſſential to the membrane of the tympanum. This tenſion is not diminiſhed by a ſmall perforation; but if the membrane be much lacerated or detached at its circumference, the tenſion will be leſſened; yet even then the patient receives a ſtriking benefit. To this imperfection we muſt however ſubmit; and perhaps a larger opening may generally be expedient, than can be made by a

ſimple

ſimple perforation with the inſtrument propoſed by Mr. Cooper.

The caſes related by Mr. Cooper may be found in the Philoſophical Tranſactions for 1802. See Saunders on the Ear, p. 41, *et ſeq.*

3. *Deafneſs from Diſorders of the internal Ear.*—The nature of the deafneſs which ariſes from diſeaſes of the internal parts of the ear is much more difficult to aſcertain, than in the preceding inſtances, in conſequence of our inability to examine the morbid changes, which are the immediate cauſe of the defect. If we reflect on the component parts of the labyrinth, we are led to conjecture that the deafneſs originates in a want of ſenſibility in the nerve; in ſome alteration in the ſtructure of the membranes on which the nerve is expanded; or in a change in the properties of that fluid, which is contained in the membranes, and is the immediate agent in impreſſing the ſentient extremities of the nerve. In diſſecting the ear of a perſon born deaf, Mr. Clive found that the labyrinth, inſtead of its aqueous fluid, contained a thick caſeous ſubſtance. This muſt have been incapable of undulating in the cavities of the labyrinth, and its exiſtence is fully adequate to account for the total abſence of the ſenſe. Examples have been mentioned by writers of hydatids in the cavities of the internal ear, and of collections of pus and blood in thoſe parts, producing deafneſs; alſo of exoſtoſis, and other alterations of the internal ſtructure of the organ, occaſioned by the virus of ſmall-pox, ſcrofula, &c. See Portal, Anatomie Medicale, tom. iv.

But it has been aſcertained by diſſection, that total deafneſs may exiſt, without any defect in the mechaniſm of the exterior parts of the ear; and without any defect in the membranous ſtructure on which the nerve is expanded, in the water it contains, or in the nerve itſelf; in ſhort, without any morbid appearance that can be traced by the eye. Such caſes may be conſidered as examples of nervous deafneſs, dependent on ſome morbid inſenſibility in the nerve itſelf. The patient can inflate the tympanum, and the external paſſage may be perfectly free from hardened wax; this ſpecies too is accompanied with the ſenſation of different noiſes in the head, ſuch as the murmuring of water, the ruſtling of leaves, the blowing of wind, &c. Some patients complain of a beating noiſe, correſponding with the pulſe, increaſing by bodily exertion in the ſame degree as the action of the heart. The cauſe of this ſenſation is doubtleſs the pulſation of the arteries; although it may be difficult to explain what the change is, which renders the organ ſuſceptible of this impreſſion; or to determine whether the ſmall arteries, which ramify in the interior of the labyrinth, are the immediate agent, or the internal carotid, which paſſes cloſe beneath the cochlea.

The inſenſibility of the auditory nerves may be occaſioned by various diſorders of the parts in their courſe; as by the preſſure of tumours, exoſtoſis of membranes thickened by inflammation, by ſcrofula, or ſyphilis, or by mere fullneſs and over-diſtenſion of the blood-veſſels: hence deafneſs of this ſort often precedes or accompanies apoplexy, palſy, epilepſy, phrenitis, &c. A ſimilar deafneſs likewiſe ariſes, where the organic cauſe is ſeated in the brain, or ſpinal marrow, at the origin of the auditory nerves; and ſometimes in the ſide oppoſite to the deaf ear. See Portal Anat. Medicale—Calliſen Syſt. Chirurg. Hodiern. tom. ii. par. 359, and 551.

Where there are ſymptoms of plethora, ſuch as intimate a probable occurrence of hemiplegia, or where local inflammation in the head has preceded the deafneſs, evacuants, particularly local ones, will be reſorted to; ſuch as the application of bliſters to the neck or behind the ears, or of leeches, or cupping glaſſes, to the ſame parts; and the general antiphlogiſtic plan will be purſued more or leſs, according to the urgency of the plethoric ſymptoms. Where theſe ſymptoms are abſent, and a ſuſpicion of the thickening and enlargement of the neighbouring parts, in conſequence of ſyphilitic or ſcrofulous affections, exiſts; the conſtitutional remedies required for theſe diſeaſes will be employed. And where it appears that the ſenſibility of the auditory nerves is impaired from a feeble and imperfect action of the circulation, the local ſtimulus of electricity, or galvaniſm, may be applied; ſtimulating liquids may be dropped into the external meatus, or introduced on lint, and ſternutatories employed, together with the external ſtimulus of veſicatories and rubefacients.

Confirmed nervous deafneſs is, in truth, generally hopeleſs; but it is not eaſy to determine *à priori*, when attempts to cure it will be vain. This does not depend on the duration of the diſeaſe, but on the degree of miſchief done to the organ; and therefore the periods at which it becomes incurable muſt be various. In the incipient ſtate, it would appear, from ſeveral caſes related by Mr. Saunders, that the nervous deafneſs may be relieved by the antiphlogiſtic regimen, purgatives, and bliſtering. On the Anat. and Diſeaſes of the Ear, p. 49, *et ſeq.*

Another diſorder of the internal ear, producing deafneſs, is a puriform diſcharge from the tympanum, of an ichorous nature, ſometimes tinged with blood, and imparting a yellow colour to a ſilver inſtrument. This diſeaſe is attended with a loſs of hearing proportionate to the injury which the machinery of the tympanum has ſuſtained; and hence the ſenſe is variouſly impaired, from the ſlighteſt degree up to total deafneſs.

In general, when the patient blows ſtrongly, with the noſe and mouth cloſe, air will be expelled at the meatus externus. Whenever this circumſtance is obſerved, it is clear that the diſcharge proceeds from, or is connected with, an injury or deſtruction of the membrane of the tympanum; but the reverſe by no means proves that the membrana tympani is found, and the diſcharge therefore confined to the external paſſage. For it often occurs, that the ſame inflammation, which terminates in a ſuppuration of the tympanum, previouſly obliterates the euſtachian tube, which remains permanently cloſed after the ceſſation of the inflammation that occaſioned it. The ſtate of the tympanum, therefore, muſt be aſcertained by actual examination. The ear muſt be inſpected in a ſtrong light. For this purpoſe the patient ſhould be placed in ſuch a poſition, that the rays of the ſun may fall into the meatus, and illuminate it ſufficiently to make the bottom viſible: or the ear may be ſounded with a blunt probe, and any perſon acquainted with the particular feel of the membrana tympani, may eaſily diſtinguiſh it by the touch. If the membrane be defective, the inſtrument will paſs into the tympanum, the bony ſuperfices of which is ſtill more diſtinguiſhable. He, therefore, who will inſtitute a proper examination, cannot fail of arriving at a certain knowledge of this diſeaſe, and will not confound it with the herpetic ulcerous ſtate of the meatus externus, before mentioned. In the latter ſucceſs is certain, and as ſoon as the ulceration is cured, hearing is perfectly reſtored; but in the former, however perfectly the diſcharge may be ſuppreſſed, the event is very dubious.

This ſtate of the tympanum is produced by various cauſes. In the ſcarlatina maligna, inflammation of the tympanum attacks the patient, and advances to gangrene: if he ſurvives the fever, the machinery of the ear often ſloughs ſo extenſively, that the membrana tympani and the whole chain of bones are evacuated, and the patient is perfectly deaf. Moſt commonly this diſeaſe ſucceeds the ear-ache, which is, in fact, an acute inflammation of the tympanum. If the inflammation ſhould not ſubſide ſpontaneouſly, or be aſſuaged by art, the tympanum and maſtoid cells form a large quantity

tity of pus. After the patient has ſuffered the moſt intenſe pain, the membrane of the tympanum ulcerates, and the pus is diſcharged at once in a large quantity. He is then greatly relieved, but the diſeaſe ceaſes not; the parts ſupply freſh matter, which continually oozes out at the meatus.

The ſymptoms produced by inflammation of the tympanum are, moſt intenſe pain of the head and ear, a great degree of ſymptomatic fever, and ſometimes ſlight delirium. This pain fluctuates, and its paroxyſms reſemble the toothache; a reſemblance which has unfortunately cauſed it to be wholly neglected, or very improperly treated. The caſe obviouſly requires the moſt active antiphlogiſtic treatment, and the abſence of every thing ſtimulative. But the oppoſite practice prevails. The moſt acrid applications and ſpirituous liquors are the general means employed for the relief of the patient; an error that unqueſtionably tends to produce the worſt cataſtrophe that can happen, *viz.* the ſuppuration of the parts. This diſeaſe, however, is not always the reſult of one acute attack of inflammation: moſt frequently it is ſlower and more inſidious in its progreſs. Slight paroxyſms of pain attack the patient, and are relieved by ſlight diſcharges. Theſe recur at intervals, until at laſt the puriform diſcharge is fully confirmed.

This diſeaſe demands attention, as it is very deſtructive in its tendency to the faculty of hearing, ſince it rarely ſtops, till it has diſorganized the tympanum. For the puriform diſcharge naturally advances to ulceration, and ulceration to denudation and caries of the bone, and ſeparation of the chain of bones: a caries of the tympanum is therefore ultimately produced. Yet it is unaccountable that many writers and practitioners aſſert the propriety of abſtaining from all attempts to ſtop this diſcharge, from a notion that the ſuppreſſion of it might be injurious. But the fact is, the puriform diſcharge from the tympanum often exiſts without a caries of the bone, and antecedently to this is moſt commonly curable.

Mr. Saunders conſiders this diſeaſe as exiſting under three ſtates or ſtages: 1. a ſimple puriform diſcharge; 2. a puriform diſcharge, complicated with fungi and polypi; 3. a puriform diſcharge with a caries of the tympanum. The time neceſſary to accompliſh the tranſition from one ſtage to another is uncertain. Years do not affect it in ſome inſtances; and, in others, it ſeems to advance almoſt at once to a carious ſtate of the bone.

The puriform diſcharge from the tympanum is a local diſeaſe, and does not depend on any diſordered ſtate of the conſtitution: general remedies are therefore inefficacious. But as a bad ſtate of health is unfavourable to the healing of any parts, ſo, in this particular complaint, any diſordered condition of the habit ſhould be corrected. The chief dependence is to be placed on direct applications to the parts affected. Injections of vitriolated zinc, acetite of lead, &c. are very efficacious in ſuppreſſing the diſcharge; and their effects may be aided by the external employment of bliſters and ſetons. The fungous and polypous excreſcences muſt be removed or deſtroyed by mechanical means; they are only incidental occurrences, and their removal reduces the diſeaſe to the firſt ſtage.

As it has been ſtated that the degree of deafneſs produced by this complaint is various; ſo, when it is cured, the ſenſe is reſtored in different degrees. For the deafneſs during its continuance is ſometimes very conſiderable, when the real injury which the organ has ſuſtained is trivial. In the firſt ſtage, the mere thickening of parts, or the collection of the diſcharge, muſt impede the action of the intervening machinery between the external and internal parts of the ear: and, in the ſecond, the mechanical obſtruction of the funguſes or polypi excludes the pulſes of the air. On this account there is often a notable increaſe of the power of hearing, when the diſcharge is ſuppreſſed in the firſt and ſecond ſtages. But as the parts are inviſible, it is difficult, if not impracticable, to decide *à priori* how far the power of hearing can be reſtored. Now this is no valid objection to attempting the cure. The ſenſe will not be rendered worſe by a failure; and, if the diſcharge ſhould be ſtopped, the diſeaſe which cauſed it is removed, the organ ſafe from farther injury, and the patient freed from an offenſive malady. In the laſt ſtage, the ſenſe is almoſt, if not totally, deſtroyed; and although the diſcharge be ſtopped, the patient's hearing will be very little, if at all, improved.

After the cure of this diſeaſe, the tympanum is expoſed to the free ingreſs and egreſs of the air, and the mucilaginous diſcharge inſpiſſates, as the mucus of the noſe, by the exhalation of its watery parts. By this accident the patient's deafneſs increaſes at intervals, for which he often ſeeks relief. The practitioner, on ſounding the ear, perceives this hardened matter; and conceiving, as is really the caſe, that it produces the augmentation of deafneſs, is tempted to remove it. But nothing ſtimulative, nor any rude attempts can be ſafe, for there is great danger of reproducing the diſcharge. Having learned that a diſcharge has pre-exiſted, it will be expedient to leave it to a ſpontaneous ſeparation. Saunder's Anat. and Diſ. of the Ear.

Deafneſs often occurs in the courſe of acute fevers, in conſequence, perhaps, of the loſs of power in the nervous ſyſtem, which ſucceeds the violence of febrile excitement. Experience has decided, that this deafneſs is a favourable ſymptom, conſidered with a view to the prognoſis in fever, and that it generally ceaſes as the ſtrength is reſtored.

The deafneſs common in old age depends upon the condition of the nerves and ſolids, which conſtitutes the decline of the conſtitution; for in this ſtate the ſolids become rigid, and unfit for delicate movements, and the ſenſibility of the nerves is greatly diminiſhed. Of courſe it is incurable.

Thoſe who are born deaf continue, through life, deprived of the faculty of ſpeech; as it is impoſſible they ſhould learn to imitate ſounds which they cannot hear. Much ingenuity and induſtry, however, have been exerted, and that with conſiderable ſucceſs, in ennabling theſe unhappy beings to communicate their thoughts to each other. See DUMBNESS.

In the year 1792, an "aſylum for the ſupport and education of the deaf and dumb children of the poor," was inſtituted in London, which has afforded relief to a conſiderable number of theſe very compaſſionable objects. This ſociety is under the direction and management of a preſident, 14 vice-preſidents, a treaſurer, and a committee of 23 governors. The children, who are admitted between the age of 9 and 14 years, are taught to ſpeak and write articulately, and to underſtand what they read and ſpeak; they are taught penmanſhip, and practical arithmetic, ſo as to fit them for the management of common concerns; and they are alſo taught ſome of the moſt uſeful mechanical arts, by which they are enabled to earn a livelihood.

Thoſe born deaf are alſo dumb, as not being able to learn any language, at leaſt in the common way. However, as the eyes, in ſome meaſure, ſerve them for ears, they may underſtand what is ſaid by obſerving the motion of the lips, tongue, &c. of the ſpeaker; and even accuſtom themſelves to move their own, as they ſee other people do; and by this means learn to ſpeak.

Thus it was that Dr. Wallis taught two young gentlemen, born deaf, to know what was ſaid to them, and to return pertinent anſwers. Digby gives us another inſtance of the ſame, within his own knowledge. And there was a Swiſs phyſician formerly living at Amſterdam, one Joh. Conrad

Conrad Amman, who effected the ſame in ſeveral children born deaf, with ſurpriſing ſucceſs. He has reduced his ſcheme to a fixed art, or method, which he has publiſhed in his Surdens Loquens, Amſtelod, 1692, and De Loquela, ibid. 1700.

In the Philoſoph. Tranſ. N° 312. we have an account by Mr. Waller, R. S. Sec. of a man and his ſiſter, each about fifty years old, born in the ſame town with Mr. Waller, who had neither of them the leaſt ſenſe of hearing; yet both of them knew, by the motion of the lips only, whatever was ſaid to them, and would anſwer pertinently to the queſtion propoſed. It ſeems they could both hear and ſpeak when children, but loſt their ſenſe afterwards; whence they retained their ſpeech, which, though uncouth, was yet intelligible.

Such another inſtance is that of Mr. Goddy's daughter, miniſter of St. Gervas in Geneva, related by biſhop Burnet. At two years old they perceived ſhe had, in great part, loſt her hearing; and ever after, though ſhe heard great noiſes, yet ſhe could hear nothing of what was ſaid to her. But by obſerving the motions of the mouths and lips of others, ſhe had acquired ſo many words, that out of theſe ſhe had formed a ſort of jargon, in which ſhe could hold converſation whole days with thoſe that could ſpeak her language. She knew nothing that was ſaid to her, unleſs ſhe ſaw the motion of the mouths of thoſe that ſpoke to her; ſo that, in the night, they were obliged to light candles to ſpeak to her. One thing will appear the ſtrangeſt part of the whole narration: ſhe had a ſiſter, with whom ſhe had practiſed her language more than with any body elſe; and in the night, by laying her hand on her ſiſter's mouth, ſhe could perceive by that what ſhe ſaid, and ſo could diſcourſe with her in the dark. Burn. Let. iv. p. 248.

It is obſervable that deaf perſons, and ſeveral others thick of hearing, hear better and more eaſily, if a loud noiſe be raiſed at the time when you ſpeak to them, which is owing, no doubt, to the greater tenſion of the ear-drum on that occaſion. Dr. Willis mentions a deaf woman, who, if a drum were beat in the room, could hear any thing very clearly; ſo that her huſband hired a drummer for a ſervant that by his means he might hold converſation with his wife. The ſame author mentions another, who, living near a ſteeple, could always hear very well, if there was a ringing of three or four bells; but never elſe.

Dr. Buchner relates an extraordinary method of making deaf perſons to hear, by applying thin ſlips of wood, about ſix feet long, an inch broad, and as thick as the back of a knife, at one end to the upper teeth of the ſpeaker, and at the other to the upper teeth of the deaf perſon. Many trials were made to aſcertain the fact, and the voice was found perceptible and diſtinct. This method, he obſerves, may be adapted to all perſons afflicted with deafneſs, provided the auditory nerves are not injured or deſtroyed at their origin. See Buchner's Eaſy and Practicable Method to enable deaf Perſons to hear, tranſlated from the German, 1770. For a further account of the deaf and dumb, and of the methods uſed for the relief of ſuch perſons, ſee DUMBNESS.

A man who is born deaf, dumb, and blind, is regarded by the law in the ſame ſtate as an idiot; being ſuppoſed incapable of any undertaking, as wanting all thoſe ſenſes which furniſh the mind with ideas. A man who could neither ſpeak nor hear, committed felony and was arraigned, and therefore committed to priſon. A perſon, having made his will, became ill and loſt his ſpeech: the ſame will was delivered into his hands, and it was ſaid to him, that he ſhould deliver it to the vicar, if it ſhould be his laſt will, or otherwiſe retain it: he delivered it to the vicar, and it was held a good will. When a defendant appeared by oath, to be both ſenſeleſs and dumb, ſo that he could not inſtruct his counſel to draw his anſwer, it was ordered that no attachment, or other proceſs of contempt, ſhould be awarded againſt him for not anſwering, without ſpecial order of the court. One that is deaf cannot give; and thus alſo, one that is dumb. However, according to the opinion of ſome, they may conſent by ſigns; but it is generally held, that a dumb perſon cannot make a gift, becauſe he cannot conſent to it. (1 Inſt. 107.) The lord ſhall have the cuſtody of a copyholder that is deaf and dumb; for elſe he ſhall be prejudiced in his rents and ſervices; and adjudged for the grantee of the lord againſt the prochain amy of the copyholder. Cro. Jac. 105.

A perſon born deaf and dumb, who ſignified by ſigns that ſhe underſtood what ſhe was about to do, was allowed to levy a fine of lands; by Bridgman, Ch. J. and other juſtices. Cart. 53.

DEAL, is a well-known kind of wood of great uſe. In its common ſtate, for ordinary purpoſes, it conſiſts of planks of fir, ſawed from the trunk of the tree longitudinally, of various thickneſſes, according to the uſes to which they are applied.

A very good method of ſeaſoning planks of deal, is to throw them into ſalt-water as ſoon as they are ſawed, and keep them there three or four days, frequently turning them. In this caſe they will be rendered much harder, by drying afterwards in the air and ſun; but neither this nor any other means yet known, will preſerve them from ſhrinking.

Deals are imported chiefly from Chriſtiania, and other parts of Norway; from Dantzic, and ſeveral parts of Pruſſia; from Peterſburg, Archangel, and other parts of Ruſſia. They are ſold by the piece, or ſtandard hundred, or long hundred of 120. A ſtandard, or reduced deal, is 1½ inch thich, 11 inches wide, and 12 feet in length.

Rods of deal expand laterally, or acroſs the grain, in moiſt weather, and contract again in dry; and thence have been found to make an uſeful hygrometer. Phil. Tranſ. N° 480. p. 184. See HYGROMETER.

DEAL, in *Geography*, is a market and ſea-port town in the hundred of Cornilo, and lathe of St. Auguſtine, in the county of Kent, England. It is diſtant 18 miles from Canterbury, and 73¾ S.E. from London. The town ſtands on the ſea-ſhore, which here forms a bold beach; and is defended from the violence of the waves by a long rampart of pebbles, which have been thrown up by the ſea. The pariſh is recorded in the domeſday book under the name of Addelam. In the time of Henry VI., it was, by the king's letters patent, conſigned, together with Walmer, to the juriſdiction of the Cinque Ports. At that time it was governed by a deputy and aſſiſtants, appointed by the mayor and jurats of Sandwich. This mode continued till the eleventh year of William III., A. D. 1699, when the people ſucceeded in obtaining a charter; by which Deal was conſtituted "a free town and borough of itſelf, and its local government veſted in a mayor, twelve jurats, twenty-four common-council-men, a recorder, town clerk, and other inferior officers. Nothing, however, appears in this charter to have abrogated the preſcriptive rights of Sandwich, in ſome inſtances, reſpecting Deal. The former has a concurrent juriſdiction with the latter; and the inhabitants of Deal are liable to ſerve on juries at Sandwich. In the time of Leland, this place did not rank as a town; it was, according to that author, no more than a ſmall "fiſher village, half a myle fro the ſhore of the ſea," inhabited by a few perſons employed in fiſhing, whoſe houſes conſtitute that part of the town called Upper Deal. What

is termed Lower Deal received a great increaſe in extent of buildings and population, about the commencement of the laſt century. It is now a conſiderable maritime town, conſiſting of three long ſtreets, running parallel with the ſea, and connected by others more or leſs narrow; which, as is common in ſea-ports, render them both incommodious and dirty. The houſes are irregularly built, principally of brick; but in thoſe erected within a few years, greater attention has been paid to uniformity. Since the year 1790, when an act was obtained for paving, lighting, and cleanſing the town, it has undergone various improvements; and convenient regulations have been made for the accommodation of perſons viſiting the place during the bathing ſeaſon. The mother-church being found too ſmall, and inconveniently diſtant, a chapel of eaſe was erected in the lower town by ſubſcription, in the year 1707. The caſtle, which ſtands to the ſouth of the town, is ſurrounded by a deep foſs, croſſed by a draw-bridge. It conſiſts chiefly of a round tower, containing apartments for the officers and garriſon who attend the battery. But the principal defence of this place is derived from the martello towers, and other batteries which have been lately erected along the coaſt in the vicinity. In the town is a regular cuſtom-houſe, at a little diſtance from which is a naval ſtore-houſe. Here are alſo an extenſive naval and military hoſpital, and a large houſe of induſtry. The ſea immediately oppoſite the town is called the Downs, which has become a general rendezvous for ſhipping, both men of war, as well as merchant veſſels. This has contributed greatly to the increaſe of Deal. In time of war, the immenſe influx of people, and the conſtant demand for ſhip-ſtores, tackling, proviſions, clothes, and various other neceſſary articles, render this town an eligible ſituation for perſons in trade. But the principal inhabitants are employed in maritime occupations, and ſome few are engaged in ſmuggling. The channel called the Downs is about eight miles long and ſix broad; and the depth varies from eight to twelve fathoms. This is the common rendezvous of the Eaſt India and other fleets on their voyages, both when homeward and outward bound. In particular ſtates of wind, nearly 400 ſail of ſhipping have been ſeen at one time, ſafely riding at anchor here. For the more ſafe conveyance of veſſels in and out of the Downs, and up the river Thames and Medway, an eſtabliſhment of pilots is formed at this port, under an act of parliament. They are divided into two claſſes, called the upper and lower book. The former conſiſts of twenty-four pilots, five of whom are conſtituted wardens; and the latter, of twenty-five. The charges of pilotage are regulated by the tonnage. Thoſe of the upper book have the privilege to pilot ſhips drawing more than eleven feet four inches. To this book, thoſe of the lower progreſſively riſe by ſeniority. Attached to theſe is a ſet of experienced and intrepid ſeamen, who make it their particular buſineſs to afford aſſiſtance to ſhips in diſtreſs. They are called Hovellers. During a ſtorm, when the wind ſeems to baffle all human ſkill, and nothing but inſtant deſtruction is expected by the labouring veſſels; two or more hovelling boats will be frequently ſeen riding upon the boſom of the wave, as if in defiance of the contending elements. Numerous are the inſtances in which the brave crews of theſe apparently inſignificant veſſels, have been ſucceſsful in reſcuing thouſands from the moſt imminent peril.

According to Gale, Horſley, and ſome other antiquaries, the place of Cæſar's firſt landing in Britain was at Rutupiæ, the preſent Richborough; but Camden, and the authors of the Beauties of England and Wales, conclude that it muſt have been near Deal. After mentioning the advantageous poſition the Britons had taken on the heights of Dover, and convinced of the folly of attempting a landing there, Cæſar ſtates, in his Commentaries, which contain his own account of his campaigns, "Dato ſigno et ſublatis anchoris circiter millium paſſuum viii., ab eo loco progreſſus aperto, et plano littore naves conſtituit;" *i. e.* having made a ſignal, weighed anchor, and ſailed eight miles further up, he brought to his ſhips on a plain and open ſhore. A deſcription which agrees with the coaſt near Deal, for it is the firſt low ſhore to the north of Dover; and ſome entrenchments, ſtill to be traced, are ſuppoſed the ſite of his maritime camp. At this place Perkin Warbeck landed from France, when he perſonated the duke of York, under which title he laid claim to the crown of England.

The amount of the population of Deal, as returned under the late act, was 5420, and the number of houſes 917. By the charter of king William, two weekly markets are held on Tueſdays and Wedneſdays, and two annual fairs. Haſted's Hiſt. of Kent. Beauties of England and Wales.

The Goodwin ſands, called by Hector Boethius, "Navium gurges & vorago, a moſt dreadful gulf and ſhip-ſwallower;" though they ſerve as a kind of natural pier, and form the ſouthern boundary of the Downs, are frequently fatal to ſhips coming from the eaſtward; as the waves break over them in boiſterous winds with unabating fury. Theſe ſands extend about ten miles in length, from what is termed the northſand-head, being nearly oppoſite to Ramſgate; and the ſouthſand-head, to Kingſdown. Tradition has repreſented theſe ſands as once an iſland, which belonged to the great earl Godwin, and that it ſuddenly ſunk, and was ſwallowed by the ſea, as a ſignal mark of divine vengeance on the heinous ſins of that nobleman. But from Gyraldus' account and that of Hector Boethius, the event appears to have more naturally happened about the end of the reign of William Rufus, or beginning of Henry the I.'s, and was occaſioned by one of thoſe ſudden inundations, which, from ſome latent cauſes, not unfrequently happen in the ocean; whereby the ſtate of its ebbings and flowings is conſiderably changed upon different coaſts. Hiſtory informs us, ſuch a phenomenon took place on the coaſts of Flanders, whereby a large tract of country was overflowed; and, at the ſame time, a ſimilar injury, though not to an equal extent, was done on the ſhores of England and Scotland. The preſent ſtate of the ancient Portus Rutupenſis, and of Sandwich haven, afford ſtriking evidence of the ſea having formerly flowed much higher than it does at preſent on this part of the coaſt. The danger of ſtriking on the ſands is deſcribed by Mr. Seaton to ariſe from their nature, which is that of a "quickſand, clean and unconnected;" yet lying ſo cloſe, as to render it difficult to work a pointed bar to the depth of more than ſix or ſeven feet. At low water they are dry in many parts, and parties frequently land on them; but when the tide begins to flow, the ſand becomes ſoft and quick, and their ingurgiting power is ſo great, that the largeſt veſſel driven upon them would, in a ſhort time, be completely ſwallowed up. To prevent ſuch accidents, the corporation of the Trinity-houſe intended to have erected a light-houſe upon theſe ſands; but no foundation being obtained by boring, the deſign was laid aſide. A floating light has been placed on the eaſt ſide of the north ſand-head, which has proved highly beneficial. Beauties of England and Wales, vol. viii. Perambulation of Kent. Hiſtorical Report of Ramſgate Harbour.

About one mile ſouth of Deal is ſituated Walmer, at the commencement of the high ſand, which extends from hence to the cliffs at Dover. The village is commonly called Walmer-ſtreet, and conſiſts of good houſes, inhabited by reſpectable families. Walmer caſtle ſtands at a ſhort diſtance from the village, nearly cloſe on the ſea ſhore; and commands, from its windows, a beautiful view of the

Downs, and the coaſt of France. This fortreſs is appropriated for the reſidence of the Warden of the Cinque-ports; and for this purpoſe, a few years ago, the principal apartments were handſomely fitted up for Mr. Pitt, on his temporary retirement from the chancellorſhip of the exchequer.

DEAL, a town of America, in the ſtate of New Jerſey, and county of Monmouth, 7 miles S. of Shrewſbury, to which the inhabitants of Philadelphia reſort, in ſummer, for health and pleaſure.

DEAMBULATORY, or AMBULACRUM, from *deambulo*, a lobby or portico for walking in, anciently very common in thoſe hoſpitals or other ſimilar buildings which were not furniſhed with regular cloiſters. One of theſe deambulatories, in length half a furlong, is to be ſeen on the eaſt ſide of the hoſpital of St. Croſs, near Wincheſter.

DE AMICIS, ANNA, in *Biography*, an exquiſite female Italian ſinger and actreſs, arrived in England in the autumn of 1762, with her family, all engaged for the comic opera, but all in ſubordinate parts, except herſelf, who was appointed firſt woman, to ſupply the place of the Paganini.

The opera-houſe opened this ſeaſon, Nov. 18th, with the comic opera of "Il Tutore e la Pupilla," a paſticcio, in which Anna De Amicis captivated the public in various ways. Her figure and geſtures were in the higheſt degree elegant and graceful; her countenance, though not perfectly beautiful, was extremely high-bred and intereſting; and her voice, and manner of ſinging, exquiſitely poliſhed and ſweet. She had not a motion that did not charm the eye, or a tone but what delighted the ear. Indeed, ſhe acted and ſung for the whole family; for by her merits, and good works, ſhe covered the multitude of their ſins, which would otherwiſe have had no remiſſion.

In Jan. 1763, a new comic paſticcio was brought on the ſtage, called "La Caſcina," and in February, another comic opera, compoſed by Galuppi, called "La Calamita de' Cuori," which had in it ſome charming airs, that ſeem to have been originally intended for the diſplay of all the enchanting powers of the young Anna De Amicis. Of this burletta, as well as the preceding, the elegant and intereſting De Amicis was the chief ſupport. The reſt of the ſinging was ſo deſpicable, that only her ſongs have been printed.

This admirable performer, on her return to Italy, in 1764, was engaged at Milan, as firſt ſerious woman, in which character ſhe ſung at the minor theatres of Italy with univerſal admiration, till 1773, when ſhe was again called to Milan, previouſly to her departure to Peterſburg, whither ſhe went in 1774. In 1775 ſhe was engaged at Naples, and in 1776 we find her ſinging in the ſame city, with Pacchierotti, under the name of De Amicis Buonſolazzo, probably the name of her huſband. And from this time ſhe ſeems to have regarded Naples as her home; as, except once at Turin with Aprile, in 1777, and the next year at Bologna with Tibaldi, we hear of her nowhere elſe, and her private conduct ſeems to have been equally correct with her public; as no irregularities have ever arrived at our knowledge to ſully her profeſſional fame and amiable character.

DEA NETTLE, a name provincially applied to the weed, wild hemp.

DEAN, a prime dignitary in moſt cathedral and collegiate churches; being uſually the preſident of the chapter.

He is called dean, decanus, of the Greek δεκα, *ten*, as being ſuppoſed to preſide over ten canons or prebendaries, at leaſt.

Canoniſts diſtinguiſh between deans of cathedral, and thoſe of collegiate churches. The firſt, with their chapter, are regularly ſubject to the juriſdiction of the biſhop. As to deans of collegiate churches, they have uſually the contentious juriſdiction in themſelves, that is, they exerciſe juriſdiction over their canons in all civil or criminal matters; though ſometimes this belongs to them in common with the chapter.

In England, as there are two foundations of cathedral and collegiate churches, the old and the new (the latter being thoſe founded by Henry VIII. on the ſuppreſſion of the abbots and priors, when their convents were turned into dean and chapter); ſo there are two ways of creating the deans. Thoſe of the old foundation, as the deans of St. Paul's, York, &c. are raiſed to their dignity much like a biſhop; the king firſt ſending out his conge d'elire to the chapter; the chapter then chooſing, the king yielding his royal aſſent, and the biſhop confirming him, and giving his mandate to inſtal him. Thoſe of the new foundation, as the deans of Canterbury, Durham, Ely, Norwich, Wincheſter, &c. are donative, and are inſtalled by a ſhorter courſe; only by the king's letters patent, without either election or confirmation, and are viſitable only by the lord chancellor, or by ſpecial commiſſion from the king; but the letters patent are preſented to the biſhop for inſtitution, and a mandate for inſtallment goes forth. 1 Inſt. 95. Davis, 46, 47. The new deaneries and chapters to old biſhoprics are eight; *viz.* Canterbury, Norwich, Wincheſter, Durham, Ely, Rocheſter, Worceſter, and Carliſle. The new deaneries and chapters to new biſhoprics are five; Peterborough, Cheſter, Glouceſter, Briſtol, and Oxford.

Deaneries and prebends may become void, like a biſhopric, by death, by deprivation, or by reſignation to either the king or the biſhop. If a dean, prebendary, or other ſpiritual perſon, be made a biſhop, all the preferments of which he was before poſſeſſed are void; and the king may preſent to them in right of his prerogative royal. But they are not void by the election, but only by the conſecration.

There are ſome cathedral churches which never had a dean; as thoſe of St. David and Landaff, where the biſhop is the head of the chapter, and in his abſence the archdeacon. The biſhop is deemed "quaſi decanus," and has, it is ſaid, both an epiſcopal throne and a deaconal ſtall allotted to him in the choir. St. Aſaph and Bangor, the two other Welſh cathedrals, have the dignity of dean diſtinct from that of biſhop; but the patronage of both deaneries is in the reſpective biſhops, theſe being neither elective by the chapter, nor donative in the crown. 1 Inſt. 95. In Ireland the king appoints to deaneries as to biſhoprics, by letters patent. *Id. ib.*

Conſtantine, we are told, erected an office of nine hundred and fifty perſons at Conſtantinople, taken out of divers trades and profeſſions, whom he exempted from all impoſitions, and beſtowed them on the cathedral church, to render the offices of burial gratis to the defunct, particularly to the poor. Theſe he called decani and lecticarii, probably becauſe they were divided by tens, each whereof had a bier, or a litter, to carry the bodies in. It is ſuppoſed to be thoſe who, under Conſtantius, began to be called copiatæ; *i. e.* clerks deſtined for labour; for they are uſually ranked among the clerks, and even before the chantors. By a law of the year 357, it appears that there were ſome of theſe copiatæ at Rome.

DEAN is alſo a title applied among us to divers perſons that are the chiefs of ſome peculiar churches, or chapels; as, the dean of the king's chapel, who has no juriſdiction; of the arches, who has juriſdiction only; of Battel, in Suſſex, founded by William I. who hath cure of ſouls, and juriſdiction within the liberty of Battel, is preſentable by the duke of Montagu, and inſtituted and inducted by the biſhop of Chicheſter, but not ſubject to his viſitation: of Bocking, in Eſſex, who hath a court and juriſdiction to hold plea of all eccleſiaſtical matters ariſing in ſeveral pariſhes within his peculiar,

peculiar, and is conſtituted by commiſſion from the archbiſhop of Canterbury, like the dean of Arches, and of Croydon in Surrey. There are alſo deputy-deans and commendatory-deans, who cannot confirm any grants, &c.

A commendatory dean may, with the chapter, chooſe a biſhop; and if a dean be elected biſhop, and before conſecration obtains diſpenſation to hold his deanery *in commendam*, ſuch dean may well confirm, &c. for his old title remains, and therefore confirmations, and other acts done by him as dean, are good in law. Latch. 237, 250. Palm. Rep. 460. A deanery is a ſpiritual dignity, and therefore a man cannot be dean and prebendary in the ſame church. Dyer, 273.

Deans of colleges in our univerſities are officers appointed to ſuperintend the behaviour of the members, and to enforce diſcipline. Some are called deans of provinces, or deans of biſhops: thus, the biſhop of London is dean of the province of Canterbury; and to him, as ſuch, the archbiſhop ſends his mandate for ſummoning the biſhops of his province, when a convocation is to be aſſembled, which may perhaps account for his being called dean of the biſhops. Deans are divided, from the nature of their office, into deans of ſpiritual promotions, and deans of lay promotions. Of the former kind are deans of peculiars, with cure of ſouls, deans of the royal chapels, deans of chapters, and perhaps rural deans. Of the latter kind are deans of peculiars, without cure of ſouls, who may be, and frequently are, perſons not in holy orders.

Deans, with regard to the manner of their appointment, are elective, ſuch as deans of chapters of the old foundation, nominally ſo, like biſhops; donative, as the deans of chapters of the new foundation, deans of the royal chapels, deans of peculiars without cure of ſouls, dean of the arches, appointed by commiſſion from the archbiſhop of Canterbury; preſentative, as ſome deans of peculiars with cure of ſouls, and the deans of ſome chapters of the new foundation, if not all; the dean of Battel, the dean of Glouceſter, preſented by the king to the biſhop, with a mandate to admit him, and to give orders for his inſtallment, and deans by virtue of another office, as the biſhop of London is dean of the province of Canterbury, and the biſhop of St. David's is dean of his own chapter.

DEAN, *Rural*, or *Urban Dean*, was formerly an eccleſiaſtical perſon, who had a diſtrict of ten churches, or pariſhes, either in the country or city, within which he exerciſed juriſdiction. Theſe rural deans were ſometimes called archipreſbyteri; and at firſt they were, both in order and authority, above the archdeacons. They were at firſt elected by the clergy, and by their votes depoſed; but afterwards they were appointed and removed, at the diſcretion of the biſhop; and hence they were called decani temporarii, to diſtinguiſh them from the cathedral deans, who were called decani perpetui. They ſeem to have been deputies of the biſhop, ſtationed round his dioceſe, the better to inſpect the conduct of the parochial clergy, to inquire into and report dilapidations, and to examine the candidates for confirmation, and therefore armed with an inferior degree of judicial and coercive authority.

We meet with rural deans as early as the ninth century. Hincmar, in a capitular to his archdeacons, reſerves the right of electing them to himſelf; and only allows it to the archdeacons, in caſe he be abſent, and by proviſion only. Some take the rural deans to hold the rank and place of the chorepiſcopi. Be this as it will, it is certain they are very ancient in France, Germany, and England; though, till the end of the ſixteenth century, they were unknown in Italy; becauſe the biſhoprics being there exceeding ſmall, they were not needed. St. Charles Borromeo is ſaid to have firſt introduced them there. Their office is now wholly extinguiſhed in England, the authority which they had being executed by the archdeacons and chancellors of biſhops; though their deaneries ſtill ſubſiſt as an eccleſiaſtical diviſion of the dioceſe, or archdeaconry.

DEAN, in the ancient monaſteries, was a ſuperior eſtabliſhed under the abbot, to eaſe him in taking care of ten monks; whence he was called decanus, in imitation of thoſe officers called by the ſame name among the Romans, who had ten ſoldiers under them.

The monaſteries being now leſs populous than they were in ancient times, the abbot, or prior, does not ſtand in ſo much need of being eaſed; ſo that theſe *deans* are, in general, ſet aſide.

DEAN *and Chapter*. Anciently, biſhops did not ordinarily tranſact matters of moment "ſine conſilio preſbyterorum principalium," who were then called "ſenatores eccleſiæ," and colleagues of the biſhops; repreſented, in ſome meaſure, by our chapters of cathedrals, wherein the dean and ſome of the prebends are, upon the biſhop's ſummons, to aſſiſt him in ordinations, deprivations, condemnations, excommunications, and other weighty concerns of the church, both religious and ſecular.

When the reſt of the clergy were ſettled in the ſeveral pariſhes of each dioceſe, theſe were reſerved for the celebration of divine ſervice in the biſhop's own cathedral. The dean and chapter are the nominal electors of a biſhop. The biſhop is their ordinary and immediate ſuperior; and has, generally ſpeaking, the power of viſiting them, and correcting their exceſſes and enormities. At common law they had a check on the biſhop; for till the ſtatute 32 Hen. VIII. c. 28. his grant or leaſe would not have bound his ſucceſſors, unleſs confirmed by the dean and chapter. Co. Litt. 103. See BISHOP, and CHAPTER.

DEAN, MICHEL, in *Geography*, a market town in the county of Glouceſter, England, is ſituated in the foreſt of Dean; diſtant weſt from Glouceſter 12 miles, and from London 120. Its name is derived from the Saxon words *dene* and *micl;* the former alluſive to its ſituation in a deep dell; and the latter ſignificant of its former importance, or its relative extent to a village, called Little Dean, in the neighbourhood. This place is principally noticed for its fine church and handſome ſpire. The body is quadrangular, conſiſting of a nave, chancel, two north, and one ſouth aiſles; which, from having variouſly ſhaped arches, appear to have been built at different periods. The roof is of oak, and its ceiling finely ſtudded with roſes and other well carved devices. In the eaſt window of one of the north aiſles are ſome remains of figures in ſtained glaſs, with which formerly the church appears to have been finely decorated. The font, which Mr. Lyſons ſuppoſes was cut out of the capital of ſome ancient column, appears as old as the twelfth century. Adjoining the ſouth aile, riſes a handſome tower, terminated by a well proportioned octagonal ſpire; which meaſures from the foundation, 156 feet in height.

Though the principal town in the foreſt, it is an inconſiderable and ill-built place; formed by three ſmall ſtreets, uniting in the ſhape of the letter Y. Formerly it was a ſtaple for wool, and had a conſiderable manufacture of cloth; but at preſent the only trade conſiſts in the ſale of leathers, and the making of pins. It has a market weekly, on Mondays, and two annual fairs. The number of houſes, as returned under the late act, amounted to 125, of inhabitants 563. In the vicinity of Michel Dean are the remains of *Flaeley Abbey*, once a highly privileged, and celebrated monaſtery of Ciſtercians; founded in the reign of king Stephen, by Roger Fitz-Milo, ſecond earl of Hereford, on the ſpot where his brother, while hunting, had accidentally been killed

killed by a random arrow. Henry the ſecond beſtowed on it ſeveral manors, an iron forge, and two oaks weekly out of the royal foreſt, to ſupply the forge with fuel. In the ſucceeding reign, this grant, having been found prejudicial to the foreſt, was revoked, and a wood conſigned in lieu of it. At the time of the diſſolution the annual revenues were valued at 112*l.* 13*s.* 1*d.* The abbey was granted to ſir Anthony Kingſton. The abbot's lodge was in tolerable preſervation ſo late as the year 1777, when a conſiderable part of it was deſtroyed by fire. The remainder having received many additions, forms the manſion of the preſent proprietor of the eſtate, ſir Thomas Crawley Boevy, bart. The floor of the chapter-houſe was diſcovered a few years ago, at a ſmall depth beneath the ſurface in the garden, and ſeven "ſtone coffin-lids," probably flat ſtones, were dug up, ſculptured with ornamental croſſes. In the church is an inſcription to the memory of Mrs. Catherine Boevy, who died in 1726; for whom a cenotaph, commemorative of her virtues, was erected in Weſtminſter abbey. Rudge's Hiſtory, &c. of Glouceſterſhire, 2 vols. 8vo.

Dean, *Foreſt of*, in Glouceſterſhire, England, includes nearly the whole of that part of the county, comprehended between the river Severn on the eaſt, the river Wye on the ſouth-weſt, and Herefordſhire on the north. By perambulations, made in different reigns, its extent was limited. The quantity of lands belonging to the crown, at preſent, appears to be 23,015 acres; excluſive of other property, which individuals have obtained by grants, or encroachments. It was formerly twenty miles in length, and ſo full of wood, as to make it dangerous for travellers to paſs through it, from the ſhelter it afforded to banditti. Formerly it afforded ſuch excellent oak, and in ſuch quantities, fit for the navy, as to be juſtly the glory of our own country, and the envy of other nations. For it is ſtated, that the officers who commanded the Spaniſh armada had expreſs inſtructions, after they had made good their landing, to proceed to the deſtruction of our foreſts; particularly that of Dean, in Glouceſterſhire. This grand reſource has almoſt failed. By the improvident grants of different ſovereigns, the neglect of the foreſt officers, and injudicious fellings, without adequate planting and fencing, to encourage the growth of young timber; ſuch depredations have taken place, and are ſtill committing, that threaten its annihilation as to the purpoſes of the navy. At preſent it ſupplies the royal dock yards, annually, with about 1000 loads of timber. In its preſent ſtate and management, the foreſt is divided into ſix walks, and the government veſted in a lord-warden, who is by virtue of his office conſtable of St. Briavel's caſtle; ſix deputy wardens; four verderors, who are choſen by the freeholders; a conſervator; ſeven woodwards; a chief foreſter in fee; a gaveller; and a ſteward of the ſwainmote. Theſe officers are empowered to hold a court of attachment every forty days, and another court called the juſtice ſeat, once in three years. Theſe courts are held at the ſpeech houſe, or king's lodge, which is ſituated near the centre of the foreſt. The whole being extra-parochial, and the inhabitants exempted from many taxes, with liberty of paſturage, and the privilege of ſinking mines, has induced many perſons to take up their reſidence here. The free miners and colliers not only claim a right to dig for iron ore and coal, but, with the conſent of the gaveller, to be ſupplied with timber for their reſpective works. The ſixth part of the produce from each mine belongs to the crown, and the annual compoſition for this, paid to the gaveller, is called the king's gawl. The crown poſſeſſes the excluſive right alſo of keeping in the foreſt 800 deer; but from various cauſes theſe are become ſo ſcarce, that the annual royal warrant, iſſued for four bucks and four does, is frequently returned unexecuted. The general appearance of the foreſt is beautiful and pictureſque, containing riſing grounds interſperſed with deep vallies, abounding in places with fine coppices and orchards. The new roads lately made by virtue of an act, granted in the 36th year of his preſent majeſty, have greatly facilitated the means of travelling through it. According to the account of ſir Robert Atkins, the foreſt only contained the ſix lodges, which were erected for the keepers; but, according to the returns under the late act of parliament, the number of houſes within it was 720, and the population amounted to 3325.

Dean *River*, or *Newark dyke*, in Nottinghamſhire, is, in fact, a ſide branch of the Trent river, (which here has two channels,) paſſing cloſe under the walls of Newark caſtle; it is navigable for about three miles, from the Trent river, to the town of Newark, has two locks upon it, and boats of 50 tons can navigate it; the exports thereon are corn, wool, Coddington paving-ſtone, (blue lias,) and plaſter-ſtone or gypſum; the imports are coals, principally from the Derbyſhire pits at Codnor-Park, and Ilkeſton; in Nottinghamſhire, at Brinſley, Bigarlee, and Eaſtwood; and Yorkſhire, at Park-Gate and Bradford; the latter for the blackſmiths' uſe; Crich and Burrow lime are alſo imported, with deals, iron, &c., for the uſe of the town of Newark, and ſurrounding country. There is a ſtone bridge of ſeven arches over the Dean at Newark, from whence the York road is embanked, acroſs the iſland or meadows in the Trent vale to Murkham, having 72 arches under the ſame, for the paſſage of the flood waters of this impetuous river. See Canal.

DEANE, Edmond, in *Biography*, brother to the biſhop of Oſſory, was born at Saltonſtall, in Yorkſhire, in 1572. At the age of nineteen he was entered at Merton college in Oxford, and having continued there, and at St. Alban's Hall, until he was admitted doctor in medicine, he went and ſettled at York. In 1626, he publiſhed, at London, "Spadacrene Anglica, or the Engliſh Spaw Fountain," being a brief ireatiſe of the acid or tart fountain in the foreſt of Knareſborough, in Yorkſhire. In a later edition, there are accounts of other mineral waters found in the foreſt. "Admiranda Chymica, Tractatulus, cum Figuris," 8vo. Frankford, 1630. This has been ſeveral times reprinted. Sam. Norton, Wood ſays, was eſteemed half author of this book, there being in it ſome of his tracts; ſc. Catholicon phyſicorum, Mercurius redivivus, &c. Dean is ſuppoſed to have died about the time the civil wars broke out, but in what year is not known. Wood's Athenæ Oxon.

DEARADERE, in *Geography*, a river of European Turkey, in Bulgaria, which runs into the Mariza near Demotica.

DEARNE and Dove Canal, is the parliamentary name of a navigable canal in Yorkſhire, between the Don river, a few miles below Rotherham, to the Barnſley canal, near the town of Barnſley, with ſide-cuts to Rockcliff bridge, and to Cob-car Jng; it ſerves for the export of the coals and iron of the great run of coals along which it paſſes. See Canal.

DEARTICULATION, in *Anatomy*. See Diarthrosis.

DEATH, in *Phyſiology*. "Death," ſays Dr. Johnſon, "is the ſeparation of the ſoul from the body." However correct this definition may be deemed, in a moral or religious point of view, we cannot admit it as ſufficiently preciſe for the purpoſes of the phyſician and phyſiologiſt. We ſhould propoſe to define it as "the irrecoverable ceſſation of all the functions which belong to a living animal." By this explanation

nation we diſtinguiſh *death*, 1ſt, from all thoſe conditions of the body in which any particular function or functions are deſtroyed, while the reſt remain in a more or leſs unimpaired ſtate: 2dly, from *ſuſpended animation*, in which the vital powers are merely interrupted, and may be reſtored to a ſtate of activity within a certain period of time: and 3dly, from *putrefaction*, which denotes the chemical changes taking place in the conſtituent ingredients of the *dead* body.

Living bodies are particularly diſtinguiſhed from inorganic matter by the mode in which their exiſtence is terminated; and hence a termination by *death* becomes one of the grand characteriſtics of *life*. The duration of an inorganized ſubſtance is dependent merely on the kind of compoſition which determines its phyſical ſolidity; hence it muſt be eſtimated from the bulk and coheſion of each body, and muſt be limited only by the nature and connection of its component parts. In living machines, on the contrary, the term of exiſtence is neceſſarily confined, and is not at all influenced by their compoſition or ſize. For many large and robuſt animals do not laſt ſo long as others much weaker and ſmaller. There are alſo relations of ſize between living and inorganic bodies totally at variance with thoſe of their reſpective duration, ſince in many inſtances particles of extreme ſmallneſs are infinitely more durable than the moſt bulky animals or vegetables.

The duration of inorganic bodies muſt always be influenced by the media in which they exiſt, and by the agents which ſurround them; but living beings are governed by very different laws. Their exiſtence is not limited by the natural corruptibility of their component elements, but is protracted, although by the nature of their formation, they tend rapidly to diſſolution, to a much longer period than that tendency would have led us to expect. Liable, by their very eſſence, to decay and decompoſition, they laſt much longer than they would have done, had their duration been determined by the properties of their elements. It is prolonged by their internal active powers, to which there is nothing analogous in inorganized ſubſtances. Definitions of life have been drawn from various abſtract and limited conſiderations; the following general view will exhibit a more ſatisfactory explanation of the ſubject: "life is the aſſemblage of thoſe functions which reſiſt death." Every thing which ſurrounds living bodies tends to deſtroy them. They are continually acted upon by inorganic ſubſtances; while at the ſame time they exert a conſtant and mutual influence on each other; they would ſoon yield, if they did not poſſeſs a permanent principle of re-action: life is that principle; unknown in its eſſence, it can only be appreciated by its phenomena; the moſt general of which is an habitual alternation of action on the part of external bodies, and of re-action on that of the living body, the proportions of which vary at different ages. The infant poſſeſſes an exceſs of life, ſince the re-action exceeds the action; they are nearly in a ſtate of equilibrium in the adult. The re-action of the internal principle diminiſhes in old age, while the influence of external agents remains the ſame; at that time the powers of life languiſh and advance inſenſibly to their natural termination, which takes place when all proportion has ceaſed.

Death then is the inevitable condition to which all bodies, that have poſſeſſed life, muſt ſooner or later be reduced. The exact period of its approach may indeed be accelerated or retarded by various cauſes; but the improved knowledge of modern times, in the compoſition of our bodies, in the powers by which they are animated, and in the laws by which theſe are governed, has clearly ſhewn that human exiſtence, however prolonged for a few ſhort years by attention to the circumſtances that promote bodily health and ſtrength, muſt at laſt arrive at its term. It has convinced every reflecting and reaſoning mind, that there cannot poſſibly be any means of protracting human life beyond a certain point; and that the attempts to diſcover an elixir of youth and immortality are to be reckoned among thoſe chimeras, which have too often employed the time, and bewildered the minds of the human ſpecies.

Natural death is remarkable on this account, *viz.* that the functions of animal life, or thoſe which connect the individual with the external world, conſiſting of ſenſation, motion, and ſpeech, ceaſe long before the functions of organic life, or thoſe by which its exiſtence is maintained, as reſpiration, digeſtion, abſorption, circulation, ſecretion.

The man who dies at the concluſion of an advanced age expires in detail. His external functions gradually ceaſe; the ſenſes are loſt in ſucceſſion, the ordinary ſtimuli no longer producing any effect on the organs. The ſight becomes obſcure and imperfect, and ſoon ceaſes altogether to tranſmit objects to the ſenſorium. The hearing, feeling, and ſmelling, are loſt in the ſame way. The taſte ſtill remains awhile, as the ſituation of its organ connects it with the organic as well as the animal life. Thus, when every agreeable ſenſation is loſt, and the ties which connected the old man to external objects, are nearly all deſtroyed, this alone remains, and is the laſt thread upon which the enjoyment of exiſtence is ſuſpended. The inactive ſtate of the organs of ſenſe is quickly ſucceeded by a loſs of the functions of the brain. Perception ſoon decays, when the ſenſes ſupply no matter for its exertion; and the power of imagination follows. The memory of recent occurrences is loſt, becauſe the ſenſes, weakened, and almoſt dead, tranſmit them imperfectly to the brain. Paſt tranſactions are ſtill often remembered with tolerable exactneſs. Hence the old man judges only according to the ſenſations which he has experienced heretofore; while the child is influenced ſolely by his preſent feelings; and the judgment in either caſe muſt be equally uncertain.

As the interruption of the functions of the brain is a neceſſary conſequence of the nearly total annihilation of external ſenſations, ſo it affects, in its turn, the powers of locomotion and ſpeech. The brain, being acted on by the ſenſes, re-acts on the muſcles in a proportionate degree. The motions of the old man are few and ſlow; it is with difficulty that he quits his accuſtomed attitude. Seated near the fire, which affords an agreeable ſource of warmth to his languid frame, he paſſes whole days retired, in a manner, within himſelf. Unintereſted in what ſurrounds him, a ſtranger to all deſires, paſſions, and ſenſations; ſpeaking little, becauſe he has no inducement to ſuch exertion, he is happy to feel that he ſtill exiſts, when he is loſt to almoſt every other feeling.

Are we juſtified in conſidering a rigid ſtate of the muſcles, and diminiſhed power of contraction in thoſe organs, as another cauſe of the inactivity of old age? This very probably has ſome influence, but we cannot conſider it as a leading cauſe, ſince the heart and inteſtines muſt partake of the ſame affection of their ſtructure, although they do not loſe the power of motion equally with the voluntary muſcles. The latter, therefore, do not loſe the *power*, but the *cauſe* which ſhould bring that into action, *viz.* the influence of the brain. If it were poſſible to unite in the ſame perſon the brain and ſenſitive organs of the old man with the muſcles of a youth, the voluntary motions would not be more energetic than in the old ſubject, becauſe there would ſtill be wanting a cauſe to excite the power into action.

From the preceding view, it appears that the external functions are gradually extinguiſhed in the old man; and that the animal life is almoſt annihilated, whilſt the organic ſtill retains its activity. At this time, the ſtate of the man who is about

to periſh by a natural death, approximates to that of the fœtus in utero, or of the vegetable, which lives only internally, and has no perception of external objects.

This inequality in the duration of the two lives is, in a certain degree, advantageous to the human ſpecies, as it diſengages the individual gradually from thoſe ties which connect him to ſurrounding objects, and thus alleviates the regret with which he would otherwiſe contemplate the hour, when theſe bonds are to be finally ſevered. The thought of death is painful only becauſe it terminates our animal exiſtence, and thereby extinguiſhes all thoſe functions which keep up our relations to the external world. It is nothing but the interruption of thoſe functions, that makes us look on death with feelings of fear and regret. We do not dread the ſuffering of bodily pain; for moſt perſons on their death-bed would gladly embrace the offer of a lengthened exiſtence, even although it were purchaſed by uninterrupted ſuffering.

The wearieſt and moſt loathed worldly life,
That age, ache, penury, and impriſonment can lay on man,
Is paradiſe to what we fear of death.

Could we imagine to ourſelves an individual, in whom death ſhould affect the internal functions only, as circulation, digeſtion, ſecretion, &c., leaving the animal life ſtill in vigour; ſuch a man would contemplate with indifference the approaching end of his organic exiſtence, becauſe he would feel that the pleaſures of life are not attached to that, and that he would ſtill be able to feel and enjoy almoſt every thing which formerly conſtituted his happineſs. Since then the animal life ceaſes by degrees; ſince each of the ties, which connects us to the pleaſure of living, is broken very gradually, this pleaſure leaves us at laſt almoſt imperceptibly, and we have already become inſenſible to the value of life, before it is terminated by the ſtroke of death. This is the courſe of things that we obſerve in the old man, who paſſes, by the ſucceſſive and partial loſs of his external functions, to the cloſe of his exiſtence. His death is that of a vegetable, which, having no relations to external objects, and no conſciouſneſs of life, can have none of death.

The organic exiſtence, which ſtill remains to the old man after the almoſt entire loſs of the animal life, ends in a very different manner from what we obſerve in violent and ſudden deaths. In the latter we may diſtinguiſh two periods: the firſt, which is marked by the ſudden ceſſation of reſpiration and circulation, two functions which ceaſe in theſe caſes nearly as ſoon as the animal life; the ſecond, which comes on more ſlowly, is the gradual termination of the organic functions. The digeſtive juices ſtill act on the contents of the ſtomach, which even retains, in ſome degree, the power of propelling the food. Abſorption, as numerous experiments have ſhewn, ſtill goes on for ſome time. And inſtances are by no means rare, where the bladder and rectum, by the irritable power which their coats ſtill retain, expel the urine and fæces ſome time after the apparent period of a ſudden death. Nutrition is ſtill manifeſted in the hair and nails; and, together with ſecretion, would no doubt be equally obvious in other parts, if we had the power of obſerving thoſe inſenſible motions in which theſe functions conſiſt. Animal heat is preſerved in moſt ſudden deaths, and particularly in aſphyxia, much beyond the time which would be neceſſary for the diſſipation of that, which the body, conſidered as a maſs of dead matter, contains at the inſtant of apparent diſſolution.

Many other facts might be adduced, to prove, in concurrence with thoſe already ſtated, that the organic functions terminate ſlowly and gradually in ſudden deaths; that the harmony of the internal life, conſidered as a whole, is firſt affected in theſe caſes; that the general circulation and reſpiration are firſt arreſted, but that the other vital organic proceſſes are ſucceſſively and ſlowly extinguiſhed. In the natural concluſion of old age, on the contrary, life ceaſes, becauſe each function has been terminated in detail. The active powers gradually deſert each organ; digeſtion languiſhes; ſecretion and abſorption are arreſted; the capillary circulation becomes troubled, and being deprived of the tonic powers, which preſide over it, ſtops. The general circulation is then ſuſpended in the large veſſels; and laſtly, the contractions of the heart ceaſe; ſo that this part is rightly termed the *ultimum moriens*. We may therefore bring the differences, which exiſt between the death from old age, and that which ariſes from ſudden cauſes, into the following view. In the former, life is firſt extinguiſhed in the parts, and then ceaſes in the heart; ſo that the influence of death is exerted from the circumference to the centre. In the latter, it ceaſes firſt in the heart, and then in all the parts: ſo that the phenomena of death take place from the centre to the circumference.

Having thus deſcribed the manner in which death takes place, when it occurs as the natural cloſe of life, we proceed to conſider the mode of its occurrence when it appears before the time allotted by nature as the cloſe of our exiſtence. So powerful indeed is the influence exerted by ſociety, that individuals of the human ſpecies ſeldom arrive at that period. Animals generally reach it; but the ceſſation of exiſtence, produced by mere old age, has become with us a rare phenomenon. Accidental death becomes, therefore, an object particularly worthy of our attention. This may take place in two ways; either as the ſudden reſult of a great diſturbance excited in the animal economy, or as the ſlow and gradual termination of diſeaſe. In the former caſe, as for inſtance in apoplexy, great hemorrhage, concuſſion, aſphyxia, we can inveſtigate the laws, which regulate the termination of the different functions; becauſe the organs of the body are unaffected, and ceaſe to act by the influence of cauſes directly the reverſe of thoſe which kept them in exertion in the natural ſtate: now, as the latter are partly underſtood, they naturally lead us to a knowledge of the former. We can, moreover, imitate theſe kinds of death on animals, and are thus enabled to analyſe their various phenomena by the way of experiment. In the caſe of diſeaſes, neither of theſe methods is open to us; we cannot produce them artificially, nor are we ſufficiently acquainted with the nature of thoſe morbid changes which occur in the vital powers, when the body is under the influence of diſeaſe, to reaſon on them with any preciſion. The firſt remark ſuggeſted to us by the obſervation of various ſpecies of ſudden death, is, that in all inſtances the organic functions may ſtill ſubſiſt for a certain time, after thoſe of animal life have been annihilated: while, on the contrary, the latter never ſurvive the termination of the former. An individual who has ſuffered compreſſion of the brain, or who has been attacked by apoplexy, ſtill lives internally for ſeveral days after he has ceaſed to exiſt for external objects. If, on the contrary, death attacks any eſſential organic function, as the circulation in caſes of wounds or aneuriſmal ruptures of the heart, reſpiration in the different kinds of aſphyxia, &c. thoſe functions are ſuddenly terminated, but the animal life ends at the ſame inſtant. Even here a part of the organic proceſſes ſtill continues for a greater or leſs length of time, and ends only by degrees. Theſe obſervations are of the firſt importance in a practical point of view, as leading us to the exertions we make uſe of in inſtances of apparent death from hanging, drowning, ſuffocation,

cation, &c. They teach us that the loſs of ſenſation and voluntary motion, together with a ceſſation of reſpiration and of the heart's action, are by no means ſure indications of death; that the powers of life ſtill exiſt under theſe circumſtances, and may be again called into action by the employment of proper means; and that ſuch caſes are, therefore, well deſcribed by the term of *ſuſpended animation*.

A warm-blooded animal never continues to exiſt externally after its internal life has ceaſed; ſo that the ceſſation of the organic phenomena is a ſure ſign of general death. We can, indeed, decide on the reality of ſuch death only by this criterion, ſince the ſuſpenſion of the external functions is almoſt always an uncertain ſign.

This difference in the termination of the two lives ariſes from the kind of influence which they exert on each other, from the ſpecies of connexion which unites them. For though they are diſtinguiſhed by numerous characters, their principal functions are connected by a reciprocal influence. This bond of union ſeems to exiſt between the brain on one ſide, for the animal, and the lungs or heart on the other, for the organic life. The action of any one of theſe three organs is eſſentially neceſſary to that of the two others. When, therefore, one ceaſes to act, the others muſt likewiſe be arreſted; and as they are the three centres, in which all the ſecondary phenomena of the two lives terminate, theſe phenomena muſt be inevitably annihilated, and general death enſue.

Phyſiologiſts of all ages have recognized the importance of this triple centre; and have almoſt univerſally beſtowed the name of *vital functions* on thoſe which reſide here: becauſe life is immediately connected with them, while its relations to the proceſſes, ranged under the heads of natural and animal functions, are much leſs intimate.

All ſudden deaths muſt begin by the interruption of circulation, reſpiration, or the action of the brain. One of theſe three functions ſtops firſt, and the others terminate ſucceſſively. The ſeries of phenomena, which occur in theſe caſes, has been admirably developed in the "Recherches phyſiologiques ſur la vie et la mort" of Bichât. We ſhall have occaſion to notice ſeveral of his experiments and remarks in the articles relating to phyſiology; and ſhall therefore confine ourſelves, on the preſent occaſion, to a ſketch of the general concluſion which he draws from them.

Death beginning in the heart: exemplified in the rupture of an aneuriſm, in a wound of the heart, or large blood-veſſels, &c. For want of the excitation, which the brain receives from the heart, its action ſtops; and conſequently ſenſation, locomotion, and the voice, are immediately interrupted. Beſides, the organs of theſe functions would ceaſe to act, for want of the excitement derived from the blood, even if the brain could ſtill exert its influence. The individual, therefore, exiſts no longer for ſurrounding objects after the inſtant in which his heart is dead. The interruption of the organic functions, which has commenced with the circulation, goes on at the ſame time with reſpiration. When the brain has ceaſed to act, there are no longer any mechanical phenomena exhibited in the lungs; ſince the diaphragm and intercoſtal muſcles are under its influence. The chemical phenomena ceaſe alſo, when the heart no longer receives or ſends the materials neceſſary for their developement. General death then comes on in a gradual way, by the ſtoppage of the ſecretions, of exhalation, and nutrition.

Death beginning in the Lungs.—When the mechanical phenomena of the lungs are interrupted, the following is the ſeries in which the other functions ceaſe. 1. Interruption of mechanical phenomena. 2. Ceſſation of chemical phenomena for want of the air which ſupports them. 3. Annihilation of the brain's action through the deficiency of excitement by the red blood. 4. Extinction of animal life; becauſe its organs are no longer excited by the brain and the arterial blood. 5. Ceſſation of the general circulation: 6. And of the capillary circulation, ſecretion, abſorption, and exhalation, for want of the influence of red blood on the organs of thoſe functions. 7. Interruption of digeſtion, through the want of ſecretion, and through the non-excitation of its organs, &c.

The phenomena of death occur in a different ſucceſſion, when the chemical functions of the lungs are interrupted; as in animals placed in vacuo, in ſtrangulation, in drowning, and in breathing non-reſpirable gaſes.

1. Interruption of chemical phenomena. 2. Suſpenſion of the brain's action. 3. Ceſſation of ſenſation, locomotion, the voice, and the mechanical phenomena of reſpiration. 4. Stoppage of the action of the heart, and of the general circulation. 5. Termination of the capillary circulation, ſecretion, exhalation, abſorption, and, conſequently, of digeſtion. 6. Diſſipation of the animal heat, which reſults from all the functions, and which does not leave the body till they have all ceaſed. In whatever function death may begin, it is always by this that it ends.

Death beginning in the Brain.—1. Annihilation of the action of the brain. 2. Sudden ceſſation of ſenſation and voluntary motion. 3. Paralyſis of the diaphragm and intercoſtal muſcles. 4. Interruption of the mechanical phenomena of reſpiration: 5. And of the chemical phenomena. 6. Admiſſion of black blood into the ſyſtem which ſhould convey red blood. 7. Retardation of the circulation from the contact of this blood with the heart and arteries, and by the abſolute immobility of all the parts, and particularly of the cheſt. 8. Death of the heart, and ceſſation of general circulation. 9. Interruption of organic functions, eſpecially in parts uſually ſupplied with red blood. 10. Abolition of animal heat.

Although in the three kinds of death, which we have juſt noticed, the functions may be annihilated ſuddenly, yet ſome of the vital powers ſtill remain in the parts for a certain length of time. Organic ſenſibility and contractility (the powers which preſide over the organic functions) are ſtill very manifeſt in the muſcles of both claſſes; and the muſcles of the animal life ſtill exhibit very clearly a ſuſceptibility of galvanic agency. This permanence of the organic properties is nearly the ſame in all caſes; the only cauſe which gives riſe to any difference, is the more or leſs gradual mode in which life has been extinguiſhed. In proportion to the rapidity of the death, is the contractility energetic, and ſlow in diſappearing. Where the functions have been gradually extinguiſhed, this property is ſo much the leſs ſuſceptible of being brought into action.

General Deſcription of Death.—The uſe of the hands, eyes, and feet generally is impaired in old perſons ſome time before death; the ſenſes fail; the bowels are torpid; the pulſe ſlow and intermittent; ſleep or dozing frequently occurs; and the laſt portions of the urine are not expelled from the bladder. The ſpeech becomes embarraſſed; the head cannot be held up; and the hands no longer execute the commands of the will. Laſtly, reſpiration becomes laborious, ſlow, interrupted, and ſtertorous; the diſtreſs excites an effort to breathe, which the debility renders nearly ineffectual. Some time before death, the heart is manifeſtly unable to drive the blood through the arteries into the veins; ſo that it is collected after death in the former veſſels. The blood then deſerts the feet, which

grow

grow cold; and the heat retreats upwards with the blood, which may be obſerved in experiments to be driven no farther than the groin; there it reaches no farther than the kidneys, and there is a reflux, driving it back through the ſpace in which it had juſt before been urged forwards. The flux and reflux then reach ſucceſſively no farther than the diaphragm, the eighth or ſixth ribs, and the arch of the aorta. Laſtly, the blood flows back upon the heart itſelf. This viſcus now reſts for a ſhort time, and then makes an effort to free itſelf from the contained blood. The impoſſibility of driving this through the lungs creates a ſenſe of anxiety, which gives riſe to the laſt ſtruggle of departing life. The heart's action and reſpiration are imperfectly performed for a few times at irregular intervals, till at laſt the accumulated blood is no longer a ſufficient ſtimulus, and the ſenſibility and contractile power of the organ are finally loſt. Reſpiration ceaſes by a ſtrong expulſion of air from the cheſt, often accompanied with a ſigh or groan, and ariſing, perhaps, partly from the action of the expiratory muſcles, and partly from the natural effect of the elaſtic powers reſiding in the parietes of the thorax. Hence, in common language, to *expire* has become ſynonymous with to *die*. The action of the left ventricle ceaſes firſt, as the obſtruction of reſpiration cuts off its ſupply of blood. The right ventricle then ceaſes to act, although it ſtill receives blood from the venæ cavæ. The auricle even now palpitates for a while, and receives and repels the blood alternately with the venæ cavæ, till it alſo grows inſenſible to the ſtimulus.

The muſcles are relaxed at the moment of death; ſo that the limbs fall into that poſition to which the force of gravity would naturally bring them. Hence, the mouth is uſually open from the dropping of the under jaw; and all the members of the body are eaſily bent and moved in every direction. Sooner or later, however, a very different ſtate of the muſcles ſucceeds: they become firmly contracted, and bring the whole body into a moſt rigid ſtate; ſo that no part can now be moved, without the application of a very great force. They remain in this ſtate until the natural progreſs towards putrefaction again ſoftens their fibres. Phyſiologiſts regard this phenomenon, together with that of the coagulation of the blood, as ariſing from the laſt exertion of that reſidue of vital power, which the body retains after the period of apparent diſſolution. It does not take place in an invariable manner in all kinds of death. In animals killed ſuddenly by lightning, or by a powerful electrical ſhock, the body does not ſtiffen, nor does the blood coagulate; this is explained by ſtating that the vital principle is totally and ſuddenly extinguiſhed over the whole body in ſuch kinds of death; and that the moment of *apparent diſſolution* is alſo that of *abſolute univerſal death*. We are alſo informed that theſe changes do not take place in the bodies of animals killed by wounding the medulla ſpinalis; and that where this method of ſlaughtering them for food is practiſed, the meat may be dreſſed the ſame day, without being found tough. (Adams on Morbid Poiſons, ed. 2d. Prel. Remarks, p. 34.) A ſimilar obſervation has been made concerning animals hunted to death; as well as the human ſubject, when dying of ſome peculiarly malignant, and, as they are often called, putrid fevers. Here the exertions of the animal in one caſe, and the progreſs of the diſeaſe in the other, have been ſuppoſed to extinguiſh the vital principle almoſt entirely, previouſly to death.

Signs of Death.—Much diſpute has ariſen on this ſubject, in endeavouring to aſcertain ſome particular appearance, by which we may be certain that death has really taken place. The preceding account will ſufficiently convince the reader, that the ceſſation of reſpiration and the heart's action cannot be relied on for this purpoſe. Theſe ſigns become ſtill more fallacious on account of ſome extraordinary caſes of recovery from apparent death: although in common they may be regarded as a ſufficiently ſure criterion that the perſon is dead. In ſpeaking on this ſubject, Haller refers to the loſs of the irritable power of the heart; but this we have no means of aſcertaining. As ſingle ſymptoms, neither the ceſſation of the pulſe and breathing, nor coldneſs of the body, nor want of efflux of blood from a vein, nor inſenſibility to ſtimuli, nor relaxation of the ſphincters, and other muſcles, can be truſted to. But we may undoubtedly judge with great certainty from the combination of theſe various ſigns, and their continuation. Perhaps the rigid ſtate of the body, produced by the contraction of the muſcles, would be as ſure a ſign of death as any individual circumſtance. But this only laſts for a certain time.

Putrefaction is the ſpontaneous decompoſition which dead animal bodies undergo, and which is to be regarded as one of their moſt ſtriking peculiarities. This ſubject might indeed be conſidered as foreign to phyſiology, defined, as it has been, by ſome of the moderns, as the *ſcience of life*: but when we conſider that the changes occurring in the dead body, after the departure of the vital principle, throw light on that principle itſelf; the hiſtory of the body will ſtill belong to the phyſiologiſt, until its appearance can no longer recal any notion of its former ſtate, and every trace of organization has been completely effaced. The organs of the body, when abandoned by the vital powers, paſs under the dominion of thoſe phyſical laws, which govern all other inorganic matter. A new motion takes place in their interior, and their component elements manifeſt a tendency to ſeparate from each other, ſtronger in proportion to the complexity of their compoſition. We learn from chemiſtry that the diſpoſition of any body to change its mode of exiſtence is in a direct ratio with the multiplicity of its elements; and that an organized being will remain undecompoſed ſo much the longer, if its compoſition be ſimple, and its component parts few and not volatile in their nature.

A neceſſary condition for the occurrence of putrefaction is that the body ſhould be totally deprived of life; the vital powers are the moſt efficacious antiſeptic, and life itſelf is nothing more than a conſtant ſtruggle againſt phyſical and chemical agency. Life and putrefaction are therefore two abſolutely contradictory ideas; and when we hear various diſeaſes characterized by the epithet putrid, we muſt recollect that the changes denoted by this expreſſion are by no means ſuch as occur in putrefaction. The other circumſtances neceſſary to the decompoſition of the dead animal body are, 1ſt, a certain temperature, which ſhould be above 10° of Reaumur's ſcale. Cold carried to the freezing point is a complete preſervative from putrefaction, as long as the animal ſubſtance is expoſed to it. Hence the practice of keeping meat in ſnow in northern countries, and of tranſporting fiſh packed in ice to conſiderable diſtances. In general, the higher the temperature the more rapid is the putrefaction, provided the heat be not ſufficient to reduce the body to dryneſs; for then it is brought to the ſtate of ſome mummies. 2d, A certain degree of moiſture is alſo neceſſary, otherwiſe the body might be reduced to a mummy. 3d, The contact of air promotes the decompoſition by volatilizing the diſengaged elements, which riſe in the form of vapour. It is not, however, eſſential, as putrefaction will go on in vacuo.

The phenomena of putrefaction, reſulting from a ſeries of particular attractions, aſſume various modifications, according to the kind of ſubſtance which undergoes this change;

the medium, in which the proceſs tekes place; the different degrees of temperature and moiſture, under which it is carried on; and the ſtage of the proceſs itſelf. Theſe varieties may be included in the following general deſcription. A diſguſting cadaverous fœtor eſcapes from the part, which ſwells, ſoftens, and changes its colour ſucceſſively to various ſhades and mixtures of green, blue, and blackiſh brown. A dirty and very fœtid ſerous matter exudes; the texture of the part becomes relaxed, and its organization deſtroyed. We notice at the ſame time the eſcape of various gaſeous products, which are chiefly of an ammoniacal nature; and hence ariſes the pungent odour which is often very ſtrong in every ſtage of the proceſs. The other gaſes are the carbonic acid, which unites with the ammonia; hydrogen joined with phoſphorus, ſulphur and carbon, and azote. The odour gradually ſubſides; the reſiduary matter, conſiſting of oils and ſalts, becomes more conſiſtent, and of a deep colour, and laſtly forms a friable and rather deliqueſcent ſubſtance, particularly uſeful as a manure. The bones, being of a much more durable nature, retain their compoſition and figure, for a great length of time; yet if expoſed for a ſeries of ages to air and moiſture, their animal portion finally decays, and the earth crumbles away into a duſt. Thus at length every trace of our material exiſtence completely diſappears. "Putrefaction," ſays a modern phyſiologiſt, "when conſidered philoſophically, is the method employed by nature to bring back our organs, when deprived of life, to a more ſimple ſtate of exiſtence, that their elements may be employed in forming new combinations. (*Circulus eterni motus.* Beccher.) Nothing therefore can be more clearly proved than the metempſycoſis of matter; and we may reaſonably conclude, that this tenet, like moſt of the religious rites and fabulous conceptions of antiquity, is only a myſterious veil, dexterouſly interpoſed between the people and the knowledge of nature by the hand of philoſophy." Richeraud, Elemens de Phyſiologie, tom. ii. p. 491.

When dead animal matter is accumulated in a conſiderable maſs, ſo that its decompoſition is effected by the reciprocal action of its ingredients upon each other, or when it is placed in a running ſtream of water, the changes that enſue are very different from thoſe firſt detailed. All the ſoft parts are diminiſhed in ſize, and converted into a peculiar fatty matter, poſſeſſing much of the appearance and properties of ſpermaceti. This was obſerved firſt at the burial ground of the Innocents in Paris, where the poorer people were buried in vaſt numbers in large pits. Every part of the body undergoes this change. The ſubſtance in queſtion exhibits all the properties of ſoap, with an exceſs of fatty matter: and is ſtated by Fourcroy to conſiſt of adipous ſubſtance, combined with ammoniac. It is applicable to all thoſe manufactures in which tallow is uſed. See ADIPOCIRE.

DEATH, in *Pathology*. It has already been ſhewn, that, when death occurs before the natural changes, induced by old age, in the animal economy, have brought life to a concluſion, it happens in conſequence of ſome ſudden diſturbance of the ſyſtem, or of the more gradual operation of diſeaſe. In the former caſe, and in ſome of the more rapid inſtances of the latter, an interruption of the functions of the heart, the lungs, or the brain, has been ſhewn to be the immediate cauſe of death; *i. e.* death in ſuch caſes begins in one or the other of theſe vital organs. It remains, then, for us to point out the morbid changes, produced in thoſe organs, either by external violence, or the internal action of the conſtitution, by which their functions are obſtructed, and death is neceſſarily brought about.

Morbid Cauſes of Death.—Diſeaſes which directly impede the functions of the heart are, compared with thoſe that obſtruct the brain and the lungs in their action, but few, and of ſomewhat rare occurrence. Death is, however, thus produced occaſionally; as when an aneuryſm of the heart, or of the great veſſels attached to it, is ruptured; or when an abſceſs forms in the ſubſtance of the heart; or when the heart is wounded from external force. Several inſtances of a rupture of the heart itſelf, diſcovered on the diſſection of perſons who had died ſuddenly, are recorded by Morgagni, (De Sedib. et Cauſ. Mobor. Epiſt. xxvii.) in which the blood was in conſequence poured out, through the opening, into the ſac of the pericardium, and neceſſarily prevented the continuance of the motion of the heart. The ſubſtance of the heart was, in ſome of theſe caſes, corroded by ulceration; in others rendered thin by dilatation. An obſtruction to the heart's action is alſo occaſioned by a dropſy of the pericardium, when that inveſting membrane is diſtended with a watery effuſion from its veſſels. The heart is likewiſe impeded by the contrary condition of that membrane, namely, when it adheres firmly to the ſurface of the heart. See Cullen, Firſt Lines, § 1185.

It is the opinion of Morgagni, that the heart, being a muſcular ſubſtance, is, like other muſcles, liable to ſpaſm or convulſion, and that death is in fact ſometimes the reſult of a ſpaſm of the heart. He quotes the opinion of Herophilus, who taught that ſudden death, when it originated from no very evident cauſe, muſt be attributed to ſuch a ſpaſm; and he obſerves, that a convulſion of the heart is more than once mentioned by Hippocrates. See Epiſt. xxv. Art. 13. To this cauſe Bichât attributes the ſudden death, which is ſometimes induced by ſtrong emotions of the mind; as by exceſſive joy or deſpair, excited by the unexpected news of certain events, or the ſight of unexpected perſons or objects, &c. Although it may not be conceded to him, that theſe circumſtances influence the heart directly, and the brain only in a ſecondary way; yet it muſt be admitted, that the heart is affected by ſtrong mental emotions in a degree far beyond the other organs in general, and diſproportionately to the affection of the brain; and that its ceſſation, therefore, is the more immediate cauſe of the death which enſues. The death, in this caſe, is a permanent ſyncope, and differs from a common *fainting fit* only in its duration. See Bichât, loc. cit. p. 231.

As the function of reſpiration is two-fold, conſiſting partly of mechanical, and partly of chemical operations; ſo death may begin in the lungs, when either the one or the other of theſe actions is interrupted, by external accident, or by diſeaſe. The mechanical act of reſpiration is arreſted partially or completely by the diſlocation of the ſpine of the neck, and the conſequent compreſſion of the ſpinal marrow, in that part: it is partially impeded if the diſlocation take place below the origin of the phrenic nerves; becauſe then the intercoſtal muſcles alone are paralyzed, and breathing goes on to a certain degree by means of the diaphragm: it is completely arreſted, if the compreſſion is above that point of the ſpinal marrow, from which the phrenic nerves originate; becauſe the diaphragm is then paralyzed too. The mechaniſm of reſpiration may be alſo obſtructed by any large wound or aperture into the thorax, through which air may be freely admitted; for, in ſuch a caſe, the external air will ruſh in, on the expanſion of the cheſt, and, preſſing on the ſurface of the lungs, will counterbalance the air in their cells, and thus prevent their alternate diſtenſion and evacuation, by the motion of the ribs and the diaphragm.

Some diſeaſes terminate in death, in conſequence of mechanically impeding the admiſſion of air into the lungs. The hydrothorax, or dropſy of the cheſt, which conſiſts of an

an effuſion of a watery fluid into the cavity of the thorax between the lungs and the ribs, neceſſarily retains the lungs in a compreſſed and contracted ſtate; it is the more ſpeedily fatal, if combined with the dropſy of the belly, and of the pericardium; the former of which, by preſſing the diaphragm upwards, cauſes an additional contraction of the cavity of the cheſt; the latter, by occupying a larger ſpace in that cavity. An oppoſite morbid condition has ſometimes, though rarely, produced death, by a mechanical impediment to reſpiration; namely, an univerſal adheſion of the lungs to the ribs and diaphragm, which altogether prevented the play of the lungs, and the proper expanſion of the cheſt. A caſe of this deſcription is recorded by Dr. Marcet, in the Edinburgh Medical and Surgical Journal, vol. i. p. 412. It is probable that a convulſive ſtate of the muſcles of reſpiration occaſionally produces a fatal interruption to the mechanical act of reſpiration in ſome convulſive diſeaſes. See Lanciſi de ſubitaneis mortibus, lib. i. cap. 9.

But the more common cauſes of a fatal interrupton of the function of the lungs, conſiſt of impediments to the chemical changes in the blood, which are neceſſary to the ſupport of life; that is, of impediments to the acceſs of pure air, or air containing oxygen. Thus life is ſpeedily deſtroyed by hanging or drowning; the preſſure of the rope obliterating the paſſage of the wind-pipe in the former caſe, and water preventing the acceſs of air in the latter. See STRANGULATION and DROWNING. In the ſame way the introduction of any foreign ſubſtance, as particles of food, &c. into the glottis, may occaſion a fatal impediment to breathing, and the perſon is ſaid to be choked. Among the caſual cauſes of ſuffocation, the breathing of the deleterious airs generated in mines, at the bottom of wells, or in cloſe rooms by the burning of charcoal fires, the fermentation of liquors, or the reſpiration of a crowded people, are the principal. Of the firſt we have inſtances in the *choke-damp*, as it is called by miners, conſiſting of carbonic acid, and which ſpeedily kills thoſe who are unfortunately immerſed in it; and of the laſt, the fatal impriſonment in the black-hole at Calcutta affords a memorable example.

Many diſeaſes terminate fatally by impeding the chemical changes of the blood in its paſſage through the lungs. Some operate by obſtructing the entrance of air through the paſſages, ſuch as croup, in which the wind-pipe is ſtuffed up by a ſecretion of lymph from its internal ſurface, which produces ſuffocation; and ſpaſmodic aſthma, in which, during the paroxyſm, the paſſages are ſpaſmodically contracted. But a more ſudden and complete interruption to the communication of air to the circulating fluids, is occaſioned by the burſting of a large blood-veſſel within the lungs, and of courſe by the ſudden filling up of the air-cells and paſſages with blood. A ſimilar reſult follows the burſting of a large abſceſs, or vomica, in the lungs, as ſometimes occurs in pulmonary conſumption, or after acute inflammation of thoſe organs; it follows likewiſe from the rapid effuſion of lymph into the cells, in the latter diſeaſe, and more gradually from the redundant ſecretion of mucus in the peripneumonia notha, and in the catarrh of old and debilitated perſons. Occaſionally, a dropſical effuſion into the ſubſtance of the lungs, or anaſarca pulmonum, arreſts the proceſs of reſpiration in a ſimilar manner. So numerous are the morbid changes in the organs of breathing, by which life is annihilated.

Bichât is diſpoſed indeed to affirm, that in the majority of ſlow diſeaſes of every kind, death begins in the lungs. But, although a difficult and laborious reſpiration is one of the moſt obvious ſymptoms of departing life, yet an accurate obſerver will remark, in many caſes, a previous failure in the functions of the brain, or of the heart and arterial ſyſtem; and this affection of the lungs muſt be conſidered, under ſuch circumſtances, as ſecondary, in this circle of aſſociated and mutually dependent functions.

The morbid affections which terminate life, by impeding the operations of the common ſenſorium on the organs of the body, are very numerous, as will be obvious from a ſlight peruſal of the works of Morgagni and other morbid anatomiſts. The different parts of the brain, and its inveſting membranes, have been found thickened, indurated, inflamed, converted into bone, connected by adheſion, compreſſed by effuſions of blood, or of its ſeparate parts by diſtended veſſels, by abſceſſes, tumours, hydatids, and excreſcences from the cranium. And beſide theſe palpable and evident cauſes of the death of the brain, the ſame conſequence has reſulted from concuſſion, as it is termed, and even from ſlight blows, where no perceptible alteration had been produced. In theſe various morbid affections of the encephalon, the ſymptoms, which precede death, are thoſe of apoplexy, palſy, coma, fatuity, epilepſy, frenzy, fever, hemicrania, &c.; or, in other words, theſe diſeaſes deſtroy life by compreſſion, or irritation of the brain in ſome of the modes juſt ſtated.

The functions of the brain may be deſtroyed by ſeveral vegetable and animal poiſons; the former, when taken into the ſtomach, affecting the brain through the medium of the nerves of that organ; the latter, being inſtilled into a wound, ſometimes deranging the ſenſorium by means of the circulation directly, as the poiſon of the rattle-ſnake and the viper; and ſometimes perhaps indirectly, as the poiſon from a rabid animal, by the abſorbents. Between the ſtomach and the brain, a cloſe connection through the nervous ſyſtem exiſts, whence perhaps not only an overdoſe of opium, henbane, or ſpirituous liquors, &c., but a blow on the epigaſtric region, or the *wind* of a cannon ball, as has been affirmed, have often produced inſtantaneous death.

The ſenſorial power, however, is not only deſtroyed by the mechanical changes of ſtructure in the brain above enumerated, and by the influence of narcotic ſubſtances, and other cauſes, through the medium of the nerves; but many other circumſtances conduce to exhauſt it, and thus to terminate life. It is a general fact in the animal economy, however whimſically Brown and Darwin may have theorized upon it, that the ſenſorial power, (or excitability, or nervous energy, or by what other term we may chuſe to deſignate it,) is diminiſhed and exhauſted by long continued or exceſſive action, as well as by the abſtraction of thoſe matters neceſſary to the ſupport of the body. Thus death is occaſioned by the exceſſive vaſcular action in fevers, which exhauſts the nervous power when no morbid ſtructure of any of the three vital organs exiſts; the ſupport of the conſtitution by digeſtion and nutrition being at the ſame time withdrawn. Thus alſo the exceſſive muſcular action in convulſions ſometimes exhauſts life; and even long continued violent pain, or thoſe leſs intolerable feelings which come under the denomination of irritation, not unfrequently wear down the vital powers, as in the confluent ſmall-pox, when the ſkin is covered with puſtules. In chronic diſeaſes accompanied by hectic fever, the conſtitution is thus worn out, perhaps in a great meaſure by the defect of nutrition, in conſequence of the loſs of the digeſtive power, which every ſtate of fever occaſions, as well as by the great exhauſtion of the febrile action, and of the profuſe ſweats.

By the abſtraction of nouriſhment, produced in various ways, life muſt be obviouſly exhauſted, as by long faſting; or by an obſtruction to the digeſtive proceſs, or to the paſſage of the food into the inteſtines (in ſchirrous pylorus), or through the lacteal into the blood (in meſenteric diſeaſes). Or it may be exhauſted by great diſcharges of the blood itſelf,

in great hæmorrhages; or by profuſe ſecretions from the blood, as of the urine in diabetes; of ſweat in chronic diſeaſes; of the inteſtinal liquids, in diarrhœa, and dyſentery; of the fluids of the uterus and vagina, in menorrhagia, fluor albus, &c. The abſtraction of the neceſſary ſtimulus of heat, or, in common language, the application of cold, is frequently fatal to the powers of life. (See COLD.) So true is the obſervation of Seneca, "naſcimus uno modo, multis morimur."

The conſideration of the phyſical proceſs of death is generally ſhunned, although on a near view it loſes much of its horror. Thoſe who have frequently witneſſed it allow that it is not generally a painful proceſs. In ſome delicate and irritable perſons, a kind of ſtruggle is indeed ſometimes excited, when reſpiration becomes very difficult; but more frequently the dying obviouſly ſuffer nothing, and expreſs no uneaſineſs. Our obſervation accords with that of an elegant and intelligent writer, who obſerves, "in thoſe who die of chronic dieaſes, the gradation is ſlow and diſtinct. Conſumptive patients are ſometimes in a dying ſtate during ſeveral days; they appear at ſuch times to ſuffer little, but to languiſh for complete diſſolution; nay, I have known them expreſs great uneaſineſs, when they have been re-called from the commencement of inſenſibility, by the cries of their friends, or the efforts of the attendants to produce pain. In obſerving perſons in this ſituation, I have always been impreſſed with an idea, that the approach of actual death produces a ſenſation ſimilar to that of falling aſleep. The diſturbance of reſpiration is the only apparent ſource of uneaſineſs to the dying; and ſenſibility ſeems to be impaired, in exact proportion to the decreaſe of that function. Beſides, both the impreſſions of preſent objects, and thoſe recalled by memory, are influenced by the extreme debility of the patient, whoſe wiſh is for abſolute reſt. I could never ſee the cloſe of life, under theſe circumſtances, without recollecting thoſe beautiful lines of Spenſer:

"Sleep after toil, port after ſtormy ſeas,
Eaſe after war, death after life, doth greatly pleaſe."
Ferriar. Med. Hiſt. b. 1.

We have obſerved in more inſtances than one, a perſon juſt ſinking into the ſleep of death, expreſſing in a languid voice, but with every ſign of perfect complacency, a ſenſe of his dying ſtate. In ſudden deaths nothing can be ſaid on this point, as little time intervenes between the commencement of death and abſolute inſenſibility; and in acute diſeaſes inſenſibility often precedes death for ſome conſiderable time.

It is the taſk of humanity, however, to mitigate the ſufferings of the dying, and, where nature has produced none, to take care that the officiouſneſs of art ſhould not inflict them. The length of the interval between inſenſibility and the abſolute ceſſation of exiſtence, has given riſe to a multitude of ſuperſtitious notions and miſchievous practices among the vulgar. Indeed ſome of theſe notions are of conſiderable antiquity; but it does not appear that, in thoſe early ages, the attendants preſumed to accelerate the death of the ſufferer. In the 16th and 17th centuries, however, it was very common to ſtrip the dying, to drag them out of bed, and place them on mattraſſes of ſtraw or hair, in the middle of the room. Religious habits, aſhes, and relics, were then thrown upon them, for the conſolation of thoſe,

——"who, to be ſure of Paradiſe,
Dying put on the weeds of Dominic,
Or in Franciſcan thought to paſs diſguis'd."

The effects of theſe impreſſions ſtill remain. It is a prevalent notion among nurſes and ſervants, that a patient, whoſe death is lingering, cannot quit life while he lies on a common bed, and that it is neceſſary to drag the bed away, and to place him on the mattraſs. This piece of cruelty is often practiſed, when the attendants are left to themſelves. A ſtill more hazardous practice has been very prevalent in France and Germany, and, it is to be feared, is not altogether unknown in this country. When the patient is ſuppoſed by the nurſes to be nearly in a dying ſtate, they withdraw the pillows and bolſter from beneath his head, ſometimes with ſuch violence as to throw back the head, and to add greatly to the difficulty of reſpiration, if not to produce actual ſuffocation. Another improper practice is the precipitation with which the attendants *lay out* the body, immediately after death has taken place. They have often been known to ſtrip the body in very cold ſtormy weather, wrap it in cold linen, throw a ſingle ſheet over it, and open the doors and windows of the apartment, in little more than half an hour after a patient had died ſuddenly.

It is too certain that the helpleſs patient feels all theſe cruelties, after he has become unable to expreſs his ſenſations diſtinctly. The teſtimony of perſons who have recovered from apparent death, leaves no doubt on this head. See a diſtreſſing caſe of this ſort under the article CATALEPSY. But the means of prevention of ſuch ſuffering in the dying are eaſy.

"Diſturb him not—let him paſs peaceably."
Shakeſpeare.

"When the toſſing of the arms, which I have deſcribed," ſays Dr. Ferriar, "the rattling noiſe in reſpiration, and difficulty of ſwallowing have come on, all unneceſſary noiſe and buſtle about the dying perſon ſhould be prohibited. The bed-curtains ſhould be drawn nearly cloſe, and unleſs the patient ſhould place himſelf in a poſture evidently uneaſy, he ſhould be left undiſturbed. Exclamations of grief, and the crowding of the family round the bed, only ſerve to harraſs him. The common practice of plying him with liquors of different kinds, and of forcing them into his mouth, when he cannot ſwallow, ſhould be totally abſtained from.

"When he no longer breathes, one perſon only ſhould remain in the room, who ſhould take care that no alteration be made in the ſtate of the bed. Every thing ſhould be conducted as if he were in a tranſitory ſleep. If the weather be hot, the windows of the room may be opened, and the bed curtains undrawn in the courſe of two or three hours. In winter, it will be ſufficient to withdraw the curtains within that time.

"There can be no juſt reaſon for the haſte, with which it is uſual to lay out the body. Several hours may be very properly ſuffered to elapſe before this is done; for the joints do not commonly become rigid for a conſiderable time. At the end of that period, the body will be completely cold, and all remains of ſenſibility will have been extinguiſhed." Ferriar on the Treatment of the Dying, loc. cit. vol. iii.

Theſe obſervations relate ſolely to the propriety of ſmoothing the bed of death. For, happily, the uſage of keeping the body unburied during ſeveral days is ſo firmly eſtabliſhed in this country, that it is unneceſſary to ſpeculate on the poſſibility of abuſes, in regard to premature interment. In France a very blameable, even criminal, degree of haſte ſeems to have been uſed in this reſpect, at the time when Bruhier wrote. For he obſerves, that the rituals, which were moſt cautiouſly drawn up, only enjoined the delay of interment for twenty-four hours after death, and that others directed it to be performed within half of that period. See his treatiſe de l'Incertitude des Signes de la Mort. The

ſlighteſt

ſlighteſt appearance of beginning putrefaction affords ſufficient ſecurity againſt any reviſitings of life; and marks of this nature are almoſt always viſible, before the date of interment obſerved in this country.

Death, in *Theology*. The nature and extent of death, in its connection with the fall of our firſt parents, and denounced as a penalty in conſequence of their tranſgreſſion, have afforded occaſion for a difference of opinion among divines and biblical critics. It has been generally ſuppoſed that the privilege of continued life was connected by a divine conſtitution with the innocence or ſinleſs obedience of the firſt progenitors of our race; and that the providence of God would preſerve and prolong their exiſtence, notwithſtanding thoſe natural decays, and that tendency to diſſolution, to which their natural frame muſt neceſſarily have been ſubject. The tree of life, to which they had acceſs, was either a pledge of permanent being and happineſs, or the appointed means of ſecuring them; and the prohibition to abſtain from the fruit of the tree of the knowledge of good and evil, was merely intended to prevent their forfeiture of happineſs, and the loſs of life, on which their happineſs depended. Joſephus, and ſome of the ancients, abſurdly imagined, that this latter tree was ſo called, becauſe there was ſomething in its fruit that by its own nature conveyed knowledge or wiſdom; but this is the effort of ſtudy and inquiry, and not of eating or drinking, at leaſt in any other way than by the experience it gives, and the effects it produces. In this ſenſe eating indeed conveys a great deal of knowledge both of good and evil, inaſmuch as the eating of noxious and poiſonous food, or proper and wholeſome food in an intemperate manner, will give a very ſenſible knowledge of good, *viz.* of the value of the eaſe and health that are loſt, by the evil that it introduces. This, if we underſtand the hiſtory in a literal ſenſe, (ſee Fall,) may be the true reaſon of the name of this tree, that of the knowledge of good and evil. Thus, the tree of life, and the tree of the knowledge of good and evil, ſeem to ſtand in oppoſition to each other, and to be of directly contrary qualities. The tree of life was certainly of an healing, reſtorative nature, and would have prolonged life to the longeſt period of duration. (See Gen. iii. 22, and Rev. xxii. 2, in which latter paſſage this tree is alluded to.) In oppoſition to this was the tree of the knowledge of good and evil, the fruit of which, however pleaſing to the ſight or grateful to the taſte, was of a pernicious and deadly quality, and tended to introduce thoſe diſorders in the body, which would eventually, and in their own nature, lead to and iſſue in death. The prohibition of the fruit of this tree was juſtly made by the great Creator and Lord of man, not merely for the exerciſe of his ſovereign authority and power, but as an inſtance of his goodneſs to, and care of, the new-formed creature he had placed in Eden, and in order to prevent him, through want of experience, from deſtroying himſelf. The exception of this tree may be conſidered partly as a friendly caution, and principally as an expreſs prohibition, carrying in it a poſitive injunction wholly to abſtain from its fruit; and in this ſenſe our firſt parents underſtood it. (Gen. iii. 1. 3.) The penalty threatened againſt the violation of this prohibition is expreſſed in theſe words, "thou ſhalt ſurely die," or "in dying thou ſhalt die:" a form of ſpeaking which commonly has an emphatical meaning; ſometimes denoting the abſolute certainty of any thing, and having in it the nature of a ſtrong affirmation; and ſometimes ſignifying what is extraordinary in its kind, and the continuation of the thing ſpoken of, and the gradual accompliſhment of it. "In the day thou eateſt thereof, in dying thou ſhalt die," *i. e.* inſtantly become incurably mortal, and tending all thy days to diſſolution and death.

Death, threatened as a penalty in conſequence of ſin, and contraſted againſt the preſent life, bleſt with all the comforts and privileges of it, and regarded as a deſirable privilege, muſt be a ſubſtantial puniſhment, and an awful inſtance of the divine diſpleaſure againſt ſin: and as the recovery to life is as far beyond the reach of the power of man, as the firſt grant of it was, this threatening, "thou ſhalt ſurely die," was not only a condemnation to certain death, but as to any thing man could do to prevent it, to perpetual and eternal death, and the entire and final loſs of life and happineſs. It has been abſurdly objected by ſome to the truth of the ſcripture hiſtory, that the ſentence of death was not executed immediately, or on the day of the tranſgreſſion. But the expreſſion, "in dying thou ſhalt die," properly interpreted, furniſhes no ground for this objection: for it ſignifies, thou ſhalt certainly, but gradually die, inſtantly become liable to death, and be perpetually tending to it, without any poſſibility of a final reprieve, or knowing when the ſentence ſhall be executed in its full weight and extent. Some perſons have alſo objected to the equity of this ſentence, or of the connection between the eating of the forbidden fruit and the puniſhment of death that attended it. Dr. Chandler, in conſidering this objection, (Sermons, vol. iv. p. 17, &c.) obſerves, that as eating the forbidden fruit and the puniſhment of death aroſe out of the nature of things, and had the connection of cauſe and effect, nothing more need be ſaid in vindication of it than for any other natural connection of this kind whatſoever. Beſides, no creature has a right to life long, or upon any other terms than the Creator pleaſes. Again, the nature of Adam's crime, when conſidered in its proper view, will appear to be extraordinary, and his guilt attended with peculiar and heinous aggravations, and on ſome accounts with unqueſtionably much greater than ever was, or ever could be committed by any of his poſterity. His tranſgreſſion was folly in its nature, and a high immorality of a moſt enormous kind, and a ſin immediately againſt God, with the worſt aggravations attending it. Moreover, it involved their poſterity to the end of time, through all ages and nations, in the conſequences of it, and ſubjected them to two of the greateſt evils, ſin and death. Farther, notwithſtanding the objections that may be urged againſt the credibility of this part of the ſcripture hiſtory, from the extraordinary conduct of God, and the ſeeming diſproportion between the offence and the puniſhment threatened to and inflicted upon it, yet there is in reality nothing extraordinary in it; nothing but what occurs in the common government of God, and what is allowed reaſonable and fit, upon the principles of natural as well as revealed religion. The ſacred hiſtory informs us, that our firſt parents, by eating the forbidden fruit, *i. e.* by indulging their appetites contrary to their knowledge and conviction of duty, and by ſuffering themſelves to be led away by the force and influence of temptation to tranſgreſs the law of God, by forfeiting their innocence, and ſuffering inclination to ſubdue the dictates of conſcience, forfeited the favour of God, and ſubjected themſelves to affliction, miſery, and death. And as far as this aroſe from the natural connection of things, does not the ſame connection ſtill hold? Do not the ſame criminal indulgences produce the ſame effects? Moreover, one ſevere and grievous part of the puniſhment of our firſt parents, their being prohibited acceſs to the tree of life, and being irrecoverably given up to the condemnation of death, was, if the matter be rightly conſidered, an act of

real compaſſion and goodneſs on the part of God. A ſcheme of recovery was immediately commenced upon their tranſgreſſion, and they had evident intimations of mercy as ſoon as their ſentence of puniſhment was announced.

Several other learned writers underſtand by the penalty of death denounced againſt the tranſgreſſion of our firſt parents, not merely the ſeparation of the ſoul from the body, or its removal from one ſtate of conſciouſneſs to the other, but the utter extinction of the human being, or death eternal, without hopes of a revival or reſurrection. To this purpoſe Dr. Taylor obſerves, (Scripture Divinity, p. 102.) that every tranſgreſſor, the moment he is ſuch, is dead in law: and, for any thing in law, he muſt continue ſo as long as it is true, that he has violated the law, that is, for evermore. The language of the law to every one that tranſgreſſes it, and for every breach and tranſgreſſion, is this, "Thou ſhalt die." And this, he ſays, is the force of the expreſſion, מות תמות, "in dying thou ſhalt die," in the law given to Adam. It does not ſpeak of the certainty of the event, as if he ſhould certainly die the day he tranſgreſſed; for the event ſhews the contrary; nor that he ſhould become mortal from a change in his conſtitution, which is a random conjecture, without any foundation in the nature of his conſtitution, which was created mortal, or in the force of the words. For the phraſe מות תמות, is an Hebraiſm, importing that a thing is, or is done, thoroughly, totally, in the moſt perfect manner, or the moſt intenſe degree, and is to be interpreted according to the nature of the ſubject. (See Gen. ii. 16. xxxvii. 33. Exod. xxi. 19.) Thus the force of the words, "in dying thou ſhalt die," is this, thou ſhalt thoroughly, utterly, totally die, or die for ever, without coming to life again. Thou haſt juſtly forfeited thy life and being, and ſhalt ſuffer a total and eternal extinction of it. Athanaſius (De Incarn. Verbi) thinks, that the doubling of the expreſſion in the above cited ſentence, denotes, that "he ſhould not only die, but remain in the corruption of death;" as we ſhould all have done, if the ſecond Adam had not obtained for us a happy reſurrection. This ſurely, ſays biſhop Law (Conſiderations on the Theory of Religion, p. 348, ed. 7.), and nothing leſs, muſt be implied in that moſt ſolemn ſentence: nor can we well conceive the unhappy ſubjects of it to have been at that time ſo very ingenious as to explain it away, by diſtinguiſhing upon the ſeveral component parts of their conſtitution; and concluding, that by death no more was intended, than only a ſeparation of theſe parts, while the principal of them was ſtill living in ſome different manner: or that it was a continuation of their conſciouſneſs, and real exiſtence, though in ſome other place. This, he ſays, was the philoſophy of after ages. Dr. Jortin alſo once held a ſimilar opinion (Serm. vol. vii. p. 283), though he afterwards adopted the contrary doctrine. If death, ſays the learned prelate (ubi ſupra), be a return to duſt, then nothing but a reviving, or a reſuſcitation from that duſt, can be the reverſing of it, or a proper recovery from it; and accordingly, as he conceives, to this, and this alone, St. Paul confines the contraſt, he has drawn at large, between the firſt and ſecond Adam: "Since by man came death, by man came alſo the reſurrection from the dead; and as in Adam all die, even ſo in Chriſt ſhall all be made alive;" which words directly affirm, ſays Taylor (Doctr. of Orig. Sin, p. 24.), "that a reſurrection, or body made alive again, is granted, aſſured, and executed by and in Chriſt alone," and evidently ſuppoſe, that the dead are not made alive till the reſurrection; and that if a reſurrection had not been provided, we ſhould never after death have been made alive. Biſhop Sherlock purſues the ſame kind of reaſoning in ſimilar language. (Diſc. ii. p. 76. 300. Diſc. vi. p. 209. Uſe and Intent of Prophecy, p. 69, &c. ed. 2.) The ſame notion of death, and of an unconſcious ſtate between death and the reſurrection, is adopted by Dr. Prieſtley, in conformity to his ideas of the homogeneity of man, and inculcated in his Inſtitutes and various other writings.

An ingenious writer, and an excellent Biblical critic, however, is of a very different opinion; and he deduces, from the antiquity of the worſhip of dead men, an explication of the term death in the threatening denounced againſt Adam, ſimilar to that with which we have introduced this ſubject, conformable to his idea of the ſoul, as a ſubſtance or principle diſtinct from matter and the body, and conſiſtent with his belief of a ſeparate ſtate. For an abſtract of his reaſoning on this intereſting ſubject, ſee SLEEP *of the Soul*. See alſo SOUL and RESURRECTION.

Death, in its original and moſt proper and natural ſenſe, ſignifies, as we have ſhewn, the loſs of life, and together with it, of all its bleſſings and comforts. This is the common, if not the univerſal, ſenſe of the word in the writings of Moſes; and in the ſanction of a law, it is reaſonable to ſuppoſe the word is uſed in its moſt natural and proper ſenſe. Death, in Scripture, is uſed ſometimes for the loſs of privileges, benefits, and comforts, even when life remains. In this ſenſe it ſignifies the ſoul's loſs of the image of God, of holineſs, and peace; this is called "ſpiritual death." Thus the Epheſians are ſaid to be "dead in treſpaſſes and ſins." (Epheſ. ii. 1.) Sometimes death ſignifies the loſs of bleſſings in the world to come, together with poſitive ſufferings both in ſoul and body. Thus, in Rom. viii. 13. "if ye live after the fleſh, ye ſhall die." (See John vi. 50.) In Rev. xxi. 18. this is called "the ſecond death:" and ſome have ſuppoſed, that it denotes the final deſtruction of the incorrigibly wicked, whom neither milder nor more ſevere diſcipline can reform, and render capable of the happineſs connected with piety and virtue.

DEATH, *Mors*, in *Mythology*, a divinity, which, according to the theogony of Heſiod, was the offſpring of Night, and whoſe brother was Sleep. (See SLEEP.) The Greek poets, as well as the Latins, and Virgil (Æn. l. 2.) among others, reckon death among their gods. It is not known what worſhip they paid her; but it is certain that the Lacedæmonians honoured her as a divinity, and had, as Pauſanias informs us, (in Lacon.) one of her ſtatues near that of her brother Sleep. Mors, or Death, was the moſt powerful miniſter of the infernal deities, and brings all mortals down to the river Acheron. It is ſaid that her mother Nox, or Night, beſtowed peculiar care on her education, and that ſhe had a great affection for her brother Somnus, or Sleep. Among the Elæans there was a temple, with the ſtatue of a woman holding in either hand a ſleeping boy, with their legs diſtorted; that in her right was white, to ſignify Sleep; that in her left was black, to repreſent Death; whilſt the female that foſtered them was Night. No ſacrifices, no temples, no ceremonies, no prieſts, were appointed for death, becauſe ſhe was looked upon as an inexorable deity, whom no prayers could move, nor ſacrifices pacify. The figures of Mors, or Death, are, as Mr Spence ſays, very uncommon, as were thoſe of the evil and hurtful beings in general; they were excluded from all medals; on ſeals and rings they were probably conſidered as bad omens, and were perhaps never uſed. Among the few figures of Mors met with by this ingenious writer, that in the Florentine gallery was the moſt remarkable: it is a little figure, in braſs, of a ſkeleton, ſitting on

the ground, and reſting one of his hands on a long urn. The figure of Mors might have been very common in ancient paintings, becauſe ſhe is frequently mentioned by the Roman poets, who diſtinguiſhed her from Lethum. The latter was that general cauſe or ſource of mortality, which they ſuppoſed to have its proper reſidence in hell, and Mors or Mortes, for they had ſeveral of them, they regarded as the immediate cauſe of each particular inſtance of mortality that occured on our earth. The face of Mors ſeems in their repreſentation of it, to have been of a pale, wan, dead colour. The poets deſcribe her, as ravenous, treacherous, and furious. They deſcribe her as roving about open-mouthed, and as ready to ſwallow up all that came in her way; they ſeem to give her black robes and dark wings, and repreſent her often as of an enormous ſize. Statius gives her arms and a ſword, exhibiting her like a deſtroying angel, where he is deſcribing a peſtilence. The ancient poets ſometimes repreſent her as coming to the doors of mortals, and thundering at them, to demand the debts they owe her: ſometimes approaching to their bedſides, and leaning over them: and at other times, purſuing her prey, or hovering in the air, and ready to ſtoop upon it. She is alſo repreſented as purſuing men with a net, catching them, and dragging them to their tombs. Of all the pictures of this deity exhibited by Statius, the moſt particular is that which repreſents her as ſtanding by the bed-ſide of a youth juſt in the flower of his age, accompanied by Envy and Vengeance. Theſe horrid deities manifeſt great friendſhip to one another in the execution of their cruel offices, and Vengeance, in particular, after having embraced the goddeſs of death, ſeems, according to his account, to take the fatal net out of her hand, and to perform her office for her.

Death, *Appeal of*, in *Law*. See Appeal *of death*.

Death, *Civil*. The law diſtinguiſhes between natural and civil death: the former is the actual termination of life; the latter, when a perſon is not actually dead, but adjudged ſo by law. Thus, by ſtat. 19. Char. II. c. 6., if a perſon for whoſe life an eſtate is granted remain beyond ſea, or is otherwiſe abſent ſeven years, and no proof be made of his being alive, or becomes a profeſſed monk, he ſhall be accounted naturally dead. However, the latter diſability, ſince the Reformation, is held to be aboliſhed. But if the party beyond ſea be afterwards proved living at the time of eviction of any perſon, then the tenant, &c. may re-enter and recover the profits. By ſtat. 6. Ann. 1. 18., perſons in reverſion or remainder, after the death of another, upon affidavit that they have cauſe to believe ſuch other dead, may move the lord chancellor to order the perſon to be produced; and if he be not produced, he ſhall be taken as dead; and thoſe claiming may enter. See Civil *Death*.

Death-*Watch*, in *Zoology*, the Engliſh name of the *pediculus* of old wood, a ſpecies of the *termes*, belonging to the order of aptera and claſs of inſects in the Linnæan ſyſtem. (See Termes.) It is nearly of the ſize of the common louſe; and the noiſe reſembling the beating of a watch is made by the male or female, when wooing each other This ticking noiſe the populace have long taken for a preſage of death, in the family where it is heard: whence it is alſo called pediculus fatidicus, mortiſaga, pulſatorius, &c.

There are two kinds of *death-watches*: of the firſt we have a good account in the Philoſophical Tranſactions, by Mr. Allen. It is a ſmall beetle, five ſixteenths of an inch long, of a dark brown colour, ſpotted; having pellucid wings under the vaginæ, a large cap, or helmet, on the head, and two antennæ proceeding from beneath the eyes. The part with which it beats, he obſerved, was the extreme edge of the face, which he chooſes to call the upper lip; the mouth being protracted by this bony part, and lying underneath, out of view.

This account is confirmed by Mr. Derham, with this difference, that, inſtead of ticking with the upper lip, he obſerved the inſect to draw back its mouth, and beat with its forehead. That author had two death-watches, a male and female, which he kept alive in a box, ſeveral months; and could bring one of them to beat whenever he pleaſed, by imitating its beating: and by this ticking noiſe he could frequently invite the male to get up upon the other, in the way of coition. When the male found he got up in vain, he would get off again, beat very eagerly, and then up again: whence the ingenious author concludes thoſe pulſations to be the way whereby thoſe inſects woo one another, and find out, and invite each other to copulation.

The ſecond kind of death-watch is an inſect in appearance quite different from the firſt. The former only beats ſeven or eight ſtrokes at a time, and quicker: the latter will beat ſome hours together, without intermiſſion; and his ſtrokes are more leiſurely, and like the beat of a watch. This latter is a ſmall greyiſh inſect, much like a louſe when viewed with the naked eye. The ticking, as in the other, is a wooing act.

This inſect is at firſt a minute white egg, much ſmaller than the nits of lice; though the inſect is near as big as a louſe. In March it is hatched, and creeps about with its ſhell on. When it firſt leaves its ſhell, it is even ſmaller than its egg; though that be ſcarce diſcernible without a microſcope. In this ſtate it is ſomewhat like the mites in cheeſe: from this ſmall ſtate they grow gradually to their mature or perfect ſize: when they become like the old one, they at firſt run about much more ſwiftly than before. Philoſoph. Tranſ. abr. vol. v. p. 26, &c.

The minute inſect, which has been long known under the name of the death-watch, has been thus noticed by Linnæus: "frequens in domibus, inviſum veſtibus, herbariis, inſtitorum muſeis. Fœmina horologii inſtar pulſatoria feſtucis, (Syſt. Nat. p. 1015, No. 2.) Geoffroy, however, ſays, he is confident that it is not from this inſect, but from the "dermes domeſticus," (Syſt. Nat. p. 563, No. 12.) which makes the circular holes in furniture, that the ticking noiſe proceeds. (Hiſt. des Inſectes, tom. i. p. 3. and tom. ii. p. 602.) Neither of theſe is larger than the pediculus humanus. Dr. Shaw aſſures us, that the inſect properly called the death-watch is a coleopterous inſect of the genus "ptinus." (Syſt. Nat. p. 565.) He ſays it is chiefly in the advanced ſtate of the ſpring that this alarming little inſect commences its ſound; the prevailing number of diſtinct ſtrokes is from 7 to 9 or 11; theſe are given in pretty quick ſucceſſion, and are repeated at uncertain intervals; and in old houſes, where the inſects are numerous, they may be heard almoſt every hour of the day, eſpecially if the weather be warm. The ſound exactly reſembles that which may be made by beating moderately hard with the nail on a table. The inſect is about a quarter of an inch in length. This ingenious and accurate naturaliſt has diſtinguiſhed the inſect by the name of "ptinus fatidicus," the beating ptinus, and ſuppoſes it to be the ſame with the "dermeſtes teſſelatus" of Fabricius, and the "ptinus pulſator" of Gmelin. He alſo cautions us not to confound this inſect, which is the real death-watch of the vulgar, emphatically ſo called, with another inſect, which makes a ſound like the ticking of a watch, and which continues its ſound for a long time without intermiſſion: it belongs to a totally different tribe from the death-watch, and is the "termes pulſatorium" of Linnæus. (Nat. Miſc. vol. iii.) Whichſoever of the inſects above deſcribed is the real death-watch, it is well known

that

that for a ſeries of years the dread of it has excited very uneaſy ſenſations in the minds of the weak and ſuperſtitious; an unhappy prejudice which exiſts even to the preſent day, and cannot be totally eradicated by all the powers of reaſon and argument. Sir Thomas Brown (Pſeudo-doxia Epidemica, b. ii. c. 7.) long ago obſerved, "he that could extinguiſh the terrifying apprehenſions hereof, might prevent the paſſions of the heart, and many cold ſweats in grandmothers and nurſes." With the feelings of theſe perſons, a well-known ſatiriſt ſports in the following lines:

——— "a wood-worm
That lies in old wood, like a hare in her form:
With teeth or with claws it will bite or will ſcratch,
And chamber-maids chriſten this worm a DEATH-WATCH:
Becauſe like a watch, it always cries click,
Then woe be to thoſe in the houſe, who are ſick,
For ſure as a gun, they will give up the ghoſt,
If the maggot cries click, when it ſcratches the poſt."

DEATH'S *Head*, or *Human Skull*, in *Heraldry*, is often borne in arms, and thus generally blazoned. An order of knighthood under this appellation was inſtituted in Sileſia, by Silvius Nimrod, duke of Wurtemberg, in 1652, for men and women; and revived in the year 1709, by Louiſa Elizabeth, widow of Philip, duke of Saxe-Maſburg, and youngeſt daughter of the founder. The enſign of this order is a death's head enamelled white, ſurmounted with a croſs pattée ſable; above the croſs pattée another croſs, compoſed of five large jewels, by which it hangs to a black ribbon, edged with white; on the ribbon is this motto—MEMENTO MORI.

DEBA, in *Ancient Geography*, a river of Syria, which has its ſource to the north in the mountains, about lat. 39°, and running S.W. diſcharges itſelf into the Euphrates about lat. 37° 45′.

DEBA, a town of Aſia in Syria, ſituated in Comagené, upon a ſtream, to the S.W. of Doliche, and W. of Zeugma, about lat. 36° 25′.—Alſo, a town of Aſia, in Meſopotamia, ſituated on the Tigris. Ptolemy.

DEBALPOUR, in *Geography*, a town of Hindooſtan, and capital of a diſtrict in the country of Moultan, ſituated on the great road from Delhi to Moultan; 70 miles S.E. of Lahore, and 150 E. of Moultan.—Alſo a town of Hindooſtan, in the Malwa country; 21 miles W. of Endore, and 13 S. of Ougein.

DEBEN, a river of England, in the county of Suffolk, which riſes near Debenham, and runs into the ſea near Harwich. This river is navigable from its mouth to the town of Woodbridge. See CANAL.

DE BENE ESSE, a Latin phraſe uſed in our law-books. To take, or do, a thing de bene eſſe, is to accept, or allow it as well done for the preſent; but when it comes to be more fully examined, or tried, to ſtand or fall, to be allowed or diſallowed, according to the merit or well-being, of the thing in its own nature; or, as we ſay, "Valeat quantum valere poteſt."

Thus, in chancery, upon motion to have one of the leſs principal defendants in a cauſe examined as a witneſs, the court (not then thoroughly examining the juſtice of it, or not hearing what may be objected on the other ſide) often orders ſuch a defendant to be examined de bene eſſe, *i. e.* that his depoſitions ſhall be allowed, or ſuppreſſed, at the hearing of the cauſe upon a full debate of the matter, as the court ſhall think fit; but for the preſent they have a well-being, or conditional allowance. 3 Cro. 68. When a complainant's witneſſes are aged or ſick, or going beyond ſea, and the plaintiff is in danger of loſing their teſtimony, the court will order them to be examined de bene eſſe; ſo as to be valid if the plaintiff hath not an opportunity to examine them afterwards; as if they die before anſwer, or do not return, &c. In either of theſe caſes the depoſitions may be uſed in the court of chancery, or at law. Thus alſo in common law, the judges often take bail de bene eſſe, to be allowed or rejected upon the approbation or exception of the plaintiff's attorney. Declarations likewiſe are ſometimes delivered de bene eſſe.

DEBENHAM, in *Geography*, a market town in the hundred of Thredling, in the county of Suffolk, England; is diſtant from Ipſwich 12 miles, and 82 from London. It is ſituated on the ſide of a hill, which declines to the river Deben. The church is a handſome ſtructure, and the market houſe a good building. Here is a free ſchool founded by ſir Robert Hitcham. In the year 1744, the town ſuffered ſeverely by fire. It has a ſmall market on Fridays, and one annual fair on the 24th of June. The number of houſes appears, by the returns made under the late act, to have been 392, and of inhabitants 1215.

DEBENTURE, a public written acknowledgment of money due, for value received or ſervices performed, ſomewhat ſimilar to a bond. They were firſt iſſued in this country in 1649, by the commonwealth, for ſecuring to the ſoldiers, or their aſſigns, the ſums due to them for pay, upon the accounts being audited; and they have been ſince iſſued to the army, purſuant to ſeveral acts of parliament, likewiſe to the ſervants of the king's houſhold for ſalaries, board-wages, &c.

In 1700, the debentures which had been iſſued for arrears due to the officers of the army, and for tranſport ſervice, and for clothing the army, were directed to be taken as ſterling money, in purchaſes of the forfeited eſtates in Ireland of perſons convicted of treaſon; but this proviſion being inſufficient, 5 *per cent.* intereſt was allowed on the debentures, till the principal part of them was ſubſcribed into the original capital of the South Sea company.

In 1711 debentures were iſſued by the commiſſioners for trade and plantations, to the proprietors and inhabitants of the iſlands of St. Chriſtopher and Nevis, who had ſuffered greatly by the invaſion of the French, in 1705. Theſe debentures carried 6 *per cent.* intereſt, but it was not paid very regularly: a part of them was paid off, and the remainder ſubſcribed into 3 *per cent.* ſtock.

Debentures have ſince been occaſionally iſſued for temporary purpoſes; thus, after the concluſion of the American war, compenſations were granted to ſuch perſons as had been ſufferers from their attachment to the Britiſh government, who, upon their claims being inveſtigated, received debentures bearing $3\frac{1}{2}$ *per cent.* intereſt, afterwards commonly called loyaliſt debentures, which in the whole amounted to about £2,000,000, and were gradually diſcharged at ſubſequent periods.

Debentures are iſſued by the Board of Ordnance to perſons contracting for ſtores, or other articles, in that department. They are not payable at any fixed period, and as they do not bear intereſt, thoſe who have occaſion to diſpoſe of them are generally obliged to ſell them at a diſcount, which has ſometimes been very conſiderable. In the years 1784 and 1785, it was thought proper to provide for the principal part of the ordnance debentures then outſtanding, by funding them in 5 *per cent.* ſtock.

DEBENTURE, in *Commerce*, a certificate iſſued by the officers of the cuſtoms, entitling the exporter of goods to a bounty or drawback of duty, purſuant to act of parliament. In order to obtain the debenture, it is neceſſary, with reſpect to foreign produce, to trace the articles on which the

allowance

allowance is claimed through all the different hands into which they have paſſed ſince their importation, in order to prove that the duty has been actually paid thereon; the exporter is likewiſe required to give a bond, as ſecurity that the goods ſhall not be re-landed in any part of the United Kingdom.

Debentures, whether for a drawback or a bounty, undergo a variety of formalities and examinations, and muſt have a number of ſignatures to render them complete. They are made out by the collector outwards; thoſe for drawbacks from a certificate ſigned by the clerk of the certificates that the duties under their ſeveral branches upon the articles entered for exportation therein enumerated, have been paid; thoſe for bounties, from the bond given by the merchant for the exportation of the goods ſpecified in the entry. The goods on which either the drawback or the bounty is computed, are thoſe certified by the ſearchers to have been actually ſhipped. On a debenture for a drawback, the duties to be paid back are computed, and endorſed in figures, by the clerk of the rates; the controller checks this computation. The examiner computes, and inſerts them in figures upon the back of the debenture, with the titles of the different branches, and the amount in words at length. On a debenture for a bounty, the collector outwards, computes, and enters, at different times, the ſeveral branches, with the amount in figures and in words at length: the controller, ſurveyor, and ſurveyor-general, ſucceſſively check this computation.

Debentures, like moſt other public documents, are liable to a ſtamp duty.

DEBET, among *Book-keepers*, is uſed to expreſs the left-hand page of the ledger, to which are carried all articles ſupplied or paid, on the ſubject of an account.

Debet et Detinet, in *Law*, are Latin words, denoting, *he oweth and detaineth*, uſed in the bringing of writs and actions; and an action ſhall always be in the debet et detinet, when he who makes a bargain or contract, or lent money to another, or he to whom a bond is made, bringeth the action againſt him who is bounden, or party to the contract and bargain, or unto the lending of the money, &c. But if a man ſells to another a horſe, &c. if he brings debt for the horſe, the writ muſt be in the detinet only. New. Nat. Br. 265.

Debet et Solet, are alſo formal words made uſe of in writs; and ſome writs have theſe words in them, which ought not to be omitted. Likewiſe, according to the diverſity of the caſe, both debet et ſolet are uſed, or debet alone: as a quod permittat may be in the debet et ſolet, or in the debet only, as the demandant claims. And if a perſon ſues to recover any right, whereof his anceſtor was diſſeiſed, by the tenant or his anceſtor, then he uſeth the word debet alone in his writ, becauſe his anceſtor only was diſſeiſed, and the eſtate diſcontinued: but if he ſue for any thing that is now firſt of all denied him, then he uſeth debet et ſolet, becauſe his anceſtor before him, and he himſelf uſually enjoyed the thing ſued for, until the preſent refuſal of the tenant. Reg. Orig. 140. The writ of ſecta molendini is a writ of right in the debet et ſolet, &c. F. N. B. 98.

DEBILITY, in *Medicine*, is a term of ſomewhat extenſive application, being uſed by medical writers, not only to denote the diminution of the muſcular powers of the body, but alſo to deſignate the failure of the due performance of the functions in all the organs reſpectively.

Thus Dr. Cullen, treating of fever, obſerves, that the ſymptoms, which denote a great degree of debility, are, in the *animal* functions; the weakneſs of the voluntary motions; the irregularity of the voluntary motions, depending on their debility; the weakneſs of ſenſation; the weakneſs and irregularity of the intellectual operations:—in the *vital* functions; the weakneſs of the pulſe; the coldneſs or ſhrinking of the extremities; the tendency to a deliquium animi, in an erect poſture; the weakneſs of reſpiration:—in the *natural* functions; the weakneſs of the ſtomach, as appearing in anorexia, nauſea, and vomiting; involuntary excretions, depending on a palſy of the ſphincters; and difficult deglutition, depending on a palſy of the muſcles of the fauces. Firſt Lines, § 104.

The term debility is alſo applied to every diminution of the powers of the ſyſtem, although originating in circumſtances altogether different in their nature. The weakneſs, for example, which ſucceeds acute diſeaſes, or which is produced by ſpare diet, or other means of privation of the ſupport of the body; and the loſs of ſtrength which is occaſioned by the operation of contagion, or other cauſes of fever, and of narcotic ſubſtances, which ſuddenly impair the energy of the brain, are both denominated debility. The latter ſtate has, however, by ſome writers, been termed, proſtration of ſtrength, to diſtinguiſh it from the actual loſs of the ſubſtance of the body, which accompanies the former.

Debility holds an important ſtation in the ſyſtem of Dr. Brown, commonly called the Brunonian ſyſtem, in which it is uſed in a peculiar acceptation. Debility, according to Brown's hypotheſis, is the cauſe of all diſeaſes, and is of two kinds, which he terms *direct* and *indirect* debility. As health conſiſts of a proper balance of ſtimuli, with excitability of the animal body, according to this hypotheſis; ſo, when the ſtimuli are in proportion too powerful, the excitability is exhauſted and *indirect* debility enſues; and when the ſtimulation is proportionately too feeble, the excitability is accumulated, and debility is the conſequence; which is called *direct* debility; becauſe it is not produced by any poſitive noxious power, but by a ſubduction of the things neceſſary to ſupport life." Brown's Elements of Medicine, chap. iii. § 45.

Dr. Darwin has placed theſe two conditions of the body in a ſimilar light, in his Zoonomia. If the quantity of ſenſorial power, he obſerves, remains the ſame, and the quantity of ſtimulus be leſſened, a weakneſs of the fibrous contractions enſues, which may be denominated *debility from defect of ſtimulus*. If the quantity of ſtimulus remains the ſame, and the quantity of ſenſorial power be leſſened, another kind of weakneſs enſues, which may be termed *debility from defect of ſenſorial power*: the former is the direct debility, the latter the indirect debility of Dr. Brown. See Zoonomia, vol. i. ſect. xii. 2. 1.

The ſubjects of direct debility, or debility from defect of ſtimulus, are perſons in a ſtate of inanition, from hunger; or who have been expoſed to ſevere cold, which is, in fact, an abſtraction of the ſtimulus of heat. On the contrary, thoſe perſons ſuffer indirect debility, or debility from exhauſtion of the ſenſorial power, who have been over ſtimulated: as thoſe who have experienced a debauch, from exceſſive potation of wine the preceding night; or thoſe who have been expoſed to exceſſive heat. Habitual drunkards ſuffer under this ſpecies of debility every morning, before they take their uſual potation, as is evinced by the tremors of their hands, their lowneſs of ſpirits, &c.

Through the whole progreſs of *indirect debility*, ſays Dr. Brown, the ſecond application of every ſtimulus has leſs effect than the firſt, the third leſs than the ſecond, and ſo forth to the laſt, which produces no more excitement; this effect takes place in proportion to the degree or duration of the ſeveral applications, though each gives ſome excitement.

Hence before the eſtabliſhment of indirect debility, and juſt as it is upon the eve of being eſtabliſhed, the ſtimulus, which is producing it, ſhould be withdrawn; a debilitating power ſhould be applied; as in giving over drinking wine at the

the end of an entertainment, and ſubſtituting water in its place, or applying cold to a perſon who has been expoſed to an exceſſive degree of heat. The progreſs to indirect debility is alſo retarded by diminiſhing the excitement from time to time, and proportionately increaſing the excitability, and thereby giving more effect to the action of ſtimuli.

In the cure of indirect debility, whatever be its degree, and from whatever ſort of exceſſive ſtimulus it has ariſen, little leſs of the ſtimulus, which is to be employed as the chief remedy, than that, which produced the diſeaſe, ſhould at firſt be uſed; and then leſs and leſs, till the diſeaſe is cured. Thus a man who has injured his conſtitution by the abuſe of ſpirituous liquors, is not ſuddenly to be reduced to water alone, as is the practice of ſome, but he is to be treated, as the judicious Dr. Pitcairn, of Edinburgh, is ſaid to have treated a highland chieftain, who applied to him for advice in this ſituation. The doctor gave him no medicines, and only exacted a promiſe from him, that he would every day put in as much wax into the wooden *queich*, out of which he drank his whiſkey, as would receive the impreſſion of his arms. The wax thus gradually accumulating, diminiſhed daily the quantity of the whiſkey, till the whole *queich* was filled with wax; and the chieftain was thus gradually, and without injury to his conſtitution, cured of the habit of drinking ſpirits.

The cure of the hurtful effect of any ſtimulus, ſhould be firſt ſet about by changing it for a leſs; this for a ſtill leſs; and the intention of cure ſhould be always to paſs from the uſe of the more violent and diffuſible, which nature in her healthy ſtate rejects, to that of the more durable, till the healthy ſtate can at laſt be maintained by the uſual means.

Through the whole courſe of *direct debility*, or debility from defect of ſtimulus, every deficiency of ſtimulus is increaſed by a ſecond, the ſecond by a third, the third by a fourth, till the effect at laſt comes to be a ceſſation of any further excitement. Excitement, therefore, in ſuch caſes, is never to be leſſened, and debility increaſed, with the view of giving greater effect to a new ſtimulus, by accumulating excitability. For as often as this is put in practice, the morbid ſtate is increaſed; and, if the debility ſhould happen to be great, any further increaſe may induce death, but will never increaſe the ſtrength. For the cure of direct debility, we ſhould begin with the ſmalleſt degree of ſtimulus, and then riſe to the uſe of a greater and greater, till the morbid abundance of excitability be gradually worn off, and health at laſt reſtored.

This may be illuſtrated in the effects of intenſe cold, or abſtraction of heat. When a limb is benumbed by cold, if heat be ſuddenly applied a ſevere pain is produced, which, if the ſtimulus of heat be continued, will be followed by violent inflammation, terminating in mortification; the direct debility being ſuddenly converted into indirect debility by over-ſtimulation, while the excitability was redundant. The ſafeſt mode of reſtoring a froſt-bitten limb is to begin with the loweſt degree of ſtimulus, ſuch as gentle friction with ſnow, and gradually proceed to warmer applications, as the excitability diminiſhes, until it is reduced to the uſual ſtandard, and can bear the uſual ſtimuli. This is the practice of the Ruſſians, and the inhabitants of cold countries in general. See Cold.

The phenomena of ſtarvation from want of food alſo illuſtrate this ſubject. It has been found by experience to be abſolutely neceſſary to begin the uſe of aliment in the moſt cautious manner, otherwiſe inflammation of the ſtomach is the conſequence. Food, not only the moſt ſparing in quantity, but of the mildeſt and leaſt ſtimulating nature, is to be firſt adminiſtered, to be repeated at ſhort intervals, and gradually increaſed both in quantity and nutritious quality; by which means the powers of the ſtomach are at length brought back to bear the uſual ſtimuli.

Thus far the theory of direct and indirect debility is the reſult of a correct generalization of facts, and ſerves us as a fundamental principle in the treatment of many morbid conditions of the human conſtitution. But in attempting to extend it, as the baſis of an explanation of all diſorders, the Brunonians have quitted the path of induction, and ſubſtituted analogies of their own creation, for thoſe which they ought to have found in the phenomena of nature. See Excitability.

DEBIN, in *Geography*, a town of Arabia, in the country of Yemen, 38 miles E. of Chamir.

DEBIR, in *Ancient Geography*, called *Kirjath ſepher*, the city of letters, and *Kirjath-arba*, a city of Judah, near Hebron. It was taken by Joſhua, and fell by lot to Caleb. It belonged to the Levites, Joſh. x. 39. xii. 13. xv. 15, 16. xxi. 15. 1 Chron. vi. 58 —Alſo, a town of Gad, beyond Jordan, Joſh. xiii. 26.—Alſo, a city of Benjamin, which had belonged to Judah, Joſh. xv. 17.

DEBIS, in *Mythology*, a Japaneſe idol, repreſented under a human form of gigantic ſtature, as an image of braſs, placed on the moſt conſpicuous part of a high road, without a temple or pagoda. The young women who viſit this idol in order to be informed when they ſhall have huſbands, receive an anſwer from a prieſt who is placed in the hollow of it. Some gratuity is expected in conſequence of this ſuppoſed communication with the god.

DEBLATHAIM, in *Ancient Geography*, a town which belonged to the Moabites, and the ruin of which was predicted by Jeremiah. Ch. xlviii. v. 2.

DEBLAW, in *Geography*, a town of Bohemia, in the circle of Chrudim; 4 miles S. S. W. of Chrudim.

DEBORAH and Barak, a female and a male judge of Iſrael, who, after Siſera, general of the Canaanites, was defeated and ſlain by Jael, ſung a hymn or canticle of thankſgiving. B. C. 1285.

DEBORUS, in *Ancient Geography*, a town of Macedonia, in Pæonia; called by Thycydides *Doberus*.

DEBRA Libano, in *Geography*, a town of Abyſſinia; 180 miles S. of Gondar.

Debra Selalo, a town of Abyſſinia; 90 miles S. W. of Gondar.

Debra Semona, a town of Abyſſinia; 110 miles S. of Gondar.

DEBRETZIN, Debrezen, Debrechen, Debrecinum, a large and populous town of Auſtria, in Upper Hungary, in the county of Bihar, 54 miles S. E. of Tokay; 54 miles N. of Great Waradin; 105 miles E. of Buda. N. lat. 47° 30′.

Debretzin, though it has the title and privileges of a town, muſt be conſidered as a village, and then it is perhaps the greateſt village in Europe, as it contains 30,000 inhabitants. But ſhould it be conſidered as a town, it is one of the worſt, though its inhabitants are not poor. It is ſurrounded with a hedge, and the town gates are like Engliſh field gates, ſtuck with thorns and brambles. The houſes, with only a few exceptions, conſiſt merely of the ground floor; they are thatched, and have the gable-end turned towards the ſtreet. The ſtreets are not paved, but in a few of the moſt frequented balks are laid down in the middle for the foot paſſengers.

By far the greateſt part of the inhabitants are Calviniſts. Their principal college is at Debretzin. The building is irregular, old and decaying. The ſtudents are very numerous.

Debretzin is famous for its ſoap manufacture, its bread, a woollen

woollen cloth called *guba*, its pipes, and its quarterly fairs. The ſoap is ſent all over Hungary, and even to foreign countries. It is made from natural mineral alkali or natron, called ſzekſo. This is found as an efflorescence on a ſandy ſoil in many parts of Hungary, but particularly about a lake near Kiſ-maria, which is only a few miles from Debretzin. It is not purified, nor does it undergo any operation before it is uſed.

There is alſo near Debretzin an imperial ſaltpetre manufactory, and juſt without the town there are a few vineyards, but they yield a very poor wine.

Debretzin is alſo remarkable for its horned cattle. As a proof of the greatneſs of its herds, Korabinſky mentions in his Lexicon, that a certain biro is ſaid often to have driven ten thouſand head of cattle upon the neighbouring common; and that in the year 1739, when, on account of the ſeverity and length of the winter, a ſcarcity of fodder prevailed, and more than eight thouſand were ſlaughtered; they were never miſſed. Dr. Robert Townſon's Travels in Hungary, chap. ix.

DEBREW, a ſmall town of Hungary, famous for its tobacco leaves, which generally ſell 12 or 15 per cent. higher than any other Hungarian tobacco.

DEBRUIZED, or DEBRUISED, in *Heraldry*, is when we would intimate the grievous reſtraint of any animal, which is debarred its natural freedom by any of the ordinaries being laid over it.

Thus when a pale, &c. is borne upon a beaſt in an eſcutcheon, the beaſt is ſaid to be *debruiſed* by the pale.

DEBT, a thing due to another, whether it conſiſt of money, goods, or ſervices.

The legal acceptation of debt is a ſum of money due by certain and expreſs agreement: as, by a bond for a determinate ſum; a bill or note; a ſpecial bargain; or a rent reſerved on a leaſe, that is fixed and unalterable. The nonpayment of theſe is an injury, for which the proper remedy is by action of debt, to compel the performance of the contract, and recover the ſpecific ſum that is due.

This is the ſhorteſt and ſureſt remedy; particularly where the debt ariſes upon a ſpecialty, that is, upon a deed or inſtrument under ſeal. Thus alſo, if I verbally agree to pay a man a certain price for a certain parcel of goods, and fail in the performance, an action of debt lies againſt me; for this is a determinate contract; but if I agree for no ſettled price, I am not liable to an action of debt, but a ſpecial action on the caſe, according to the nature of my contract. Actions of debt are now ſeldom brought but upon ſpecial contracts under ſeal, in which the ſum is clearly and preciſely expreſſed; for in caſe of ſuch an action upon a ſimple contract, the plaintiff labours under two difficulties: 1ſt, the defendant hath here the ſame advantage as in action of *detinue*, that of waging his law, or purging himſelf of the debt by oath, if he thinks proper (4 Rep. 94.); 2dly, in an action of debt the plaintiff muſt prove the whole debt he claims, or recover nothing at all. For the debt is one ſingle cauſe of action, fixed and determined; and which therefore, if the proof varies from the claim, cannot be looked upon as the ſame contract, the performance of which it ſues for. However, in actions of debt, where the contract is proved or admitted, if the defendant can ſhew that he has diſcharged any part of it, the plaintiff ſhall recover the reſidue. 1 Roll. Rep. 257. Salk. 664. The various caſes in which action of debt lies are too numerous to be here recited. (See Jacob's Law Dict. by Tomlins, art. *Debt.*)

The form of the writ of debt is ſometimes in the *debet* and *detinet*, and ſometimes in the *detinet* only; that is, the writ ſtates, either that the defendant owes and unjuſtly detains the debt or thing in queſtion, or only that he unjuſtly detains it. It is brought in the *debet* as well as *detinet*, when ſued by one of the original contracting parties, who perſonally gave the credit, againſt the other who perſonally incurred the debt, or againſt his heirs, if they are bound to the payment; as by the obligee againſt the obligor, the landlord againſt the tenant, &c. But, if it be brought by or againſt an executor, for a debt due to or from the teſtator, this not being his own debt, ſhall be ſued for in the *detinet* only. (F. N. B. 119.) So alſo, if the action be for goods, for corn, or an horſe, the writ ſhall be in the *detinet* only; for nothing but a ſum of money, for which I (or my anceſtors in my name) have perſonally contracted, is properly conſidered as my debt. And, indeed, a writ of debt in the *detinet* only, for goods and chattels, is neither more nor leſs than a mere writ of *detinet*; and is followed by the ſame judgment. Raſt. Entr. 174.

By our law, debts due to the king are to be ſatisfied in the firſt place in all caſes of executorſhip, and adminiſtratorſhip; and till the king's debt be ſatisfied, he may protect the debtor from the arreſt of any other creditor. At the common law, debt lies not for rent upon a leaſe for life, though it doth on a leaſe for years; but the remedy is aſſiſe, if the plaintiff have ſeiſin, or by diſtreſs. (3 Rep. 65.) But by ſtat. 8 Anne, c. 17. any perſon having rent in arrear, upon any leaſe for life or lives, may bring action of debt for ſuch rent, as where rent is due on a leaſe for years. Action of debt will lie againſt a leſſee, for rent due after the aſſignment of the leaſe; for the perſonal privity of contract remains, notwithſtanding the privity of eſtate is gone. (3 Rep. 22.) But after the death of the leſſee, it is then a real contract, and runs with the land. Cro. Eliz. 555.

It behoves an executor or adminiſtrator to pay regard to the priority of debts in diſcharging them; otherwiſe, on deficiency of aſſets, he muſt anſwer thoſe of a higher nature out of his own eſtate: ſuch are funeral charges, and expence of proving the will; debts to the king on record or ſpecialty; debts, which by particular ſtatutes are to be preferred to all others, as forfeiture for not burying in woollen, money due on poor's rates, letters to the poſt office, and ſome others; debts of record, as judgments, ſtatutes, and recognizances; debts due on ſpecial contracts, as for rent, on bonds, covenants, &c. under ſeal; and laſtly, debts on ſimple contracts, as notes and verbal promiſes, and ſervants' wages.

As any contract, by which a determinate ſum of money becomes due to any perſon, and is not paid, but remains in action merely, is a contract of debt, we have various kinds of debts; and they are uſually divided into debts of *record*, debts by *ſpecial*, and debts by *ſimple* contract.

A *debt of record* is a ſum of money which appears to be due by the evidence of a court of record. Thus, when any ſpecific ſum is adjudged to be due from the defendant to the plaintiff, on an action or ſuit at law, this is a contract of the higheſt nature, being eſtabliſhed by the ſentence of a court of judicature. Debts upon recognizance, are alſo a ſum of money recognized or acknowledged to be due to the crown or a ſubject, in the preſence of ſome court or magiſtrate, with a condition that ſuch acknowledgment ſhall be void upon the appearance of the party, his good behaviour, or the like: and theſe, together with ſtatutes merchant and ſtatutes ſtaple, &c. if forfeited by nonperformance of the condition, are alſo ranked among this firſt and principal claſs of debts, *viz.* debts of record; ſince the contract, on which they are founded, is witneſſed by the higheſt kind of evidence, *viz.* by matter of record.

Debts by ſpecialty, or ſpecial contract, are ſuch by which a ſum of money becomes, or is acknowledged to be due, by deed or inſtrument under ſeal. Such as, by deed of covenant,

nant, by deed of ſale, by leaſe reſerving rent, or by bond or obligation. Theſe are looked upon as the next claſs of debts after thoſe of record, being confirmed by ſpecial evidence under ſeal.

Debts by ſimple contract, are ſuch, where the contract, upon which the obligation ariſes, is neither aſcertained by the matter of record, nor yet by deed or ſpecial inſtrument, but by mere oral evidence, the moſt ſimple of any; or by notes unſealed, which are capable of a more eaſy proof, and (therefore only) better than a verbal promiſe. There is one ſpecies of debts upon ſimple contract, which is diſtinguiſhed by the now well-known appellation of "paper-credit." Theſe are debts by *bills of exchange*, and *promiſſory notes*, which ſee reſpectively.

DEBT, *Information of*. See INFORMATION.

DEBT, *Chirographary*, in the *Ancient French Law*, is that due by virtue of a note, or writing under one's hand, and not proved in judicature.

DEBT, *Hypothecary*, is that due in virtue of ſome contract or judgment.

DEBT, *Prædiatory*, is that ariſing from an alienation of lands, &c. the whole purchaſe whereof has not been paid.

DEBT, *Privileged*, is that which muſt be ſatisfied before all others; as the king's tax, &c.

DEBTEE EXECUTOR. If a perſon, debtor to another, makes his creditor or debtee his executor, or if ſuch creditor obtains letters of adminiſtration to his debtor, he may retain ſufficient to pay himſelf before any dther creditors whoſe debts are of equal degree. Blackſt. Com. vol. iii. p. 18. See EXECUTOR and RETAINER.

DEBTOR, a perſon who owes ſomething to another: in oppoſition to creditor, which is he to whom it is owing. Concerning the treatment of inſolvent debtors by the 12 tables, &c.; ſee BANKRUPT.

DEBTS, PRIORITY OF. See EXECUTOR.

DEBTS, *Public*, are debts entailed by a government upon the induſtry and reſources of poſterity, in order to provide for the preſent exceſs of the expenditure above the ordinary revenue of a country. In the earlier periods of the different ſtates of Europe, the annual expences both of the civil and military adminiſtration appear to have been always raiſed within the year. The former, indeed, were altogether inconſiderable, and the latter, whenever they occurred, in conſequence of being thus directly paid by the people, were ſpeedily checked by the difficulty of providing for them. But ſince the ſyſtem of *borrowing* has been adopted, and government have been obliged to provide no more than the annual intereſt of the money which they expended, wars have not only been multiplied and protracted, but rendered more expenſive by the facility with which the means of maintaining them have been ſupplied; and hence debts and taxes have accumulated till they have involved moſt of the nations which have had recourſe to them in diſtreſs and ruin.

In Great Britain this ſyſtem of borrowing, though hitherto exempt from the conſequences which it has produced in other countries, has been carried to a much greater extent, and its progreſs ſeems to have been accelerated in proportion as the debt has become more enormous; ſo that, during the laſt fifteen years, it has almoſt *tripled* the accumulation of the preceding century, and the ſum now annually raiſed for the mere payment of the *intereſt* would have nearly diſcharged the whole *principal* of the debt, at a time when the nation was in fear of being overwhelmed by the weight of it.

The government of this country may, perhaps, have been neither more frugal nor more attentive to the intereſts of the people *before*, than they have been *ſince*, the revolution; yet it is certain, that at the death of Charles II., and even at the expulſion of his ſucceſſor, the nation was encumbered with no other debt than that of 664,263 to the bankers, which was charged upon the hereditary exciſe in the 12th of king William, and of 60,000*l.* to the ſervants of Charles II., which was provided for in the firſt ſeſſion of parliament after the revolution. But, in conſequence of the continued wars during the whole of king William's reign, above 61 millions were voted by parliament for the public expenditure; and on the 31ſt of December, 1701, the nation was encumbered with a permanent debt of 6,748,780*l.* the annual intereſt on which amounted to 566,165*l.* In the following reign, the ſame ſyſtem of expending and borrowing was purſued without the leaſt intermiſſion. The grants of parliament, in the courſe of 13 years, exceeded 80 millions; and at the death of queen Anne in 1714, the debt amounted to 50,644,306*l.* requiring 2,811,903*l.* to be annually raiſed in taxes on the property and labour of the people, towards paying the intereſt of it.

On the acceſſion of George I. the nation appears to have been ſo ſeriouſly alarmed at the magnitude of the debt, and to have felt ſo impatient under the burthens which it had impoſed upon them, that they conſidered the public expenditure as having nearly exhauſted the reſources and deſtroyed the credit of the country. The earlieſt attention of government, therefore, was engaged in arranging the finances, and applying remedies to the evils which they threatened to the public peace and ſecurity. Such of the taxes as were only temporary were made perpetual, and the funds which had hitherto been blended together, without order or diſtinction, were divided into four claſſes, and were appropriated to the following purpoſes: 1ſt. The Aggregate Fund, to the payment of intereſt on money due to the bank of England, and on other debts, and alſo to the payment of 120,000*l.* *per ann.* for the uſe of the civil liſt. 2dly. The South Sea Fund, to the payment of intereſt on the capital of the South Sea company. 3dly. The General Fund, to the payment of intereſt on 7,808,087*l.* ſtock in the South Sea annuities—and 4thly. The Sinking Fund, which, conſiſting of the ſurplus of all the taxes, after diſcharging the intereſt, &c. in the three former claſſes, was to be regularly applied to the payment of the national debt. During a few years after the eſtabliſhment of theſe funds, the application of them was attended to with conſiderable care and vigilance; and the improvement of the ſinking fund, in particular, was recommended to parliament in ſpeeches from the throne, with the ſame zeal as it was echoed back in the addreſſes of the houſe of commons. (See FUNDS.) But as the operations of this fund did not commence till the year 1719, and they were never aſſiſted by any economy in the adminiſtration of the finances, they produced but little effect during the remaining part of this reign; ſo that, although the nation, through the whole courſe of it, was engaged in no wars of any conſequence, the debt, inſtead of being reduced, was increaſed, on the 31ſt of December, 1727, (or in ſix months after the deceaſe of George I.) to 52,092,235*l.*: but, in conſequence of the reduction of *intereſt* on ſome part of this debt, the annual amount of the taxes neceſſary to provide for the ſame, was only 2,363,564*l.*, or 448,339*l.* leſs than at the cloſe of the preceding reign.

When George II. ſucceeded to the throne, the nation was in a ſtate of peace, or, at leaſt, was under the neceſſity of providing for no other extraordinary expenditure than about 300 000*l.* a year in foreign ſubſidies, towards preſerving the balance of power, and ſecuring the king's dominions in Germany. Nevertheleſs, the miniſter who had aſſumed ſo much credit in eſtabliſhing the ſinking fund, and who had

had ſo often repreſented it as abſolutely neceſſary to ſave the nation from ruin, was the firſt to lay violent hands upon it, by appropriating a million of its produce to the ſupplies of the year;—a practice thus ſhamefully begun was continued without intermiſſion in the following years, and the alienation of this fund became as conſtant and invariable as the prodigal waſte and extravagance that produced it. Hence the nation, though diſturbed by no foreign wars during the firſt 13 years of that reign, and therefore expoſed to no extraordinary expenditure, derived little or no relief from a fund, which, if honeſtly applied in that time, and aſſiſted by public economy, would have diſcharged the greateſt part of its debts. At the end of the year 1739, therefore, when the clamours of the commercial part of the country forced the government into a war with Spain, the capital of the debt amounted to 46,382,650*l* ; and at the concluſion of that war, in 1749, which terminated with a general reſtitution of conqueſts, it had accumulated to 78,166,906*l*., leaving the trade of the country encumbered with additional cuſtoms and exciſe, and the nation, in regard to its foreign poſſeſſions, exactly in the ſame ſtate as at the commencement of the war. From this period, to the beginning of the next war, the ſinking fund, inſtead of being aſſiſted in its operations by any economy in the management of the public finances, was invariably alienated towards providing for the ordinary ſupplies of the year, ſo that, during an interval of eight years' peace, only 3,089,641*l*. of the debt were redeemed, which did not amount to *one tenth* part of what had been incurred by the preceding war.

In the year 1756, the nation became again involved in hoſtilities, in conſequence (as M. Voltaire obſerves) of ſome diſputes about a few acres of ſnow in North America, and the public debt, which at the commencement of that war amounted to 75,071,264*l*., had accumulated, at the death of the late king in 1761, to 110,604,836*l*.; and at the general peace in 1763, it amounted to 146,582,844*l*., requiring 4,840,821*l*. to be annually raiſed in taxes towards paying the intereſt of it; a ſum conſidered at that time as too heavy to be borne by the people of Great Britain; and hence the miniſter directed his views to the colonies in North America, with the hope of making them bear a part at leaſt of the burdens which oppreſſed the mother country. As early therefore as the month of March 1764, it was reſolved in the houſe of commons, at the inſtigation of the miniſter, that it would be proper to impoſe certain ſtamp duties in the colonies for the purpoſe of raiſing a revenue in Great Britain; and in the year 1765 this reſolution was paſſed into a law. Thus, having juſt terminated a foreign war, the ſeeds were immediately ſown for kindling a civil one. It would be improper, in the preſent article, to trace the progreſs of the violence on one ſide, and of reſiſtance on the other, which mutually exaſperated the two countries; and it will be ſufficient only to obſerve here, that the flames of war burſt forth in the beginning of the year 1775. At that period, though the nation had enjoyed an external peace for more than twelve years, the debt was not reduced as many millions; for, at the commencement of the war, it amounted to 135,943,051*l*., or only to 10,639,193*l*. leſs than its amount in 1763; ſo that in proportion as the public burthens increaſed, the efforts of miniſterial economy to relieve them appear to have become more feeble and inefficient. After having extended its ravages to both ſides of the globe, by drawing France, Spain, and Holland into an alliance with America, this war, begun for the oſtenſible purpoſe of leſſening the public burthens, by forcing the colonies to ſhare in them, terminated, like all other wars, without obtaining its object, and by increaſing thoſe burthens more than twofold. The whole of the funded debt in January 1784 amounting to 232,152,803*l*., and the unfunded debt to more than 36 millions, requiring an annual revenue of 9,560,907*l*. for the mere payment of intereſt upon it, excluſive of taxes, for the ordinary expences of the peace-eſtabliſhment, which had alſo increaſed nearly in the ſame proportion.

In this year commenced the adminiſtration of Mr. Pitt, which is diſtinguiſhed for having added more to the public debts than all the adminiſtrations that have ever exiſted ſince the revolution. By the bad management of his predeceſſors, the unfunded debt had now accumulated beyond all example. The greater part of this enormous maſs was converted into a permanent debt in 3, 4, and 5 *per cents*. The former diviſion of the revenue into the *General*, the *South Sea*, the *Aggregate*, and the *Sinking Fund*, was diſcontinued; the whole of the taxes were collected together into one fund, called the *Conſolidated Fund*, and one million of the ſurplus of thoſe taxes, after diſcharging the intereſt of the debt, &c. was to be appropriated annually towards redeeming the principal. During the firſt ſeven years, however, after this new arrangement of the finances, no ſuch ſurplus really exiſted (although the public were amuſed with the belief of it), and the deficiencies were made up by loans; by the receipt of balances in the hands of the collectors, and other adventitious means; ſo that at the end of nine years of peace, the nation, ſo far from being relieved of any of its burdens, found itſelf loaded with a permanent debt of 260,892,756*l*., excluſive of what remained unfunded, amounting to many millions more. It muſt, however, be obſerved, that this interval of peace had been diſturbed at different times, by provocations to hoſtilities with Holland, Ruſſia, and Spain, and that the expenditure in conſequence had been increaſed by the warlike preparations of the miniſter. But certainly the additional expences incurred on theſe occaſions were not to ſuch an extent as to account for the inſufficiency of the public income, and to juſtify him in aſſerting that it was more than equal to the ordinary expenditure of a peace eſtabliſhment. It is, however, a matter of little moment at preſent on which ſide of the account the balance then lay. The debts have ſince ſwollen into ſuch a ſtupendous maſs as to render the ſurplus or the deficiency of a few millions in the revenue, an object neither of hope on the one hand, nor of apprehenſion on the other.

In the year 1793, the government, alarmed at the progreſs of the French revolution, plunged the nation into a war, the moſt calamitous and expenſive that ever deſolated the population, or deſtroyed the reſources of the country; from which it juſt emerged at the end of eight years, to ſink deeper than ever into a gulph which has ſwallowed up all the old governments on the continent of Europe, and which the warmeſt and ſtouteſt of our own cannot contemplate without anxiety. From the commencement of this war, to the ceſſation of hoſtilities in 1801, a term diſtinguiſhed above all others in the annals of this country, by the greateſt waſte of the public treaſure, and the moſt improvident extravagance in contracting the public loans, the debt had accumulated ſo far beyond all former example, that at the final cloſing of the accounts in April, 1803, it amounted, after deducting 67 millions which had been redeemed by the ſinking fund, to a capital of 531,769,159*l*. requiring 24,564,811*l*. to be annually raiſed in taxes towards paying the intereſt, excluſive of the ſums neceſſary for the intereſt upon the unfunded debt, and for the expences of the civil and military eſtabliſhments, amounting at leaſt to twelve millions more, and making the whole peace eſtabliſhment to exceed 36 millions *per annum*.

Encumbered with ſuch an immenſe weight of debts and

taxes, incurred for the moſt part in the ſupport of wars deſtructive of the beſt intereſts of the country, it was to have been hoped that peace, ſo highly neceſſary to heal the wounds, and relieve the burdens under which it laboured, would have been ſuffered to remain a few years at leaſt undiſturbed; but unfortunately this hope has been diſappointed. The rejoicings on the termination of one war had hardly been finiſhed, before the kingdom was plunged into all the miſeries of another; which, having raged with unabated violence and expence for more than five years, without affording the moſt diſtant proſpect of being concluded, renders it impoſſible at this time to determine to what greater ſum the debts may be accumulated. The following ſtatements, therefore, deduced from the accounts which were laid before parliament in March, 1808, are confined to the end of the preceding year; but they exhibit a picture of itſelf ſufficient to alarm the nation, without being reminded of the many additional millions, which have been borrowed and expended in the preſent year.

Amount of the Public Debt on the 1ſt of February, 1808.

46,184*l.* annuities on lives granted prior to, and during the preſent reign, ſuppoſed to be worth about 7 years purchaſe - -		£323,288
Sum ſubſcribed in 1766 for annuities with benefit of ſurvivorſhip - - - -		18,000
Ditto ſubſcribed in 1789 for ditto - -		1,002,099
1,047,494*l.* annuities expiring in 1860, valued at 5*l. per cent.* - - - - -		19,292,700
Stock in the 3 *per cents.*	£590,091,288	
Redeemed by the commiſſioners	125,177,702	
		464,913,586
Stock in the 4 *per cents.* -	49,425,085	
Redeemed by the commiſſioners	2,617,400	
		46,807,685
Stock in the 5 *per cents.* -	44,830,742	
Redeemed by the commiſſioners	142,000	44,688,742
Imperial Loans.		
Stock in the 3 *per cents.* -	7,502,633	
Redeemed by the commiſſioners	829,426	
		6,673,207
230.000*l.* annuities for 13 years, valued at 5 *per cent.* - - - - - -		2,160,505
Whole of the funded debt - -		£585,879,812

Unfunded Debt, not provided for on the 5th of January, 1808.

Exchequer bills -	£31,942,900	
Treaſury warrants, &c. -	727,101	
Barracks and ordnance -	1,252,182	
Navy - - - -	6,561,237	
Civil Liſt advances - -	50,430	
		40,533,850
Whole of the funded and unfunded debt of Great Britain - - - -		626,413,662

As Ireland now conſtitutes a part of the united kingdom, its debts may not improperly be added to the preceding account, and are as follow:

Stock in the 3 *per cents.* -	47,139,625	
Redeemed by the commiſſioners	4,628,926	
		42,510,699
Carry over		42,510,699
91,208*l.* annuities expiring in 1860, valued at 5 *per cent.*		1,679,870
		44,190,569
Brought over		626,413,622
Whole of the funded and unfunded debt of the united kingdom - - -		£670,604,231

Amount of the Sums neceſſary to be raiſed in Taxes towards defraying the annual Charge of the National Debt.

Intereſt on the unredeemed part of the debt -	£19 014,619	
Annual appropriation for the redemption of the debt - - -	9,338,814	
Annual charges of management - -	272,948	
		£28,626,382
Intereſt on the unredeemed part of the imperial loans	432,792	
Annual appropriation for the redemption of the debt - - -	22,287	
Charges of management -	5,645	
		460,724
Intereſt on exchequer bills - -		1,574.362
Whole amount of the ſums to be annually raiſed on account of the debts of Great Britain - - -		£30,661,468
Intereſt on the unredeemed part of the Iriſh debt -	£1,253,840	
Annual appropriation for the redemption of the debt - -	118,064	
Charges of management	19 163	
		1,391,067
Whole amount of the ſums to be annually raiſed on account of the debts of the united kingdom of Great Britain and Ireland - - - - -		£32,052,535

In addition to theſe ſums, about 40 millions are neceſſary to be raiſed in each year towards providing for the civil and military eſtabliſhment, which, of courſe requiring new loans and taxes, are continually adding to the permanent burdens of the kingdom; nor is it eaſy to determine to what further extent their weight may be increaſed by the preſent war. They have already far exceeded what the moſt ſanguine had conceived it poſſible for the nation to ſupport; and the debt has long ago over-paſſed the bounds which had been aſſigned to public credit. A continued progreſſion, however, in the ſame career of expence muſt at laſt terminate in that ruin which the more timid may perhaps have anticipated too ſoon, but which by being protracted, will only be rendered more general and deſtructive. See on this ſubject "The Hiſtory of our Debts and Taxes." Dr Price's Tracts on the National Debt. Mr. Morgan's Tracts on the Public Finances &c. &c.

DEBTS *and Credits*, in *Military Language*. Every captain of a troop or company, in the Britiſh ſervice, is directed to give

give in a monthly ſtatement of the "debts and credits" of his men; and it is the duty of every commanding officer to examine each liſt, and to ſee that no injuſtice or irregularity has been countenanced or overlooked in ſo important an object, as every money-matter between officer and ſoldier moſt unqueſtionably is.

DEÇA, in *Geography*, a river of Spain, which runs into the Xalon, two leagues below Anza in Aragon.

DECACHORDON, in *Antiquity*, a muſical inſtrument, of ten ſtrings, called by the Hebrews *haſur*, reſembling our harp, of a triangular figure, with a hollow belly, and ſounding from the lower part.

DECACTIS, in *Natural Hiſtory*, a name given by ſome to a kind of ſtar-fiſh, of the branched, or aſtrophyte kind, whoſe rays are ten in number, where they firſt part from the body, and each ſoon branches out into a number more.

DECADARCHUS, Δεκαδαρχος, among the Greeks, a commander of a party of ten men.

DECADE, a word uſed by ſome old writers for the number ten; and decades, for an enumeration by tens: the word is formed from the Latin decas, which is derived from a Greek word of the ſame import. The word has been more peculiarly appropriated to the number of books, *q. d.* decades into which the Roman Hiſtory of Titus Livius is divided. Hence alſo came decadal arithmetic, the Decameron of Boccaccio, &c.

DECAGON, a plain figure in geometry, having ten ſides and angles. If all the ſides and angles be equal, it is called a regular decagon, and may be inſcribed in a circle; for the method of doing which, ſee PENTAGON. If AB, (*Geometry*, *Plate* VI. *fig.* 74.) be the ſide of a regular decagon inſcribed in a circle, whoſe radius is AD, the radius will be a mean proportional between the ſide of the decagon and the ſum of that ſide and the radius: *i. e.* AB: AD :: AD: AD + AB. Produce AB to F, ſo that BF may be equal to AD, and draw DF and DB, then the angle ADB, being at the centre and ſubtended by the ſide of a decagon, is $= \frac{1}{10}$ of four right angles, or $\frac{1}{5}$ of two right angles, and therefore DAB + DBA $= \frac{4}{5}$ of two right angles, and ABD (= DAB) $= \frac{2}{5}$ of two right angles = (as the external angle) BDF + BFD = (the triangle BDF being iſoſceles) 2 BDF; and therefore BDF or BFD $= \frac{1}{5}$ of two right angles = ADB. Conſequently the triangles ADB and ADF are ſimilar, F being = ADB, and A being common, and therefore AF or AB + BD (=AD): AD :: AD: AB.

Hence it appears that if the radius be cut in extreme and mean proportion, the greater ſegment is the ſide of the decagon AB. For, by diviſion, $\overline{AB + AD} - AD$, *i. e.* AB: AD :: AD − AB: AB, or AD: AB :: AB: AD − AB, ſo that AD is ſuppoſed to be cut in extreme and mean proportion. See EXTREAM and *Mean Proportion*. It alſo appears that the radius is to the ſide of the decagon as 2 to $\sqrt{5} - 1$. For the rectangle of the extremes being equal to the ſquare of the mean, we have $AB^2 + AB \times AD = AD^2$, and adding $\frac{1}{4} AD^2$, $AB^2 + AB \times AD + \frac{1}{4} AD^2 = \frac{5}{4} AD^2$, and $AB + \frac{1}{2} AD = \frac{AD\sqrt{5}}{2}$, and $AB = \frac{AD}{2}\sqrt{5} - \frac{AD}{2}$, and 2 AB $= AD \times \sqrt{5} - 1$. Therefore AD: AB :: 2: $\sqrt{5} - 1$. Or, by an algebraic proceſs, and the ſolution of a quadratic equation, making AD $= a$, and AB $= x$, we have $x^2 + ax = a^2$, and completing the ſquare, $x^2 + ax + \frac{1}{4} a^2 = a^2 + \frac{1}{4} a^2 = \frac{5a^2}{4}$; and, by extracting the ſquare root, $x + \frac{1}{2} a = \sqrt{\frac{5}{4} a^2}$, and $x = \sqrt{\frac{5}{4} a^2} - \frac{1}{2} a$; and ſuppoſing radius 1, x, or the ſide of a decagon inſcribed in the circle, $= \sqrt{\frac{5}{4}} - \frac{1}{2} = \frac{\sqrt{5} - 1}{2}$, and $2x = \sqrt{5} - 1$., and 1: x :: 2: $\sqrt{5} - 1$, as before; or the ſide of the inſcribed decagon $= \sqrt{\frac{5 - 1}{2}} \times r$, r being radius.

If the ſide of a regular decagon be 1, its area will be $\frac{5}{2}\sqrt{5 + 2\sqrt{5}} = 7.6942088$; therefore, as 1 is to 7.6942088 ſo is the ſquare of the ſide of any regular decagon to the area of the ſame; ſo that if s be the ſide of ſuch a decagon, its area will be equal to $7.6942088\, s^2$. See REGULAR *Figure*, and POLYGON.

DECALITRON, among the *Ancients*, a piece of money uſed by the people of Ægina, Corinth, and Syracuſe, in value equal to $16\frac{2}{3}$ oboli of Athens.

DECALOGUE, the Ten Commandments of God, engraven on two tables of ſtone, and given to Moſes.

The word is Greek, compoſed of δεκα, *ten*, and λογος, *word*, *q. d. ten words*. Accordingly the Jews call them עשרת דברים, *the ten words*, which appellation is very ancient.

The Samaritans, both in their text and verſion, add after the ſeventeenth chapter of the twentieth chapter of Exodus, and after the twenty-firſt verſe of the fifth chapter of Deuteronomy, an eleventh commandment, to build an altar on mount Gerizim, &c. But it is apparently an interpolation, to authorize their having a temple and an altar on that mountain; and to diſcredit, if poſſible, the temple at Jeruſalem, and the worſhip there performed. It muſt be added, however, that though all, both Jews and Chriſtians, agree in the number of Ten Commandments, there is ſome difference as to the manner of dividing them.

The Talmudiſts, and Poſtellus, after them, in his treatiſe "De Phœnicum Literis," ſay, that the Decalogue, or Ten Commandments, were engraven quite through the tables which God gave to Moſes; but that nevertheleſs the middle of the ם *Mem* final, and of the ס *Samech*, remained miraculouſly ſuſpended without adhering to any thing. See the Diſſertation on the Samaritan Medals, printed at Paris in 1715. They add, that the Decalogue was written in letters of light, *i. e.* in luminous ſhining letters.

The Decalogue was originally delivered in two tables; one of which contains our duty to God, expreſſed in the four firſt commandments; and the ſecond, our duty to our neighbour, enforced in the ſix laſt. The church of Rome, for a very obvious reaſon, hath omitted the ſecond commandment in many of her books; and in order to preſerve the number complete, divided the laſt into two. It is omitted not only in the ſhort catechiſms and manuals of the Romiſh church; but in the reformed office of the bleſſed virgin, printed at Salamanca, A. D. 1588, publiſhed by order of Pius V.; and alſo in the Engliſh office at Antwerp, A. D. 1658. See Stillingfleet's Works, vol. vi. p. 572.

DECAMERIS, a term ſignifying a tenth part; uſed by Mr. Sauveur, and ſome other authors, to mark and meaſure the intervals of ſounds.

The word is formed of δεκα, *ten*, and μερις, *part*.

In Mr. Sauveur's ſyſtem, the decameris is the tenth part of the heptameris, which he makes the ſeventh part of the meris; and this is the forty-third part of the octave; ſo that the decameris is $\frac{1}{3015}$ of an octave. See Mem. Acad. Scienc. 1701. and 1707.

DECAMERON, from δεκα, *ten*, and ημερα, *day*; a work containing the actions or converſations of ten days. Boccacio's Decameron conſiſts of one hundred novels related in ten days.

DECAMPMENT, in a *Military Senſe*, relates to the removal of troops from a place where they were encamped, or quartered. When the intention has been previouſly known, little precaution is uſed to conceal the movement, and the orders are, for the moſt part, iſſued one, or more, days before the army commences its march. At the hour appointed for ſtriking the tents the drums beat *the general*, which is the ſignal univerſally known for a removal of quarters; ſo much ſo indeed, that whenever *the general* is beat through the camp, or town, the whole prepare for marching by ſtriking the tents, loading the baggage, harneſſing the cattle, limbering the cannon, and all the various operations attendant upon ſuch a change of locality. When the notice has been long given, it is uſual to allow from half to a full hour, between beating the general, and beating *the aſſemblée*; under the ſuppoſition that all would be duly prepared, and that a very ſhort interval of time would ſuffice for thoſe ſeveral matters which are inevitably delayed to the laſt moment. But when the decampment is rather ſudden, and it has not been practicable to call in various detachments, out-poſts, &c. the time between the *general* and the *aſſemblée* is uſually extended, perhaps to two or three hours, to allow the warning to be generally known, and that every thing may be completed for removal.

Decampments ariſing from emergency, ſuch as the intelligence of riots, &c. in neighbouring towns, or of an intended ſurpriſe by a party of the enemy, are commonly announced by beating *to arms*, on which ſignal, every one repairs to his poſt, and the means of attack, of reſiſtance, or of retreat, become the firſt conſideration. When this happens in conſequence of an expected aſſault, and that it is found expedient to retire before a ſuperior force, the baggage, &c. is ſent forward, and the troops act as an eſcort, or covering-party; where riots, &c. demand the preſence of the troops elſewhere, the baggage is either ordered to follow with all due circumſpection and activity, under a ſmall guard; or it is left, as it is technically termed, "on the ground," (*i. e.* at the place quitted by the troops,) to await further orders.

Decampments made for ſecret purpoſes, ſuch as a night attack upon an enemy, or for the purpoſe of avoiding an attack, or for changing the poſition of a line unknown to the enemy, ſo that he may be deceived, either by having to oppoſe a greater force than was expected, or by finding that poſt vacated, towards which he had beſtowed a large portion of his force, thus thrown out of the line of action; are uſually made *without beat of drum*. And in order to carry on the intended deception, it is not uncommon to leave a few horſemen to keep up the ordinary fires; to challenge the approaching troops; or to appear, when the decampment is known to the enemy, as the rear, or baggage-guard, and thus to lead them into a purſuit; ſo that they may either fall into an ambuſcade, or be more completely detached from their main body, and eventually be cut off. In fact, we are not to conſider decampment as the mere act of removal from one quarters, camp, or poſition, to another; but as one of thoſe *ruſes de guerre*, which often give a complete turn to the poſture of affairs, and have been known to change the campaign into a new direction, as well as to give it a new aſpect. This device was one of the moſt ſucceſsful, among the many exerciſed, againſt our commanders, by the great Waſhington: perhaps it would he difficult to quote any inſtances in European warfare, that could bear a competition for ſkill, and allurement, with thoſe practiſed by that worthy and brave general. Nor have the French, during their late ſucceſſes among the ſubdued ſtates of Europe, been a little indebted to this deception; whether by bribery, by ignorance, or by want of prudence, our allies have on various occaſions ſuffered partly by this *ignis-fatuus* ſyſtem; and when they thought it was impoſſible for the object of clandeſtine attack to eſcape, have found their rear ſuddenly aſſaulted by the very troops they judged to be ſome miles diſtant in their front.

Hence our readers will perceive that decampment may be occaſionally conſidered rather as an evolution, than as a mechanical operation; and that, when well conducted, it often affords the means of avoiding intended miſchief, and of ſeverely retaliating on the enemy.

DECAMYRON, in the *Medicinal Writings of the Ancients*, the name of a maiagma or cataplaſm, conſiſting of ten different kinds of aromatics: theſe were the Indian leaf, maſtic, euphorbium, ſpikenard, adarce, ſtorax, pepper, ointment of nard, opobalſamum, and wax.

DECANDRIA, in *Botany*, the tenth claſs of plants, with hermaphrodite flowers, and ten ſtamina, or male parts in each.

The word is formed of the Greek δεκας, *ten*, and ανηρ, *male*.

Of this claſs of plants there are five orders; *viz.* the *monogynia*, containing fifty-three genera; the *digynia*, comprehending twelve genera; the *trigynia*, eleven; the *pentagynia*, fourteen; and the *decagynia*, two genera.

DECANTATION, is the act of pouring a liquor off clear from the dregs or ſediment.

DECANUS, among the Romans, an officer who had ten other officers, or perſons, under his charge; whence our Engliſh dean. See Dean.

Decanus, in *Aſtrology*, a title given to the god who preſided at any birth, ὁ ὡροσκοπος. See Astrology.

DECAPITE', in *Heraldry*. See Defait.

DECAPOLIS, in *Ancient Geography*, a country of Paleſtine, which contained 10 principal cities, ſome on this and ſome on the other ſide of Jordan, whence the name. Pliny enumerates the following: Scythopolis, Philadelphia, Raphanæ, Gadara, Hippos, Dion, Pella, Geraſa, Canatha, and Damaſcus. Others reckon them differently. They were chiefly inhabited by the Gentiles, though ſome of them might be within the region of Judæa.

DECAPROTI, Decemprimi, among the *Ancients*, were officers who gathered the tributes, or taxes.

The word comes from δεκα, *ten*, and πρωτος, *firſt*; probably becauſe the ten firſt, or principal perſons of each community, were choſen to make the levies.

The decaproti were obliged to pay for the dead; or, to anſwer to the emperor for the quota of ſuch as died, out of their own eſtates. Cicero, in his oration for Roſcius, calls them decemprimi.

DECASMUS, Δεκασμος, in *Antiquity*, the name of an action or proceſs among the Athenians, which was brought againſt any perſon who offered a bribe. They thought it not enough to puniſh the perſon receiving a bribe, but that the perſon who offered it ought to be puniſhed likewiſe. Pott. Archæol. Græc. lib. i. c. 23.

DECASPERMUM, in *Botany*. See Psidium.

DECASTADIUM, in *Ancient Geography*, a town of Italy in Brutium, at its ſouthern extremity, S. of Rhegium, and on the ſame coaſt.

DECASTYLE, in *Architecture*. A temple is ſaid to be decaſtyle,

decaſtyle, when its portico contains ten columns in a linei front: From δεκα. *ten*, and στυλος. *column*.

DECATARIA, in *Ancient Geography*, a town of Illyria in Dalmatia.

DECCAN, in *Geography* a general term, ſignifying the *South*, but applied by the Indian geographers to the countries that lie ſouth of the parallel of 21° or 22° of N. lat. and compriſing nearly one half of the tract generally known by the name of the Mogul empire, ſo that the Deccan and peninſula are about equal to the Britiſh Iſlands, Spain, and Turkey in Europe. The Deccan, in its moſt extenſive ſignification, includes the whole peninſula ſouth of Hindooſtan proper; but in its limited ſenſe and ordinary acceptation, it denotes only the countries ſituated between Hindooſtan proper, the Carnatic and Oriſſa, that is, the provinces of Candeiſh, Amednagur, or Dowlatabad, Viſiapour, Golconda, or Biſnagur, and the weſtern part of Berar. Many attempts were made by the Mogul emperors, towards the cloſe of the 13th and commencement of the 14th century, for ſubduing the Deccan; but about the year 1344, when Mahomed III. was emperor, the princes of the Deccan aſſumed courage, and headed by Belaldeo, king of the Carnatic, drove the Mahomedans entirely out of thoſe countries; and nothing remained to them, except the fortreſs of Dowlatabad, or Deogur. About the beginning of the 16th century, the Portugueſe firſt accompliſhed the paſſage to India by the Cape of Good Hope, but their connexions were altogether with the maritime parts of the Deccan. As it had been long a ſtumbling-block to the Mogul emperors, Acbar, in 1585, reſolved on the attack of it, and ſoon after carried the war into Berar, while another army was reducing Caſhmere, in an oppoſite corner of the empire. However, at the time of Acbar's death, in 1605, no further progreſs was made in the reduction of the Deccan, and the adjoining countries, than the taking poſſeſſion of the weſtern part of Berar, Candeiſh, Tellingana (a diviſion of Golconda), and the northern part of Amednagur; the capital of which, bearing the ſame name, was taken in 1601, after a long and bloody ſiege, and an unſucceſsful attempt to relieve it, by the confederate princes of the Deccan. In the reign of Shah Jehan, who aſcended the throne in 1628, the conqueſt of the Deccan was vigorouſly purſued; and the plunders and devaſtations perpetrated there occaſioned moſt, or all of its princes to make ſubmiſſion, and acknowledge the emperor, lord paramount. Golconda was in part actually taken poſſeſſion of; but Viſiapour, and the Carnatic, together with the region of the Gauts, remained in the hands of their ancient poſſeſſors.

During the latter part of the reign of Aurungzebe, who diſdained to have any other boundary on the ſouth beſides the ocean, the conqueſt of the remote part of the Deccan employed a very conſiderable part of his leiſure; when the whole of that region, together with the peninſula, a few mountainous and inacceſſible tracts only excepted, were either entirely ſubjected, or rendered tributary to the throne of Delhi. What ſeemed to induce Aurungzebe to ſubdue the Deccan was the determined ſpirit and growing power of Sevajee, the founder of the Mahratta ſtate; who, by his conqueſts in Viſiapour, appeared almoſt under the character of a rival to Aurungzebe. Accordingly he was employed in the Deccan from the year 1678 to the time of his death, in 17 7. Deccan was erected into a vice-royalty or ſoubah, and at the time of the invaſion of Nadir Shah, the viceroy was Nizam-al Muluck, who preſerved an apparent independence, and whoſe juriſdiction extended from Burhampour to Cape Comorin, and eaſtward to the ſea. Six provinces depended on this prince, and the number of his ſubjects was eſtimated at 35 millions. The Mahrattas, however, are in poſſeſſion of the greater part; other diſtricts have from time to time been formed into ſeparate ſtates; and the conſtant revolutions in India, render the boundaries of each country uncertain. The poſſeſſions of the Nizam, or ſoubah of the Deccan, (a younger ſon of the famous Nizam-al-Muluck) comprize, as they are ſtated in major Rennell's Memoir, the province of Golconda, that is, the ancient province of Tellingana, or Tilling, ſituated between the lower parts of the courſes of the Kiſtnah and Godavery rivers, and the principal part of Dowlatabad; together with the weſtern part of Berar, ſubject to a tribute of a chout, or fourth part of its net revenue, to the Berar Mahratta. The Nizam has the Paiſhwah, or Poonah Mahratta, on the weſt and north-weſt, the Berar Mahratta on the north, the northern Circars on the eaſt, and the Carnatic, and the late Hyder Ally on the ſouth. His weſtern boundaries, during his wars with the Mahrattas, have been ſubject to continual fluctuation; but they are underſtood generally to extend more than 40 miles beyond the city of Aurungabad, weſtwards; and to come within 80 miles of the city of Poonah; and on the S.W. to go conſiderably beyond the river Beemah, and to the borders of Sanore-Bancapour. His capital is Hydrabad or Bagnagur, ſituated on the Mouſſi river, near the famous fortreſs of Golconda. The diſtricts of Adoni and Rachore, which were in the hands of Bazalet Jung, (brother to the Nizam,) during his life-time, are now in the hands of the Nizam. The ſourapour, or ſollapour-rajah, on the weſt of the Beemah river, together with ſome other rajahs, are his tributaries. Probably, ſays Mr. Rennell, (Memoir, Introd. p. 136.) the Nizam's dominions, including his tributaries and feudatories, are no leſs than 430 miles in length, from N. W. to S. E., by 300 wide. Till he took poſſeſſion of the Guntoor Circar in 1780, his dominions no where touched on the ſea-coaſt; but Guntoor has been ſince ceded to the India company. See CIRCAR.

DECCAN *Shabazpour*, an iſland of India, in the mouth of the Ganges. N. lat. 22° 30′. E. long. 98° 58′.

DECEATES, in *Ancient Geography*, the name of a people who occupied the eaſtern ſide of Gallia Narbonnenſis, near the Mediterranean ſea, according to Strabo and Pliny.

DECEATUM, the town of the Deceates, in Gaul, which belonged to the Liguri.

DECEBALUS, in *Biography*, one of the barbarian kings, who contended with the greateſt ſucceſs againſt the power of the Roman empire. He was raiſed to the throne of Dacia on account of his military talents, about the period in which Domitian was ſovereign of Rome. In the war that commenced about the year 86, he frequently defeated the Romans, with great ſlaughter; and in one inſtance, prevented, by ſtratagem, the enemy from advancing to his own capital, by felling a great number of trees, and covering their trunks with armour, ſo as to appear like ſoldiers. Shortly after Domitian ſought for peace, to which Decebalus acceded, upon condition that he ſhould receive from the emperor's own hand a diadem, and a yearly tribute under the form and title of a penſion, which was regularly paid till the time of Trajan, who not only refuſed to be tributary to the Dacians, but entered his country with a powerful army, and was completely victorious. Decebalus was obliged to ſubmit to very humiliating terms; for the ſake of peace, he agreed to give up his arms and diſmantle his fortreſſes. Scarcely, however, had the emperor departed before the Dacian king prepared for new hoſtilities, and defied the power of Rome: Trajan was again ſucceſsful, and Decebalus, who found himſelf unequal to the open conteſt, determined to deſtroy by treachery

and aſſaſſination him whom he durſt not meet in the field. For this purpoſe he perfidiouſly got poſſeſſion of Longinus, the favourite officer of the Roman emperor, and endeavoured, by bribes and by threats, to make uſe of him as the inſtrument of his maſter's death. Longinus preferred the life of his king to his own, and by poiſon freed himſelf from the power of his enemy. Trajan now built his celebrated bridge over the Danube, completely conquered Dacia, and took poſſeſſion of its capital. Decebalus, ſeeing no chance of eſcaping from the hands of the emperor, put an end to his own life; and with him terminated the independence of Dacia, which was aftewards a mere Roman province. He had concealed the vaſt treaſures which he had accumulated, but theſe were diſcovered to the conqueror, and were found more than equal to the expence of the war. In the early part of life Decebalus had the character of being equally wiſe in council, and prompt in action; ſkilful in all the manœuvres of war, poſſeſſed of vigour to improve a victory, and conſtancy to repair a defeat. Univ. Hiſt.

DECEIT, *Deceptio*, or *Dolus*, in *Law*, is uſed for any ſubtile, wily ſhift, or trick; to which may be referred all manner of craft, ſubtility, guile, fraud, ſleight, cunning, covin, colluſion, and practice uſed to deceive another by any means.

Deceit is an offence both by common law and by ſtatute. All practices of defrauding, or endeavouring to defraud, another of his right, are puniſhable by fine and impriſonment, ſometimes pillory, &c. (ſee CHEATS); and there is a writ called deceptione that lies for one who receives injury, or damage, &c.

Serjeants, counſellors, attornies, and others, chargeable with deceit are to be impriſoned a year and a day; alſo pleaders by deceit ſhall be expelled the court: ſtat. 3. Ed. I. c. 29.

An action of deceit will give damages in ſome particular caſes of fraud; and principally where one man does any thing in the name of another, by which he is deceived or injured; as if one brings an action in another's name, and then ſuffers a non-ſuit, whereby the plaintiff becomes liable to coſts; or where one obtains or ſuffers a fraudulent recovery of lands, tenements, or chattels, to the prejudice of him that hath right. As when by colluſion the attorney of the tenant makes default in a real action; or where the ſheriff returns that the tenant was ſummoned when he was not ſo, and in caſe he loſes the land, the writ of deceit lies againſt the demandant and alſo the attorney, or the ſheriff and his officers, to annul the former proceedings, and recover back the land. It alſo lies in caſes of warranty, and other perſonal injuries committed contrary to good faith and honeſty. But an action on the caſe, for damages, in nature of a writ of deceit, is more uſually brought on theſe occaſions. And indeed it is the only remedy for a lord of a manor, in or out of ancient demeſne, to reverſe a fine or recovery had in the king's courts of lands lying within his juriſdiction, which would otherwiſe be thereby turned into frank fee. And this may be brought by the lord againſt the parties, and *ceſtuy que uſe* of ſuch fine or recovery; and thereby he ſhall obtain judgment not only for damages (which are uſually remitted), but alſo to recover his court and juriſdiction over the lands, and to annul the former proceedings.

A writ of deceit lies not only againſt attornies, for loſſes ſuſtained by their default; but alſo againſt bakers, brewers, and other artificers, for not ſelling good commodities, or refuſing to perform a bargain: in all which caſes they are by ſtatute liable to penalties in proportion to their offence.

DECEIVED, in the *Manege*, is uſed when a horſe upon a demi-volt of one or two treads, working, for inſtance, to the right, and not having yet finiſhed above half the demi-volt, is preſſed one time or motion forwards with the inner leg, and then is put to a repriſe upon the left, in the ſame cadence with which he began. He thus regains the place where the demi-volt had been begun to the right, and works to the left. A horſe may in this manner be deceived on any hand. Guillet, Gen. Dict. p. i. in voc.

DECELEA, or DECELIA, in *Ancient Geography*, a town of Greeee, in Attica. It was taken and fortified by the Lacedæmonians in the 19th year of the Peloponneſian war. It lay N. E. of Athens, near the ſource of the Cephiſus.

DECEMBER, in *Chronology*, the laſt month of the year; wherein the ſun enters the tropic of Capricorn, and makes the winter ſolſtice.

In Romulus's year, December was the tenth month; whence the name, *viz.* from *decem*, ten: for the Romans began their year in March.

The month of December was under the protection of Veſta: Romulus aſſigned it thirty days; Numa reduced it to twenty-nine; which Julius Cæſar increaſed to thirty-one.

Under the reign of Commodus, this month was called, by way of flattery, Amazonius, in honour of a courteſan, whom that prince paſſionately loved, and had got painted like an Amazon; but it only kept the name during that emperor's life.

At the latter end of this month they had the Juveniles ludi, and the country people kept the feaſt of the goddeſs Vacuna in the fields, having then gathered in their fruits, and ſown their corn; whence ſeems to be derived our popular feſtival called harveſt-home.

DECEMBRIO, PIETRO CANDIDO, in *Biography*, a learned Italian, was born at Pavia, in 1399, and was at an early age appointed ſecretary to Philip-Maria Viſconti, duke of Milan, in whoſe ſervice he continued till the death of his noble maſter in 1447. He is celebrated in hiſtory as one of the moſt able and ſtrenuous defenders of the liberties of the Milaneſe. When they ignobly reſolved to ſubmit to the arms of Francis Sforza, he refuſed to accept the humiliating office of ſurrendering the city to the conqueror. When the cauſe of Milan was hopeleſs, he became apoſtolic ſecretary to pope Nicholas V., and removed to Rome. He was likewiſe at ſome period of his life, the date of which has not been exactly aſcertained, ſecretary to Alphonſo of Arragon, king of Naples. Notwithſtanding the buſineſs which theſe important offices devolved upon him, he found leiſure to do much in the cauſe of literature. He wrote the lives of Philip Maria Viſconti, and Francis Sforza, dukes of Milan, in the manner of Suetonius. He tranſlated "Appian's Hiſtory;" "Quintus Curtius," and the firſt ten books of Livy's Hiſtory. This was by the command of king Alphonſo. He tranſlated into Latin proſe, the hiſtory of Diodorus Siculus, and various other works of the ancients, and was author of many miſcellaneous pieces in proſe and verſe, in the Latin and Italian languages. He died at Milan in the year 1477, and was buried in the cathedral of St. Ambroſe. Gen. Biog.

DECEM-PAGI, in *Ancient Geography*, *Dieaze*, a place of Gaul, in Belgica Prima, belonging to the Mediomatrici, N. W. of Pons Saravi.

DECEMPEDA, Δεκαπους, *ten-feet rod*; an inſtrument uſed by the ancients in meaſuring.

The decempeda was a rule or rod, divided into ten feet; whence its name, from *decem*, *ten*, and *pes*, *pedis*, *foot*.

The foot was ſubdivided into twelve inches; and each inch into ten digits.

The

The decempeda was uſed both in meaſuring of land, like the chain among us; and by architects, to give the proper dimenſions and proportions to the parts of their buildings, which uſe it ſtill retains. Horace, lib. ii. od. 15. blaming the magnificence and delicacy of the building of his time, obſerves, that it was otherwiſe in the times of Romulus and Cato; that in the houſes of private perſons there were not then known any porticoes meaſured out with the decempeda, nor turned to the north to take the cool air.

DECEMSEPTIMA, in *Ancient Geography*, a town of Spain, belonging to the Coſetani, N. E. of Tarraco.

DECEM-TALES, in *Law*, a writ that iſſues directed to the ſheriff, whereby he is commanded to make a ſupply of jurymen, when a ſufficient number does not appear on a trial at bar.

DECEMVIRI, an order of annual magiſtrates among the Romans, created with a ſovereign power to draw up and make laws for the people; thus called, becauſe their number was ten.

To the decemviri was given all the legiſlative authority ever enjoyed by the kings, and after them by the conſuls. One among them had all the enſigns and honours of the function; and the reſt had the like in their turn, during the year of their decemvirate.

The decemviri were thoſe who drew up the laws of the Twelve Tables, called thence leges decemvirales, which for a conſiderable time were the whole of the Roman law. See TABLES.

In the year 302, the conſuls Appius Claudius Craſſinius, and T. Genucius Augurinus, being obliged to abdicate, the firſt decemviri were created; in the year following, ten new ones were appointed to ſucceed them; they at firſt behaved with great moderation, and adminiſtered juſtice to the people each every tenth day; the twelve faſces were carried before him who was to preſide, and his nine colleagues were attended by a ſingle officer, called *Accenſus*; they propoſed ten tables of laws, which were ratified by the people at the "Comitia curiata," in the compoſition of which they are ſaid to have had the aſſiſtance of one Hermodorus, an Epheſian exile, who ſerved them as an interpreter; and as two other tables ſeemed to be wanting, decemviri were again created for another year to make them; and in the year 304, another ſet was to have been choſen, but that the people roſe, made them lay down, and reſumed the conſuls. The exceſſive debauchery of Appius Claudius Craſſinius, one of the conſuls, who was firſt obliged to abdicate, and who had been choſen firſt decemvir three times, was the principal cauſe of all this. Cicero De Finib. lib. i. Livy, lib. iii. Halicarnaſſeus, lib. x. and Florus, lib. i. c. 24. relate the hiſtory.

The decemviral adminiſtration, however, it is to be obſerved, had not its firſt riſe at the time when the authority of the conſuls was devolved into the hands of the decemviri: for, during the interregnum that enſued after the death of Romulus, the management of affairs, which the ſenate then took upon them, is called by Halicarnaſſeus, lib. ii. decemviral, becauſe the ſenators, divided into tens, commanded each in their turn: that is, one of each ten, for five days ſucceſſively, having the faſces, lictors, &c. like the kings.

There were alſo military decemviri; and on divers emergencies, decemviri were created to manage and regulate certain affairs, after the ſame manner as boards of commiſſioners are appointed among us. Thus we find decemviri for conducting colonies; decemviri, who officiated as judges in caſes of litigation, under the quæſtor and prætor; decemviri for dividing the lands among the veteran ſoldiers; decemviri to prepare and preſide at feaſts in honour of the gods; decemviri to take care of the ſacrifices; and decemviri to keep the Sibyls books.

Sometimes, in lieu of decemviri, they only created ſeptemviri or triumviri, or duumviri, &c.

DECENNALIA, in *Antiquity*, feaſts which the Roman emperors held every tenth year of their reign, with ſacrifices, games, largeſſes, to the people, &c.

Auguſtus was the author of this cuſtom, which was afterwards imitated by his ſucceſſors.

At the ſame time they likewiſe offered vows for the emperor, and the perpetuity of his empire, called vota decennalia.

From the time of Antoninus Pius, we find theſe ceremonies marked on medals, PRIMI DECENNALES, SECUNDI DECENNALES. VOTA SOL. DECEN. II. VOTA SVSCEP. DECENN. III.

Theſe vows muſt have been made at the beginning of every tenth year; for on a medal of Pertinax, who ſcarcely reigned four months, we find VOTA DECENN. and VOTIS DECENNALIBUS.

Struvius is of opinion, that theſe vows took place of thoſe which the cenſor uſed to make in the times of the republic, for the proſperity and preſervation thereof. In effect, they were not only made in behalf of the prince, but alſo of the ſtate, as may be obſerved from Dion. lib. viii. and Pliny the younger, lib. x. ep. 101.

Auguſtus's aim in eſtabliſhing the decennalia, was to preſerve the empire, and the ſovereign power, without offence or reſtraint to the people. For, during the celebration of this feaſt, that prince uſed to ſurrender up all his authority into the hands of the people, who, filled with joy, and charmed with the goodneſs of Auguſtus, immediately delivered it to him back again.

DECENNARY, *Decennaria*, the limits or compaſs of ten friburghs, or, a town or tithing conſiſting originally of ten families of freeholders. Ten tithings compoſed an hundred. The inſtitution of decennaries (or frank-pledges) is aſcribed to Alfred. In theſe decennaries the whole vicinity or tithing of franks were mutually pledges for the good behaviour of each other. See DECINERS, and TITHING.

DECENNOVIUM, in *Ancient Geography*, a canal of 19 miles from Forum Appii to Terracina, on which Horace embarked in the night. The Decennovium mentioned by Lucan, Dion Caſſius, and Caſſiodorius, has been ſucceſſively ruined, reſtored, and obliterated. This canal, ſtrangely confounded by Cluverius with the river Uſens, has recently ſerved to drain the Pomptine marſhes, by which they are converted into excellent paſtures.

DECEPTION BAY, in *Geography*, a bay on the weſt coaſt of North America, in the North Pacific ocean. N. lat. 46° 10′. W. long. 124° 5′.

DECEPTION, *Cape*, a cape in Solomon's iſles. S. lat. 8° 32′ 30″. E. long. 157° 2′ 14″.

DECEPTIONE, in *Law*, a writ which properly lies for one that receives harm or damage, by him that does any thing deceitfully in the name of another.

This writ is either original or judicial. Old Nat. Br. fol. 50. Fitz. Nat. Br. fol. 95. See Bag. of Writs, fol. 112. and Reg. Judicial. See DECEIT.

DECETIA, in *Ancient Geography*, *Decize*, a town of Gaul, in Lyonnenſis prima. It belonged to the Æduani, and was ſituated on the Liger, S.E. of Noviodurum. See DECISE.

DECHALES, CLAUD FRANCIS MILLIET, in *Biography*, an excellent mathematician was born at Chamberry, the capital of Savoy, in 1611. He read lectures in the college

lege of Clermont, at Paris, for about four years, where he was highly reſpected for his ſcientific talents, and greatly beloved on account of the probity of his heart, and the excellence of his diſpoſition. From Paris he removed to Marſeilles, where he taught the art of navigation and the practical mathematical ſciences. He afterwards became profeſſor of mathematies in the univerſity of Turin. Here he died in the year 1678, at the age of 67. His edition of Euclid is well known in this country; in this he has omitted many propoſitions which he deemed of inferior importance, and he has explained the uſes of ſome of thoſe which he has retained. He is known alſo for treatiſes on fortification, and navigation; and other works on the practical ſciences. His works have been collected and publiſhed, as a complete courſe of mathematics, in four volumes, folio. He is chiefly eſteemed for the eaſy method which he had adopted of explaining and illuſtrating difficult ſubjects.

DECHLANA, in *Geography*, a town of Aſia in Albania.

DECIALES, a people of the maritime Alps, along the coaſts, W. of the Velauni.

DECIDUA TUNICA, in *Anatomy*, the external membrane of the ovum, including the embryo, with the placenta and the other membranes. For the diſcovery of this part we are indebted to Dr. William Hunter. He proved that it is produced by the veſſels of the uterus itſelf, after impregnation, and before the arrival of the ovum in the cavity of that organ: he explained how it formed the medium of communication between the mother and the new being, by adhering on one ſurface to the uterus, and receiving continuations of the uterine blood-veſſels; and on the other, by being applied over the ſurface of the ovum, and forming in one part the uterine portion of the placenta, which is intimately blended with the ramifications of the umbilical veſſels; he ſhewed that it is thrown off from the uterus after the birth of the child, with the ſecundines, and from that circumſtance gave it the name of decidua. He was alſo of opinion that it conſiſted of two portions, one lining the cavity of the uterus *(decidua uteri)*, and another reflected over the ovum *(decidua reflexa)*. For a more particular account of this membrane, ſee GENERATION, *Organs of*.

DECIDUOUS, in the general, expreſſes a thing apt and ready to fall.

DECIDUOUS *Leaves*, in *Vegetable Phyſiology*, are ſuch as fall off in autumn, or at the approach of winter, as in moſt trees and ſhrubs of cold climates, and ſome tropical ones; an entirely freſh crop being produced in the enſuing ſpring. In North America the ſeaſon in which this takes place derives its name from that circumſtance, and inſtead of autumn is univerſally called the *fall*. We are not, however, to ſuppoſe that the leaves of evergreen trees or ſhrubs are not as regularly changed as deciduous ones; the only difference is, that they laſt longer, thoſe of ſome trees being of biennial, others of triennial, or perhaps further duration, ſo that the branches are never ſtripped. The leaves of ſuch evergreens generally fall in ſummer, as ſoon as the young crop is fully grown, which may be obſerved in the fir tribe.

How the falling or ſeparation of leaves from their branches is accompliſhed, has long been greatly miſunderſtood. It is not always in conſequence of the injuries of autumnal froſt, for ſome trees have their appropriate period of defoliation, ſeemingly independent of external cauſes. The lime, *Tilia europæa*, commonly loſes its leaves before any froſt happens: the aſh, *Fraxinus excelſior*, ſeems, on the contrary, to wait for that event; and at whatever period the firſt rather ſharp froſt takes place, all its leaves fall at once. The fall of the leaf can be conſidered only as "a ſloughing or caſting off diſeaſed or worn-out parts," whether the injury to their conſtitution may ariſe from external cauſes, or from an exhauſtion of their vital powers. Hence a ſeparation takes place, either in the footſtalk, or, more uſually, at its baſe, and the dying part quits the vigorous one, which is promoted by the weight of the leaf itſelf, or by the action of autumnal winds upon its expanded form. Sometimes, as in the hornbeam, the beech, and ſome oaks, the ſwelling of the buds for the enſuing ſeaſon is neceſſary to accompliſh the total ſeparation of the old ſtalks from their inſertions. Sometimes trees or ſhrubs, naturally deciduous, retain their leaves through a milder winter than ordinary, and even accidental varieties, raiſed from ſeed, are occaſionally more diſpoſed to be evergreen than is natural to their ſpecies, witneſs the Privet, *Liguſtrum vulgare*. Du Hamel very juſtly obſerves that trees killed by any ſudden cauſe, as thunder, retain their leaves firmly upon the branches. The reaſon evidently is, that the vital principle, being perfectly extinguiſhed, cannot act to throw off the injured foliage. It is curious that Du Hamel, evidently very anxious, and greatly embarraſſed, to underſtand the fall of the leaf, ſhould not have hit upon this ſimple and evident explanation. S.

DECIDUOUS *Plants*, in *Gardening*, are all ſuch plants, whether of the tree or ſhrub kind, as ſhed or loſe their leaves, in the autumnal and winter ſeaſons.

It is a term which embraces a great variety of both the former and latter ſorts, in moſt of which the leaves begin to fall off in the autumn, and the whole are naked during the winter ſeaſon. Almoſt all the valuable timber and fruit trees are of this tribe, as well as the greateſt part of the ornamental trees and ſhrubs that are introduced in plantations and ſhrubberies. There are likewiſe ſeveral other plants that may be termed deciduous, from their ſhedding their leaves on the approach of winter. See FRUIT and FOREST *Trees*.

Trees and ſhrubs of this ſort are in general of hardy growth, being capable of ſucceeding well in the full ground in different ſituations according to their kinds. Particular deſcriptions of the different ſorts, as well as of their habits of growth, culture, management, and uſes, are given under the genus to which they reſpectively belong.

The proper ſeaſons for removing this kind of plants from the nurſery or other places, and planting them out where they are to remain, are either the early ſpring or autumn, according to the kind and the nature of the ſoil. In general, where the land is dry, the latter is the moſt proper and advantageous; but in the contrary circumſtances, the former may be the more adviſeable. In the planting out all trees, ſhrubs, and other plants of this ſort, ſufficiently large openings ſhould be formed for the roots to be conveniently bedded in, after having been ſuitably trimmed according to the kinds; and the mould be made fine and well mixed in with the roots, by ſlightly ſhaking the plants, and the ſoil then well trodden in about them. In the early plantings at both ſeaſons it is of much advantage, eſpecially when the weather is dry, to have them well watered occaſionally, and moſt of the ſorts ſhould be kept ſteady in their ſituations by proper ſtakes, as they never ſucceed well where this is not the caſe, from their roots being deſtroyed by being ſo much agitated by the winds.

DECIES TANTUM, a writ that lies on ſtat. 38. Ed. III. c. 12. againſt a juror, who hath taken money of either party for giving his verdict. It is ſo called from its effect, which is to recover ten times as much as he took.

It alſo lies againſt embraceors that procure ſuch an inqueſt. See EMBRACEOR.

DECIMA, or DEZIMA, in *Geography*, a ſmall iſland in the harbour of Nagaſaki, on the coaſt of Japan, ſituated in N. lat. 42°, and ceded to the Dutch.

DECIMA, *Ital.*, the interval of a *tenth*, in *Muſic*, or octave of the 3d major or minor. Decima, preceding or following an integer, has in Italian the force of ten in Engliſh: as undecima, 11; duodecima, 12; decima terzo, 13; decima quarta, 14; decima quinta, the 15th or double octave; decima ſeſta, the 2d tripled, or octave of the 9th; decima ſettima, or 17th, &c.

DECIMÆ, or DECUMÆ, *Tenths*, or *Tithes*, in *Roman Antiquity*, a tribute or impoſt, which formed one part of the vectigalia of the Romans, in the early times of the commonwealth, and was raiſed upon lands. When the Romans had conquered a people, either in or out of Italy, they deprived them of part of their territory, of which they diſtributed a portion among citizens, who ſettled there as a colony, reſerving the property of the reſt to the ſtate, which they farmed to particular perſons, upon condition of paying a tenth of the profits of ſuch lands to the Roman people. The tenths were not raiſed in the ſame manner in all the provinces. From ſome a certain quantity of grain, or a fixed ſum of money, was exacted, as in Spain and Africa; and this impoſt was called "vectigal certum," becauſe it was always the ſame, whether the year were good or bad, or the lands produced much or little. Other provinces, as Aſia, were treated more favourably, and paid only the tenth preciſely, ſo that the Roman people ſhared in the misfortune of barren years. Sicily was treated in the ſame manner, and, indeed, with ſtill greater indulgence. Corn was bought from Sicily, and alſo from the other provinces, under three different denominations: *viz.* "frumentum decumanum," which was the 10th of the corn produced by each huſbandman's lands, with which he was obliged to ſupply the Roman people *gratis*; "emptum," which was the corn bought by the Roman people for the occaſions of the ſtate, and on which they themſelves fixed the price; and "æſtimatum," which was the corn conſumed in the prætor's houſe, and with which the province was obliged to ſupply him: this he ſometimes received in money, and he fixed the value of it himſelf. The tenths of wine, oil, and the lower ſpecies of grain were alſo paid.

Thoſe who farmed the tithes, "decumani," were eſteemed the moſt honourable of the publicans or farmers general, as agriculture was eſteemed the moſt honourable way of making a fortune among the Romans. The ground from which tithes were paid, was alſo called "decumanus." (See Cicero in Verr.) But theſe lands were all ſold or diſtributed among the citizens at different times, and the land of Capua, the laſt by Cæſar. (Suet. Jul. 20. Cicero Att. ii. 16.

DECIMÆ. See TITHES.

DECIMAL, in a general ſenſe, denotes any thing that proceeds by tens, as decimal arithmetic, fractions, ſcales, &c.

DECIMAL *Arithmetic*, the art of computing by decimal fractions, firſt invented by Johannes Regiomontanus, about the year 1464, and uſed by him in the conſtruction of his tables of ſines; who thus introduced decimal parts in the room of ſexageſimals. They were alſo uſed by Ramus, in his Arithmetic, written in 1550; and before his time, by our countryman Buckley, and about the ſame time by Record. But the firſt perſon who wrote an expreſs treatiſe on decimals, was Stevinus, about the year 1582.

This kind of arithmetic, in a general ſenſe, may be conſidered as the common arithmetical computation in uſe, in which the decimal ſeries of numbers is adopted, or in which the places of the figures change their value in a tenfold proportion, being 10 times as much for every place more towards the left hand, or 10 times leſs for every place more towards the right hand; the place being ſuppoſed to be indefinitely continued, both to the right and left. In this ſenſe, therefore, the term comprehends both the arithmetic of integers, and decimal fractions. In a more limited ſenſe, however, it is reſtricted to the latter.

DECIMAL *fractions*, are thoſe whoſe denominator is 1, with one or more cyphers; as, 10, 100, 1000, 10000, &c. Thus, $\frac{5}{10}$, $\frac{6}{100}$, $\frac{7}{1000}$, &c. are *decimal fractions*.

In the writing of decimal fractions, we uſually omit the denominator, as only conſiſting of unity with cyphers annexed; and in lieu thereof, a point, or comma, called the ſeparatrix, is prefixed to the numerator. Thus, $\frac{5}{10}$ is written .5; $\frac{46}{100}$, .46. So .125 expreſſes a hundred and twenty-five parts of any thing ſuppoſed to be divided into a thouſand parts.

This ſeparatrix has been different according to the fancy of different authors; ſometimes it has been a ſemiparentheſis or ſemicrotchet, or a perpendicular bar, or the ſame with a line drawn under the figures, or ſimply this line itſelf, &c. The point or comma, now generally uſed, has ſometimes been placed near the upper part of the figures, which was done by ſir Iſaac Newton; and though it has been more commonly placed at the bottom, the other mode has the advantage of preventing the ſeparatrix from being confounded with other characters of ſeparation, particularly in large numbers, and alſo with mere marks of punctuation.

As cyphers on the right hand of integers increaſe their value decimally; as 2, 20, 200, &c. ſo, when ſet on the left hand of decimal fractions, they diminiſh the value decimally; as, 5, 05, 005, &c. when ſet on the left hand of integers, or on the right hand of decimals, they ſignify nothing, but only to fill up places; thus .5000 denotes only five tenths, and 0005. is only five units.

In ſetting down a decimal fraction without its denominator, the numerator muſt conſiſt of as many places as there are cyphers in the denominator; and if it has not ſo many figures, the deficiency muſt be ſupplied by ſetting before them as many cyphers as will make them ſo many; thus $\frac{3}{10}$ is .3, $\frac{14}{100}$ is .14, and $\frac{14}{10000}$ is .014, and $\frac{3}{10000}$ is .003, &c.

To reduce any vulgar fraction, as ſuppoſe $\frac{5}{8}$, *to a decimal fraction* of the ſame value: add cyphers at pleaſure to the numerator, and divide by the denominator; as thus,

8)5000(

.625

And therefore $\frac{625}{1000}$, or .625, is a decimal of the ſame value with the former fraction $\frac{5}{8}$.

Some vulgar fractions can never be reduced into decimals without defect; as $\frac{1}{3}$, &c. in thoſe caſes, the greater number of places the decimals are continued to, the more is the defect diminiſhed, in a tenfold proportion. Thus, $\frac{1}{3}$ expreſſed in decimals is .333333 *ad infinitum*.

Such decimals are very properly called circulating decimals, becauſe of the continual return of the ſame figures; and they may be called indeterminate or infinite decimals, by way of diſtinction from thoſe where the reduction leaves no remainder, and which are therefore called finite or determinate decimals. See REPETENDS.

By the rule above given, the parts of any integer may be eaſily reduced into decimals. Thus, 5*s.* is $\frac{5}{20}$, or .25 of a pound ſterling; 6*d.* is $\frac{6}{240}$, or $\frac{1}{40}$, *i. e.* .025 of a pound; and 5*s.* 6*d.* is .25 + .025 = .275*l.* Or the decimal of a mixed number may be readily obtained by reducing the number of the loweſt ſpecies to the decimal of the next above; add to this the number of that ſpecies, if there be

any, and reduce the ſum to the next higher ſpecies, adding to the number found the number of that ſpecies given in the queſtion; and thus proceed till you arrive at the propoſed integer; 4 *s.* 7 *d.* 3 *f.* are equal to .2322916 *l.* for 3 *f.* is $\frac{3}{4}$, or .75 *d.* to which add 7 *d.* and 7.75 is equal to $\frac{7.75}{12}$, or .645833, &c. *s.* to which add 4 *s.* and 4.645833, &c. is equal to $\frac{4.645833}{20}$, or .23229166 &c. *l.*

Or thus: write the numbers of different names or ſpecies in an orderly manner under one another, the leaſt being the uppermoſt, and on their left ſide draw a line: and let theſe be reckoned as dividends: Then, againſt each name on the left hand of the line, write the number, making one of its next ſuperior name; and let theſe, be the diviſors to the former dividends: Begin with the upper one, and write the quotient of each diviſion as fractions, on the right of the dividend next below it; and let this mixed number be divided by its diviſor; and the laſt quotient will be the decimal ſought. Thus, for the laſt example, 4 *s.* 7 *d.* 3 *f.*

4 | 3
12 | 7.75
20 | 4.645833, &c.
.23229166, &c. *l.*, the number required.

The ſame proceſs may be eaſily applied to the decimal parts of any other integer, as weights, meaſures, and time.

E. G. 1. Reduce 8 *oz.* 15 *dwt.* 18 *gr.* to the fractional part of a pound troy.

24 { 4 | 18
6 | 4.5
20 | 15.75
12 | 8.7875
0.732291 *lb.*, the anſwer required.

Note.—As 24 is too great a number to divide by in one line, it is broken into the parts 4 and 6, which multiplied together, make 24.

E. G. 2. Reduce 48′ 17″ 53‴ to the proportional part of a degree.

60 | 53
60 | 17.883333
60 | 48.298055
0.804967 *deg.*, the anſwer required.

The common operations in decimals are performed as in the vulgar rules, regard being had only to the particular notation, to diſtinguiſh the integral from the fractional part of a ſum.

In Addition and Subtraction of DECIMALS; the points being all placed under each other, the figures are to be added, and ſubtracted, as in common arithmetic; and when the operation is done, ſo many figures of the ſum, or the remainder, are to be noted for decimals, as there are places of decimals in the greateſt given numbers. An example will make this clear.

Addition of Decimals.

.43791	59.271
.792	15.040
.6124	3.791
.053	12.009
.10	7.5
.2	
2.19531	97.611

Subtraction.

From	67	.9
Take	29	.8754
Rem.	38	.0246
From	25	.1462
Take	13	.07
Rem.	12	.0762

For Multiplication of DECIMALS, obſerve to cut off juſt ſo many decimal parts from the product as there are decimals in both factors. The work is the ſame as in integers. Thus,

Multiplication of Decimals.

.1472	.365	3.650
.175	.122	621
7360	730	3 650
10304	733	73 00
1472	365	2190 0
.0257600	.044530	2266.650

Note. In the firſt and ſecond examples, the products only amount to ſix and five places; for which reaſon cyphers are prefixed to make up the number of decimal places in the two factors reſpectively.

Hence, to multiply a decimal by unit with any number of cyphers, is only to remove the ſeparatrix ſo many places to the right as there are cyphers annexed.

In Diviſion of DECIMALS, proceed in all reſpects as in dividing of integers; and, when the operation is done, mark as many places in the quotient for decimals, as, with the number of decimals in the diviſor, are equal to the decimal places of the dividend.

.22).8030(3.65	22)8.030(.365
66	66
143	1 43
132	1 32
110	1 10
110	1 10
..0	.. 0
22).8030(.0365	73.2(83.219(1.13
66	73 2
142	100 1
132	73 2
110	26 99
110	21 96
...	5 03

Hence, to divide a decimal by unity with any number of cyphers, is only to remove the ſeparatrix ſo many places to the left, as there are cyphers annexed.

But there are certain caſes in diviſion of decimals, which require ſome farther management; as, firſt, where the diviſor is a decimal fraction, and the dividend is an integer; add, or annex, as many or rather more cyphers to the dividend, than there are places in the diviſor; thus, .365)22 0000(60.2 For there being three places or decimals in the diviſor, and four in the dividend, there will be but one in the quotient. Secondly, Where the diviſor is a mixed number, and the dividend a whole number, add at leaſt as many cyphers to the dividend as there are places in the diviſor; thus, 36.5)22.0000(6.02. Thirdly, Wherever the diviſor is bigger than the dividend, annex cyphers to the latter; thus,

36.5)22.0000(.602.

For

For the Valuation of DECIMALS; multiply the given decimal by the number of parts contained in the propoſed integer, proceeding from the higher to the lower if there be a remainder, and you will have the value required at the left of the ſeparatrix. Thus, .785*l.* is equal to 15*s.* 8*d.* 1.6*f.*

.785	.78 of a yard = 2 feet,
20	4.08 inches.
s. 15.700	.78
12	3
d. 8.400	*f.* 2.34
4	12
f. 1.600	*in.* 4.08

DECIMAL *ſcales*, in the general, denote any ſcales divided decimally; but particularly certain ſcales of money, weights, aud meaſures, made from tables ſo called, to expedite decimal arithmetic, by ſhewing by inſpection the decimal fraction of any part of money, weight, or meaſure. See SCALE.

DECIMATION, a puniſhment which the Romans uſed to inflict on the ſoldiers who had quitted their poſt, raiſed a mutiny in the camp, behaved themſelves cowardly in the fight, or otherwiſe failed in their duty; for which every tenth man was put to death as an example to the reſt.

The manner of decimating was thus; the general aſſembled the whole camp; then the tribune brought to him thoſe that were guilty, and impeached, and reproached them with their cowardly actions and baſeneſs, in the preſence of the whole army; then putting their names into an urn, or a helmet, as many were drawn out as made the tenth part of the whole number, and theſe were put to the ſword, and the others ſaved.

This was called *decimare*, a word of the ancient Roman militia, who, to puniſh whole legions, when they had failed in their duty, ſometimes alſo made every tenth ſoldier draw lots, and put him to death as an example to the others.

As the Romans had their decimatio, they had alſo the viceſimatio, and centeſimatio, when only the twentieth or hundredth man ſuffered by lot.

This practice has been occaſionally recurred to in modern times; as, particularly, in France, for the puniſhment of the garriſon of Treves in 1675, who capitulated and ſurrendered that place in oppoſition to the remonſtrance of the marſhal de Crequi, who commanded there. There was alſo a decimation during the time of the uſurper in this kingdom in 1655.

DECIMIS *ſolvendis pro poſſeſſionibus alienigenarum*, in *Law*, a writ yet extant in the regiſter, which lay againſt thoſe that had farmed the priors aliens lands of the king, for the rector of the pariſh, to recover the tithe of them. Reg. of Writs, fol. 179.

DECINERS, DECENNIERS, or DOZINERS, derived from the French dizeine, *i. e.* decas, *ten;* in the ancient monuments of our *Law*, are ſuch as are wont to have the overſight and check of the friburghs, for the maintenance of the king's peace, the limits of whoſe juriſdiction were called decenna, becauſe it commonly conſiſted of ten houſholds, and dozein; and every perſon bound for himſelf and his neighbours to keep the peace, was ſtiled *decennier*. Bract. lib. iii. tract. 2. c. 15.

Theſe perſons ſeem to have had very large authority in the Saxon times; taking cognizance of cauſes within their circuits, and redreſſing wrongs by way of judgment. Thus Briton, "We will that all thoſe that are fourteen years old ſhall make oath, that they will be ſufficient and loyal to us; and neither be felons, nor aſſenting to felons; and we will, that all profeſs themſelves of this or that dozein, and make or ſuffer ſurety of their behaviour by thoſe or thoſe doziners, except religious perſons, clerks, knights eldeſt ſons, and women."

A dozein now ſeems to be no more than a leet; for in leets only this oath is adminiſtered by the ſteward, and taken by ſuch as are twelve years old and upwards.

DECIO, PHILIP, in *Biography*, an eminent lawyer, was born at Milan in 1453. At an early age he appears to have been devoted to the belles lettres, but the plague which broke out forced him from his native place and interrupted his ſtudies, when he was but 17 years of age. He retired to Pavia, and, at the deſire of his brother, who was already a profeſſor of the law, he reſolved to follow the ſame courſe of life. He ſoon diſplayed much talent and acuteneſs in diſputation. At Piſa he obtained a doctor's degree in 1476, and was immediately appointed to read lectures on the "Inſtitutions." He was now appointed lecturer extraordinary in the civil law, nnd ſurpaſſed all his contemporaries, in whatever was connected with the duties of his profeſſion. His great reputation excited the jealouſy of his rivals, and he thought it prudent to remove to Sienna, where he had not been long before he was invited to Rome, to accept an office under the pope, which, as it would have rendered holy orders indiſpenſable, he declined, and reſumed the profeſſor's chair at Sienna. From Sienna he went to Piſa, and from thence he went to Padua, where he became profeſſor of canon law; and ſo deſirous were perſons to hear him, that the other ſchools were deſerted, and people of the higheſt rank became his conſtant auditors. When Milan fell under the power of France, Louis XII. reclaimed Decio as a ſubject, but Venice refuſed to part with him. In 1505, he removed to Pavia, where, for ſeven years, he explained the canon law to a numerous and very reſpectable audience. In a difference between pope Julius II. and the French, Decio took part with the latter, and was excommunicated; and what, perhaps, was a ſtill greater trouble to him, his houſe at Pavia was pillaged of every thing that was valuable by the Swiſs troops, who, not contented with this, went alſo to a monaſtery, the aſylum of Decio's natural daughter, and carried away the money that he had aſſigned for her ſubſiſtence. Decio had now no refuge but France; here he was greeted in every town, and received a full compenſation for his various loſſes. His lectures were crowded; and the king created him a member of the parliament of Grenoble. The pope would at this period willingly have been reconciled to him, on condition of his reſiding at Rome, which he thought fit to decline. His next ſituation was profeſſor of the civil law at Valence in Dauphinè, with a large ſalary. After various other changes, all honourable to the talents and virtues of Decio, he finiſhed his courſe at Piſa, at the age of 82. He was author of many works in his own profeſſion, which are of little note to the general reader. Gen. Biog.

DECIPHERING, or DECYPHERING, is the art of diſcovering and explaining what has been written in *cipher*. We have given a copious account of this art under the word CIPHER, and have illuſtrated our remarks by ſuitable examples. The authors who are moſt deſerving of notice on this ſubject are Mr. Falconer, Arnold Conrad, and Breithaupt; but the curious reader will alſo find a very methodical and complete ſpecimen of deciphering, in the 35th chapter of Graveſande's "Introductio ad Philoſophiam," printed at Leyden in 1737. No one plan of proceeding, however, can

can be applicable to different ſpecies of cipher; and, therefore, none of the above authors will be of much uſe in developing new and intricate modes of ſecret-writing. Dr. Wallis, the great mathematician, remarks very juſtly, that "all perſons are not qualified or capable of acquiring the art of deciphering, and that a certain degree of *acumen* is requiſite for this purpoſe."

DE'CISE, or DÉCIZE, in *Geography*, a ſmall town of France, in the department of the Nievre, and chief place of a canton, in the diſtrict of Nevers, on an iſland formed by the Loire, 178 miles S. by E. of Paris. It has 2212 inhabitants, and the canton, which has an extent of 352½ kiliometres, contains 17 communes, and a population of 9686 individuals. This place has an old caſtle, a priory, and two convents; it is ſeated on a rocky iſland near the conflux of the Airon and Loire, in *Bazois*, a diſtrict conſiſting of vallies lying along the hills of Morvan, and abounding in wood and paſturage; 8 leagues from Nevers, and 55 S.E. from Paris.

DECISIVE OATH, in *Civil Law*. See SACRAMENTUM *Deciſionis*.

DECIUS, MUS, P., in *Biography*, diſtinguiſhed for valour and patriotiſm, was a military tribune of plebeian rank in the army of C. Coſſus about the year B. C. 343, when it was brought into imminent danger of ruin by the Samnites. Decius ſaw a method of extricating his countrymen; he propoſed his plan to the general, which was agreed upon, and which, being inſtantly adopted, was crowned with complete ſucceſs. He was received by the general and ſoldiers as their deliverer, and was preſented, for his wiſdom and proweſs, with a golden crown, an hundred oxen, and a white bull, from the conſul: with an obſidional crown of graſs from the army, and a civic crown of oak from his own detachment. To himſelf he reſerved only the crowns, and diſtributed the other preſents among his brave comrades. Two years afterwards, he was created conſul with Manlius Torquatus. In a dangerous war with the Latins, it was agreed between the conſuls, that he whoſe army ſhould give way in battle ſhould devote himſelf to death for his country: the event took place in the ſucceeding combat, and Decius immediately plunged into the thickeſt part of the hoſtile forces, where he fell a ſacrifice to his patriotiſm: his body was found the next day buried under the enemy's weapons, and was honourably interred. Livy.

DECIUS, MUS, P., ſon of the preceding, was four times appointed conſul, and was, during his ſecond conſulate, B. C. 308, very ſucceſsful againſt the Etrurians. Five years afterwards he was elected cenſor with Q. Fabius Maximus, and in the following year he ſupported the claim of the plebeians to partake in the pontifical office, and was himſelf choſen into the college of pontiffs. With Fabius he again ſerved the office of conſul, when they obtained great and very important advantages over the Samnites and their allies. New dangers, to which the republic was expoſed from its confederated enemies, called forth the energy of Decius a fourth time as conſul. He was oppoſed by the Gauls, who, by means of their armed chariots, broke the Roman cavalry, and put the firſt line of infantry into the utmoſt confuſion. When Decius had done all to rally his troops without ſucceſs, he determined to imitate the patriotiſm of his father by a voluntary devotion of his life to his country's welfare. He called upon the pontiff to perform his part of the ceremony; to which Decius added the ſolemn prayer, "that he might carry before him terror and flight, blood and ſlaughter, the wrath of the celeſtial and infernal deities, and that the ſame ſpot might witneſs his own deſtruction, and that of the Gauls and Samnites." He then ruſhed into the midſt of the enemy, and was ſlain. By this act on the part of the conſul, the Romans were excited to new efforts, and the enemy were ſo confounded, that the victory was decided in favour of the republic. The names of the Decii have been held up to the world by the moſt celebrated poets of antiquity, for a patriotiſm and real worth never excelled, and rarely equalled. Rom. Hiſt.

DECIUS, emperor of Rome, was born in Pannonia, A. D. 201. We have no particular account of his origin; he probably was advanced to the rank of conſul for his ſuperior talents. By the emperor Philip he was ſent, much againſt his inclination, to command the legions in Mœſia and Pannonia, which had been guilty of revolt. Here, inſtead of purſuing the orders of his maſter, he aſſumed to himſelf the imperial title and dignity. He is ſaid to have been forced to this meaſure by the diſaffected troops. Philip, however, did not admit the excuſe, but immediately marched againſt the uſurper; they met near Verona, and a deſperate battle enſued, in which Philip was defeated, and killed either in the field, or put to death after he fell into the conqueror's power. This was in the year 249, which may be conſidered as the commencement of the reign of Decius. His eldeſt ſon he immediately raiſed to the rank of Cæſar. The reign of this emperor was very ſhort; but during the two years which it continued, he inflicted upon the Chriſtians the moſt cruel perſecutions, in which he omitted no means in his power to ſhake the faith of thoſe who had embraced the new religion. In other reſpects Decius obtained a good reputation: he diſtinguiſhed himſelf by an expedition againſt the Perſians. An invaſion of the Goths called forth all the energies of Decius; after much miſchief they ſued for peace, but Decius was deſirous of terminating the war by a blow: an action was commenced, and almoſt inſtantly the younger Decius was ſlain by an arrow: the father, who ſaw him fall, exclaimed, "be not diſcouraged, it is the loſs of one man only," and then ruſhed forward to revenge his death. He was, with the greater part of his troops, entangled in a moraſs, where ſurrounded by the enemy, he periſhed under a ſhower of darts. He died in 251, aged 50 years. Univ. Hiſt.

DECK *of a ſhip*, from *decker*, Dan. *to cover*; a kind of planked floor, connecting the ſides, and ſerving as different platforms to ſupport the artillery, to lodge the men, and to preſerve the cargo in merchant-veſſels.

A ſhip is ſaid to have two or three decks, when it contains two or three ſtories. Ships of the firſt and ſecond rates are furniſhed with three whole decks, reaching from the ſtem to the ſtern, beſides a fore-caſtle and a quarter-deck, which extend from the ſtern to the main-maſt. There is alſo another deck above the hinder part of the quarter-deck, called the poop, and ſerving as a roof for the captain's cabbin or couch. Inferior ſhips of the line of battle have two decks and a half; and frigates, ſloops, &c. have one gun-deck and a half; with a ſpare deck below to lodge the crew. The frame of the lower deck is ſtronger than that of the others, becauſe ſhips are broader at the lower deck than at the next above it, and it alſo bears the heavieſt cannon.

The decks are formed and ſuſtained by the beams, the clamps, the water-ways, the carlings, the ledges, the knees, and two rows of ſmall pillars called ſtanchions.

DECK, *Fluſh*, is one that lies even in a right line, fore and aft, from ſtem to ſtern.

The ſeamen ſay, a deck lies cambering, when it doth not lie level, but higher at the middle than at either end. A cambered deck is by no means proper for a man of war. Alſo if the ſhip's keel be bent in the middle upwards (which may happen from her lying aground on a place where neither her aft or fore part touch it, and from many other

other cauſes taken from her make), they ſay ſhe is camber-keeled.

Deck, *Half*, is a ſpace under the quarter-deck of a ſhip of war, between the foremoſt bulk-head of the ſteerage, and the fore part of the quarter-deck. In the Northumberland colliers, the ſteerage is called the half deck, and is uſually the habitation of the ſhip's crew.

Deck, a *Rope*, is that made of cordages interwoven, and ſtretched over a veſſel that has no deck, through which it is eaſy to annoy the enemy who comes to board her, and has leaped thereon. Theſe are little uſed but in merchant-veſſels, to defend them from the corſairs.

DECKED, or Marguette', in *Heraldry*, a term applied to an eagle or other birds, when their feathers are trimmed at the edges, with a ſmall line or purfle of another colour.

DECKENDORF, in *Geography*, a ſmall town of Bavaria, in lower Bavaria, in the diſtrict of the ſame name, with a bridge over the Danube.

DECKER, or Dekher, John, in *Biography*, was born in Flanders about the middle of the ſixteenth century. He was educated at Douay, from which place he removed to Rome, where he entered the order of the Jeſuits, and thence he went to Naples to complete his ſtudies, and to perfect himſelf in theology. As ſoon as he came back to Rome he took orders, and then went to his native place to teach philoſophy and ſcholaſtic theology. He was afterwards made chancellor of the univerſity of Gratz, in which ſituation he died in the year 1619. Decker is famous for his ſkill in chronology and hiſtory, and publiſhed various works chiefly in Latin, which exhibit much erudition and intenſe ſtudy: his chief work was entitled "Velificatio, ſeu theoremata de anno ortus ac mortis Domini, deque univerſa Jeſu Chriſti in carne economia, &c. cum tabula chronographica a capta par Pompeium Jeroſolyma ad deletam a Tito Urbem et Templum," 1616, 4to. Moreri.

Decker, Francis, a Dutch Phyſician and profeſſor in the practice of medicine at the univerſity of Leyden, who flouriſhed in the middle of the ſeventeenth century, was author of ſeveral works on different parts of medicine, which are ſtill occaſionally referred to; among them are "Exercitationes practicæ circa medendi methodum," Leid. 1673, 8vo. It has been ſeveral times reprinted. The medicines were firſt deſcribed, ranged in claſſes, with the compoſitions into which they enter; then the diſeaſes, with the method of treating them. In hæmoptœ the author frequently experienced good effects from the Dulcamara. He publiſhed an edition of the "Praxis Babettiana, with Notes and Obſervations," 1669, Leid. 8vo. In a mild apoplexy, he excited ſalivation by mercurial frictions with advantage. He does not ſay how long the frictions were continued before the effect was produced. In the ſame diſeaſe are recommended the reſin of colocynthis, and the extract of black hellebore, with more probability of ſucceſs. In lethargy he uſed the turbith mineral as an errhine. This is now uſed, and with advantage. Haller Bib. Med.

DECKINGEN, in *Geography*, a ſmall town of Wurtemberg, on the river Fils, in the diſtrict of Wieſenſteig.

DECLAMATION, a diſcourſe or ſpeech made in public, in the tone and manner of an oration.

Among the Greeks, declamation was the art of ſpeaking indifferently on all ſubjects, and on all ſides of a queſtion; of making a thing appear juſt that was unjuſt; and of triumphing over the beſt and ſoundeſt reaſons.

Such ſort of declamations, M. de St. Evremond obſerves, were only fit to corrupt the mind, by accuſtoming men, to cultivate their imagination rather than to form their judgment, and to ſeek for veriſimilitudes to impoſe upon rather than ſolid reaſons to convince the underſtanding.

It is ſaid that a certain orator, named Plotius Gallus, firſt introduced the uſe of declamations at Rome. In this way Cicero formed himſelf for eloquence. The term frequently occurs both in Horace and Juvenal.

Among us, declamation is reſtrained to certain exerciſes which ſcholars perform, to teach them to ſpeak in public.

We ſay, a declamation againſt Hannibal, againſt Pyrrhus, the declamation of Quintilian, &c.

In the colleges of the Jeſuits, declamations are little theatrical or dramatic performances, conſiſting of a few ſcenes not divided into acts, rehearſed by the ſtudents by way of exerciſe, and to form them for ſpeaking in public. Such declamations are the moſt uſeful exerciſes performed in the colleges.

Declamation, *Muſical*. See Recitative.

DECLAMATORY Style. See Style.

DECLANA, or Deciana, in *Ancient Geography*, a town of Spain, in the Tarragonenſis, and territory of the Endigatæ, according to Ptolemy, and the tables of Pentiager.

DECLARATION, in the *Cuſtom Houſe and Commerce of France*, contains a particular account or invoice of what is contained in the bales or caſes, brought to the officer for entrance inward or outward.

Declaration, in *Law*, called alſo *narratio* or *count* and anciently the *tale*, the act of ſhowing in writing the cauſe of complaint of the demandant, or plaintiff, againſt the defendant, where he is ſuppoſed to have received ſome wrong.

This is merely an amplification or expoſition of the original writ upon which the action of the plaintiff is founded, with the additional circumſtances of time and place, when and where the injury was committed. In the king's bench, when the defendant is brought into court by a Bill of *Middleſex*, upon a ſuppoſed treſpaſs, in order to give the court a juriſdiction, the plaintiff may declare in whatever action, or charge him with whatever injury he thinks proper; unleſs he has held him to bail by a ſpecial *ac etiam*, which the plaintiff is bound to purſue. And ſo alſo, in order to have the benefit of a *capias* to ſecure the defendant's perſon, it was the ancient practice, and is therefore ſtill warrantable in the common pleas, to ſue out a writ of treſpaſs, *quare clauſum fregit*, for breaking the plaintiff's cloſe, and when the defendant is once brought in upon this writ, the plaintiff declares in whatever action the nature of his true injury may require; as in an action of covenant, or on the caſe for breach of contract, or other leſs forcible tranſgreſſion; unleſs by holding the defendant to bail on a ſpecial *ac etiam*, he has bound himſelf to declare accordingly.

In *real* actions, when poſſeſſion of land is to be recovered, or damages for an actual treſpaſs, or for waſte, &c. affecting land, the plaintiff muſt lay his declaration, or declare his injury to have happened in the very county and place where it did really happen; but in *tranſitory* actions, for injuries that might have happened any where, as debt, detinue, ſlander, and the like, the plaintiff may declare in what county he pleaſes, and then the trial muſt be had in that county in which the declaration is laid. Though if the defendant will make affidavit, that the cauſe of action, if any, aroſe not in that but in another county, the court will direct a change of the *venue* or *viſne* (that is, the *vicinia*, or neighbourhood in which the injury is declared to be done), and will oblige the plaintiff to declare in the other county; unleſs he will undertake to give material evidence in the firſt. For the ſtatutes 6 Rich. II. c. 2. and 4 Hen. IV. c. 18. having ordered all writs to be laid in their proper counties, this, as the judges conceived, empowered them to change

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the *venue*, if required, and not to inſiſt rigidly on abating the writ, which practice began in the reign of James I. And this power is diſcretionally exerciſed, ſo as to prevent and not to cauſe a defect of juſtice. Therefore the court will not change the *venue* to any of the four northern counties, previouſly to the ſpring circuit; becauſe there the aſſizes are holden only once a year, at the time of the ſummer circuit. And it will ſometimes remove the *venue* from the proper juriſdiction (eſpecially of a narrow and limited kind), upon a ſuggeſtion, duly ſupported, that a fair and impartial trial cannot be had therein. (Stra. 874.)

In actions upon the caſe, it is generally uſual to ſet forth ſeveral caſes by different counts in the ſame declaration; ſo that if the plaintiff fails in the proof of the one, he may ſucceed in another. And if he proves the caſe laid in one of his counts, though he fails in the reſt, he ſhall recover proportionable damages. This declaration always concludes with theſe words, "and thereupon he brings ſuit, &c." "*inde producit ſectam*, &c." But the actual production of the ſuit, the *ſecta*, or followers (*i. e.* the witneſſes) of the plaintiff), according to the ancient uſe of the term, is now antiquated; and hath been totally diſuſed, at leaſt ever ſince the reign of Edward III., though the form of it ſtill continues.

At the end of the declaration are added the plaintiff's common pledges of proſecution, John Doe and Richard Roe, which are now mere names of form, though formerly they were of uſe to anſwer to the king for the amercement of the plaintiff, in caſe he were nonſuited, barred of his action, or had a verdict and judgment againſt him. (3 Bulſtr. 275. 4 Inſt. 189.) For if the plaintiff neglects to deliver a declaration for two terms after the defendant appears, or is guilty of other delays or defaults againſt the rules of law, in any ſubſequent ſtage of the action, he is adjudged "not to follow" or purſue his remedy, as he ought to do; and thereupon a *nonſuit* or *non proſequitur* is entered; and he is ſaid to be *nonpros'd*. And for thus deſerting his complaint, after making a falſe claim or complaint *(pro falſo clamore ſuo)*, he ſhall not only pay coſts to the defendant, but is liable to be amerced to the king.

When the plaintiff hath ſtated his caſe in the declaration, it is incumbent on the defendant within a reaſonable time to make his defence (ſee DEFENCE), and to put in a plea (ſee PLEA); elſe the plaintff will at once recover judgment by *default*, or *nihil dicit* of the defendant. Blackſt. Com. b. iii.

In all notices of declarations, the cauſe ſhould be properly named, as well as the court in which the ſuit is inſtituted; and the nature of the action is alſo to be expreſſed, and at whoſe ſuit proſecuted; and the time limited to plead to ſuch declaration. R. T. 1 Geo. II.

On filing declarations, copies of them are ſerved on the defendants, or their attornies, &c. And by an order of all the judges, (12 W. III.) the plaintiff's attorney is not obliged to deliver the defendant's attorney the original declaration; but inſtead of it, is to deliver a true copy of the declaration; upon delivery or tender of which, the defendant's attorney ſhall pay for ſuch copy after the rate of 4*d.* per ſheet, &c.; and if any perſon refuſe to pay for the copy tendered, the ſaid copy is to be left in the office, with the clerk that keeps the files of declarations, and thereupon the plaintiff's attorney giving rule to plead, may, for want of a plea, ſign judgment; and before any plea ſhall be received, the defendant's attorney is to pay for the copy of the declaration. See alſo Trin. 2 Geo. II. There are ſeveral other rules of court as to the filing and delivering of declarations, &c. which may be found in the ſeveral books of practice. Jacob's Law Dict. by Tomlins, art. *Declaration*.

DECLARATION *of fidelity*, is uſed for a confeſſion, which the quakers, who ſcruple taking the oath of ſupremacy, &c. are obliged to make and ſubſcribe in lieu thereof.

Its tenor is a ſolemn promiſe to be true and faithful to king George; with a deteſtation and horror of that damnable poſition, that princes excommunicated by the pope, or any other power, may be depoſed or murdered; and a declaration that no foreign prince, or power, has any right, juriſdiction, or authority, in this kingdom.

There is alſo a declaration againſt tranſubſtantiation made and ſubſcribed by thoſe who qualify for offices; 25 Car. II. c. 2. and a declaration againſt popery to be made and ſubſcribed by the members of both houſes of parliament, by diſſenters qualified according to the toleration act, &c. &c. in which they renounce tranſubſtantiation, the invocation of ſaints and of the Virgin Mary, and the ſacrifice of the maſs, and every kind of evaſion, and mental reſervation, as well as diſpenſation or abſolution. 30 Car. II. ſtat. 2. c. 1.

DECLARATION of *War*, a public proclamation made by the herald at arms, to the members or ſubjects of a ſtate, declaring them to be at war with any foreign prince, and forbidding all of them to aſſiſt the common enemy at their peril.

DECLARATIONS, *Clerk of the*. See CLERK.

DECLARATORY *part of a Law*, is that by which the rights to be obſerved, and the wrongs to be avoided, are clearly defined and laid down. This depends not ſo much on the law of revelation or of nature, as on the wiſdom and will of the legiſlator. The rights which God and nature have eſtabliſhed, called natural rights, ſuch as life and liberty, receive no additional ſtrength when declared by the municipal laws to be inviolable. Indeed, no human legiſlature has power to abridge or deſtroy them, unleſs the owner himſelf ſhall commit ſome act that amounts to a forfeiture. Neither do divine or natural duties, ſuch as the worſhip of God, the maintenance of children, &c. receive any ſtronger ſanction from being alſo declared to be duties by the law of the land. The caſe is the ſame with regard to crimes and miſdemeanors, that are forbidden by ſuperior laws, and therefore ſtyled "mala in ſe," ſuch as murder, theft, perjury, which contract no additional turpitude from being declared unlawful by the inferior legiſlature. Upon the whole, the declaratory part of the municipal law has no force or operation at all, with regard to actions that are naturally or intrinſically right or wrong. But the caſe is entirely altered with reſpect to things that are in themſelves indifferent. Theſe become either right or wrong, juſt or unjuſt, duties or miſdemeanors, according as the municipal legiſlator ſees proper, for promoting the welfare of ſociety, and more effectually carrying on the purpoſes of civil life. Such are the declarations of common law, that the goods of the wife do inſtantly upon marriage become the property and right of the huſband; and the declaration of our ſtatute law, that all monopolies are a public offence. Thus alſo with regard to civil duties, obedience to ſuperiors is the doctrine of revealed as well as natural religion; but who thoſe ſuperiors ſhall be, and in what circumſtances, and to what degrees they ſhall be obeyed, it is the province of human laws to determine; and ſo, as to injuries or crimes, it muſt be left to our own legiſlature to decide, in which caſes the ſeizing of another's cattle ſhall amount to a treſpaſs or a theft; and where it ſhall be a juſtifiable action, as when a landlord takes them by way of diſtreſs for rent. Blackſt. Com. vol. i. Introd.

DECLARATORY *part of a Statute*, is that which relates to obſolete or diſputable cuſtoms: in which caſe the parliament has

has thought proper, *in perpetuum rei teſtimonium*, and for avoiding all doubts and difficulties, *to declare* what the common law is and ever hath been. Thus the ſtatute of treaſons, 25 Edw. III. c. 2. doth not make any new ſpecies of treaſon; but only, for the benefit of the ſubject, declares and enumerates thoſe ſeveral kinds of offence, which before were treaſon at the common law.

DECLENSION, in *Grammar*, the inflexion of a noun, according to its diverſe caſes. See CASE, NOMINATIVE, &c.

Mr. Harris obſerves, that the Peripatetics likened the noun in its primary and original form, to a perpendicular line; and the variations from the nominative were conſidered as if that line *fell* from its perpendicular to an oblique poſition: and hence the variations were called πτωσεις, *caſus*, *caſes*, or *fallings*. Grammarians were thus led to call the method of enumerating the various caſes of a noun κλισις, *declinatio*, *a declenſion*; becauſe it was a ſort of progreſſive deſcent from the noun's upright form, through its various declining forms. Hermes, p. 277. 278.

The declenſion of nouns is a different thing in the modern languages, which have not properly any caſes, from what it is in the ancient Greek and Latin, which have.

Declenſion in languages, wherein the nouns admit of changes, whether in the middle, beginning, or end, is properly the expreſſing or reciting all thoſe changes in a certain order, and by certain degrees, called *caſes*.

In languages wherein the nouns do not admit of changes in the ſame number, declenſion is the expreſſing of the different ſtates or habitudes a noun is in, and the different relations it has: which difference of relations is marked by particles called *articles*; as, *a*, *the*, *of*, *to*, *from*, &c.

DECLENSION *of a diſeaſe*, is when it is paſt its height, and the ſymptoms abate.

DECLINATION, *of a celeſtial object*, in *Aſtronomy*, is its angular or perpendicular diſtance from the equator, meaſured on a meridian or great circle paſſing through the object and the poles of the heavens.

A great circle paſſing in this manner through the poles, (and therefore perpendicular to the equator), is called a circle of declination.

Declination on the celeſtial globe, correſponds with latitude on the terreſtrial. And in the ſame manner as the geographical ſituation of a place is known, when its longitude and latitude are given, ſo in the heavens the place of a ſtar is determined, when its right aſcenſion and declination are known. To find, therefore, by obſervation the right aſcenſion and declination of a heavenly body is a problem of the firſt importance in practical aſtronomy. And moſt of the principal inſtruments in modern obſervatories are conſtructed with a view to one or other of theſe operations.

One of the moſt obvious methods of determining the declination of a ſtar is by means of its meridian altitude; for if this be given, and the latitude of the place known, the declination is eaſily calculated by the following rule:

When the latitude of the place and zenith diſtance of the ſtar are of different kinds, namely, one north, and the other ſouth, their difference will be the declination, and it is of the ſame kind as the latitude, when that is the greateſt of the two; otherwiſe it is of the contrary kind. If the latitude and zenith diſtance are of the ſame kind, *i. e.* both north or both ſouth, their ſum is the declination, and it is of the ſame kind as the latitude. But it will be found much more convenient to follow the method of many modern aſtronomers, who claſs the ſtars according to their north polar diſtance.

The declinations of all the celeſtial bodies are continually varying. To obſerve and explain the cauſe of theſe changes peculiarly belongs to the ſcience of aſtronomy.

The change of declination in the ſun ariſes from his motion in the ecliptic. When the obliquity of the ecliptic and the ſun's longitude are known, the declination is eaſily calculated by the ſolution of a right angled ſpherical triangle; or if the declination is obſerved, the ſun's longitude may be found by the ſame method. Twice a year, namely, at the equinoxes, the ſun has no declination; and twice a year, at the ſolſtices, his declination is the greateſt, being then equal to the obliquity of the ecliptic.

The declination of the moon varies in a ſimilar manner to that of the ſun, but more rapidly, as its revolution is performed in a ſhorter time. The ſame changes that are obſerved to take place in the declination of the ſun in the courſe of a year, occur to the moon in the ſpace of a month. Twice during this period the moon croſſes the equator, and therefore has no declination, and twice its declination is at a maximum. But the quantity of its greateſt declination, in one revolution, is exceedingly variable, being ſometimes equal to the *ſum* of the obliquity of the ecliptic, and the inclination of the moon's orbit to the ecliptic; at other times, only equal to the *difference* of theſe quantities. This is occaſioned by a retrograde motion of the moon's nodes, which ſucceſſively change their place throughout the ecliptic in the ſpace of about eighteen years.

The greateſt and leaſt declinations, both north and ſouth, happen when the nodes are in the equinoctial points. This will be eaſily underſtood by conſulting a celeſtial globe, or by referring to *Plate* V. *Aſtronomy*, *fig.* 44, where ♈ ♎ ♈′ repreſents the equator. When the aſcending node is in ♈, the moon's orbit lies above or without the ecliptic as ♈ *m* ♎ *n* ♈′ and its greateſt declinaton, *m p*, is equal to the obliquity of the ecliptic, plus *m c*, the inclination of the moon's orbit, her ſouthern declination, *p′ n*, is at the ſame time likewiſe a maximum; but when the deſcending node arrives at ♈ (by the retrograde motion above mentioned) the moon's orbit lies within the ecliptic, and its greateſt declination in the courſe of the month is *m′ p* and *p′ n′*, or the difference between the obliquity of the ecliptic and the inclination of the moon's orbit.

The declinations of the planets likewiſe vary from the intricate combinations of their reſpective motions with that of the earth. The declinations of the planets which are neareſt to us vary more rapidly, and with a greater apparent irregularity than thoſe more remote.

The changes that take place in the declinations of the fixed ſtars, are more uniform than any of thoſe above-mentioned, and ariſe principally from the retroceſſion of the equinoctial points. This motion, if uniform, would affect the longitude of every ſtar equally and uniformly, but the declination of a ſtar being its poſition relative to a different circle to that in which its motion in longitude is performed, the declination of ſome ſtars will be more affected by this retroceſſion than that of others. When the motion in longitude of a ſtar is nearly parallel to the equator, the declination is but little affected. This happens to thoſe ſtars which have 6 or 18 hours of right aſcenſion. The greateſt change takes place in thoſe ſtars which have 0 or 12 hours right aſcenſion.

Beſides this change of declination common to all ſtars, many of them have motions peculiar to themſelves. This is called their proper motion in declination: it is found by comparing obſervations made at very diſtant periods from each other. Theſe proper motions do not appear to follow any certain rule depending on their ſituation, yet Dr. Herſchel thinks many of them may be explained by ſuppoſing a

motion in the whole ſolar ſyſtem directed to a particular point in the heavens. The proper motion of each ſtar in declination is found by comparing its preſent place with that determined ſeveral years ſince: if its change in declination is only equal to that which ſhould take place from the calculated preceſſion, we preſume the ſtar to have no proper motion; but if any difference ſhould be found between its calculated and obſerved declination, and particularly if it exceed the probable errors of obſervation, then we ſuppoſe that difference to ariſe from the proper motion of the ſtar. We have annexed Dr. Bradley's catalogue of ſtars, obſerved about the year 1756, as they afford the moſt exact term of compariſon for modern obſervations.

The moſt ancient method of determining the declination of the ſun or moon, was by means of a gnomon or ſhadow; and till teleſcopes were applied to aſtronomical inſtruments, a more exact method could not eaſily have been deviſed.

Triangular or parallactic rules were uſed by Ptolemy, and the Arabian aſtronomers.

Mural quadrants have been employed in the moſt celebrated obſervatories of Europe for this purpoſe, till the late improvements in the conſtruction of aſtronomical circles have rendered it highly probable that the uſe of the quadrant will be entirely diſcontinued. For this reaſon, every thing here which relates to the practice of finding the declinations of celeſtial bodies, is intended only to apply to aſtronomical circles. The reader is referred to the article *quadrant*, for ſuch corrections as are peculiar to that inſtrument.

Armillary ſpheres were uſed by the ancients, and equatorial inſtruments, which bear ſome reſemblance to them, by the moderns, to obſerve the declinations of heavenly bodies, out of the meridian; but ſuch obſervations are only ſuited to accidental caſes, ſuch as for comets or planets when they cannot be ſeen on the meridian. All obſervations intended to ſerve as a foundation for aſtronomy ſhould be made when the object is on the meridian.

Method of obſerving Declinations with the aſtronomical Circle.

If the inſtrument is conſtructed with an azimuth circle, this ſhould be firſt placed in a horizontal poſition; this verification, though not abſolutely neceſſary, ſhould not be omitted. It is performed by bringing any one of the levels of the inſtrument into a line parallel with any two of the feet ſcrews, the bulb of the level being made to reſt in a central poſition; the inſtrument is next to be moved half round in azimuth, and if the level has changed its poſition, half the deviation is to be corrected by either of the feet ſcrews that are parallel to it, and the other half by any ſcrew that moſt conveniently acts on the level. The level muſt next be brought perpendicular to its firſt poſition, and the whole of its deviation corrected by the other foot-ſcrew.

The axis of the circle ſhould next be made horizontal. This is known to be accompliſhed, when the hanging level remains ſtationary during a whole revolution of the circle round its horizontal axis. Sometimes the level is not fixed to the axis, but only intended to be occaſionally applied to the pivots; in this caſe it muſt be reverſed end for end, and if the bulb of the level reſts at the ſame point in each poſition, the axis is horizontal.

The poſition of the micrometer wire ſhould now be examined, a diſtinct object ſhould be biſected, and the whole inſtrument moved gently in azimuth by the tangent-ſcrew of the azimuth circle. The object ſhould remain biſected in every part of its apparent motion through the field of the teleſcope; if it does not, the micrometer muſt be moved in its cell till this is effected. When the circle does not move in azimuth, this verification may be performed by the vertical wire, taking for granted that the horizontal wire is at right angles to it, or it may be examined, by obſerving if a ſtar in the equator continues biſected during its paſſage through the field of the teleſcope.

The line of collimation ſhould next be made to deſcribe a great circle of the ſphere. This is done when the inſtrument admits of it by reverſing the circle in its Y's, and obſerving if the ſame object is biſected in each poſition; when this cannot be done, the inſtrument muſt be turned half round in azimuth; by this means the line of collimation is rendered perpendicular to the horizontal axis.

We will now ſuppoſe that the mechanical adjuſtments have been accurately performed, and the inſtrument placed in the meridian, and that the object of the obſerver is to undertake a courſe of obſervations for the purpoſe of determining the declinations of the fixed ſtars, and other celeſtial objects.

Some time before the ſtar is expected on the meridian, the teleſcope ſhould be directed nearly to the place of the ſtar, ſo that it may paſs through the field; this may eaſily be done, as the latitude of the place is always ſuppoſed known within a few minutes. The plumb-line point ſhould be accurately biſected, and the inſtrument carefully protected from the ſun, and from unequal currents of air. Solar obſervations ſhould always be omitted, where they do not form an eſſential part of the object of inveſtigation, as they have a great tendency to derange ſome of the nicer adjuſtments of theſe inſtruments.

As ſoon as the ſtar appears in the teleſcope, it ſhould be brought to the middle wire by the micrometer ſcrew, which gives motion to the whole inſtrument. The plumb line ſhould now be again examined, and the biſection of its dot or point made with all imaginable preciſion; the ſtar will now probably be very near the middle wire, and ſhould be biſected by the micrometer-ſcrew; and in effecting this, great care ſhould be taken to avoid all undue preſſure either forward or ſideways, which might derange the plumb line. The preſſure of the finger and thumb ſhould be wholly directed towards the centre of the head of the ſcrew. The ſtar and the plumb-line ſhould be alternately examined; and when both remain ſteadily biſected, the obſervation may be conſidered as good. If the ſtar is near the equator, it will continue biſected for ſome time; but if its declination be conſiderable, it is eſſential to accompliſh the biſection near the middle wire. The obſervation ſhould be immediately read off at each microſcope, and the ſame precaution ſhould be obſerved in the management of their ſcrews, as was recommended above in the uſe of the micrometer-ſcrew.

With tranſit circles, not fixed on ſtone-piers but on frame work, ſuch as deſcribed by Mr. Wollaſton, vide CIRCLE, and Ph. Tranſ.; this method of biſecting the plumb-line point, and the ſtar, at the ſame inſtant, cannot be adopted; and ſo much muſt depend on the ſtability of every part of the inſtrument, that it is not much to be wondered at that theſe inſtruments have not been very ſucceſsful.

The ſtate of the barometer and thermometer (the latter within the tube of the teleſcope, if poſſible) ſhould be noted down.

It is eaſy to ſee that by this obſervation alone, the obſerver can derive no information either with reſpect to the declination of the ſtar or the latitude of the place. But if, on the ſame night, an obſervation can be obtained of the pole ſtar, or any other circumpolar ſtar, both above and below the pole, the polar diſtance of any other ſtar may be deduced by a direct compariſon, without any reference to the real altitude or zenith diſtance of either of them, provided the altitude is known near enough for the purpoſe of calculating the refrac-

tions.

tions. And here it may be remarked, that if the inſtrument does not turn freely in azimuth, this mode of obſerving polar diſtances, by reference to the polar point on the inſtrument, will be found very convenient in practice, and often preferable to the uſual mode of ſuppoſing the true zenith diſtance and latitude known. But if the inſtrument revolves freely in azimuth, then having obſerved ſeveral ſtars, in the manner above deſcribed, the inſtrument ſhould be turned half round in azimuth, and the plumb-line point biſected. The circle ſhould on no account be handled more than is abſolutely requiſite for this operation. The ſame ſtars that were obſerved in the firſt poſition ſhould now be obſerved again in preciſely the ſame manner, but the microſcopes will not indicate the ſame quantities. If in the firſt poſition they gave zenith diſtances, they will now give altitudes; or, if one miſcroſcope is made to mark the zenith diſtance, and the other the altitude, they will be now reverſed, and the one which gave zenith-diſtance will now give altitude. When the ſtars have been thus obſerved two or three times in each poſition, the obſerver will be enabled to judge both of the perfection of his inſtrument, and of his own ſkill in the management of it. For in calculating the above obſervations, he ſhould begin by deducing the index error, or error of collimation, from each ſtar ſeparately; and the difference of the quantities thus found ſhould, if the inſtrument and obſervations are good, be contained in very narrow limits.

Half the extreme difference will be very nearly the greateſt error to which the obſervations will be liable.

Upon this ſubject, vid. Ph. Tranſ. 1806.

To illuſtrate this, we ſhall take for example ſome obſervations made with an aſtronomical circle of two feet diameter, conſtructed by Mr. Troughton, and which moved freely in azimuth.

		Altitude.
6th Sept. Rigel, Poſ.	E.	30° 21′ 36″.25
7th	E.	30 21 40
	Mean,	30 21 38.1
8th	Poſ. W.	30 20 22.5
9th	W.	30 20 23.5
	Mean,	30 20 23.
Difference between E. and W.		0 1 15.12
Half, or error of Coll.		0 0 37.5
True altitude,		30 21 00.5
Sirius, W.		22 20 40
E.		22 20 1
		0 1 21
Error of Col.		0 0 40″.5
True Altitude		22 21 20.5
♪ Sagittæ. W.		8 56 45.8
E.		8 58 7.1
		0 1 21.3
Error of Coll.		0 0 40.6
True altitude		8 57 26.4

χ	W.	31° 18′ 54″.7
	E.	31 20 15 .7
		0 1 24
Error of Coll.		0 0 42
True altitude		31 19 36.7
α Cap.	W.	25 38 41 7
	E.	0 40 00.6
		0 1 18.9
Error of Coll.		0 0 39.45
True altitude		25 39 21.15
θ	W.	18 9 39.25
	E.	18 10 54. 5
		0 1 14.25
Error of Coll.		0 0 37.12
True altitude		0 10 16.37
γ	W.	21 13 53
	E.	21 15 7.7
		0 1 14.7
Error of Coll.		0 0 37.35
True altitude		21 14 30.35
δ	W.	21 45 39.75
	E.	0 46 55. 5
		1 15 7. 5
Error of Coll.		0 0 37.87
		21 46 17. 6

	Error of Coll.	Number of Obſ.
Rigel	37″.5	4
Sirius	40. 5	3
♪ Sagittæ	40. 6	3
χ	42. 0	2
α Cap.	39.45	3
θ	37.12	2
γ	37.35	2
δ	37.87	2
Mean Error of Collimation	39. 0	

From this it ſhould appear that 3″ was probably the greateſt error committed in the determination of the altitudes of the above ſtars, including errors of every kind. Had the obſervations been continued, the diſcordance would have been leſs, as the errors of obſervation would have been gradually done away, and the errors of diviſion only would have remained.

The index error being thus found, may be applied to any ſtar or planet that has been obſerved only in one poſition of the inſtrument. A well divided circle of two feet diameter will, in the hands of a careful obſerver, always give declinations true to 2″ or 3″.

The zenith diſtances being brought up to the beginning of the year, ſhould be regiſtered in a table. The polar diſtance is obtained by applying the co.-lat. of the place of obſervation; but this ſhould be conſidered as an equation known at firſt only as an approximation to the truth. Many months may elapſe before an obſerver, who is anxious to attain perfection, will be ſatisfied with the accuracy of this eſſential element in his calculations. In uſing large inſtruments on ſtone piers, which cannot be reverſed without great danger of diſturbing their adjuſtments, the method of finding the Polar-point on the circle, and referring all obſervations to it, is preferable to the other; and here the obſerver muſt be as ſcrupulous in his attention to aſcertain this point accurately, as to find the latitude in the uſual method. Obſervations of circum-polar ſtars are in each caſe to be ſelected for the purpoſe.

Of the Corrections to be applied to the Obſervations.

Theſe are of two kinds, one depending on the mechanical conſtruction of the inſtruments, the other entirely aſtronomical, and intended to reduce the apparent altitude as ſeen at the place of the obſerver, to that which would have been obſerved from ſome other ſituation, as the centre of the earth; or even at ſome other period, as the beginning of the year.

The corrections ariſing from the conſtruction of aſtronomical circles are very few, as theſe inſtruments have the means of avoiding moſt of the deviations that quadrants are ſubject to. The index error, as above deſcribed, is the principal correction in ſingle obſervations; and half the thickneſs of the wire of the micrometer ſhould be taken into the calculation, where one of its edges has been made a tangent to the upper or lower limb of the ſun, moon, or planet. But when the micrometer is formed by fine cobweb, this method need not be adopted.

The corrections for reducing the apparent zen. diſt. at the time of obſervation, to the true zen. diſt. as ſeen from the centre of earth, for the beginning of the year, ariſe from refraction, parallax, aberration, nutation, preceſſion, and ſemi-annual ſolar-equation. For an explanation of theſe corrections, ſee the reſpective articles ABERRATION, NUTATION, &c. &c.

Among the tables ſubjoined will be found thoſe of the Rev. Mr. Wollaſton, which are much the moſt convenient of any that have yet been publiſhed for reducing obſervations of this kind. By means of theſe tables the obſerver will be enabled, with the greateſt eaſe, to regiſter all his obſervations, with their reſpective corrections, in one column, which will greatly facilitate all the ſubſequent calculations.

It ſometimes will happen, that an obſervation cannot be taken, at the preciſe moment the ſtar is on the meridian, but a few minutes before or after. If the inſtrument moves in azimuth, it ſhould be made to follow the ſtar; and if the ſtar is on the middle of the field, when the obſervation is made, no other correction is required than for the change of altitude in the ſtar, for the given interval, which will be found in the tables for the uſe of the French repeating circle. But in a fixed inſtrument, the only obſervation that can be had, may be when the ſtar has conſiderably paſſed the centre of the field, in this caſe a double correction muſt be applied. The firſt to reduce the obſerved altitude, to that which would have been given by the inſtrument, if the ſtar had been obſerved on the vertical wire; the ſecond is the ſame as above mentioned, namely, to allow for the change of altitude in the ſtar ſince the moment of its tranſit over the meridian. The firſt correction is given in Tab. XXI. The argument on the left hand column is the altitude, and on the top the diſt. from the vertical wire.

To obſerve the Declination of the Sun.

This obſervation requires the following corrections: error of collimation, refraction, parallax, ſemidiameter of the ſun, and for half the thickneſs of the micrometer wire, when it is made a tangent to the limb of the ſun. Theſe quantities are eaſily taken from the annexed tables. The ſemidiameter of the ſun will vary according to the power of the teleſcope, ſo that it is adviſeable to obſerve ſometimes the upper, and ſometimes the lower limb. If the circle is of ſmall dimenſions, and turns eaſily in azimuth, two or more obſervations may be obtained in one day, an allowance being made for the ſun's motion in altitude, according to ſuch rules as will be given when we come to treat more particularly of the French repeating circle. In obſerving the ſun, the inſtrument ſhould be carefully protected from its rays till the moment of obſervation.

Example of an Obſervation of the Sun, made at Weſtbury in Somerſetſhire, with a circular Inſtrument conſtructed by Mr. Troughton.

1801. 21 June.			
⊙ U. L.	62°	30′	30″.5
Error of coll.	0	0	34.5
	62	29	56
Apparent zen. diſt.	27	30	4
Refraction	0	0	29
	27	30	33
Parallax	0	0	4
	27	30	29
Semidiameter ⊙	0	15	47
	27	46	16
Lat. of the place of obſervation	51	14	17
Declination of the ⊙	23	28	1
1801. 22 June.			
Zen. diſt. ⊙ L. L.	28	2	7.5
	0	0	34.5
Error of Coll.	28	1	33
Refraction	0	0	30.1
	28	2	3
Parallax	0	0	4
	28	1	59
Semidiameter ⊙	0	15	47
	27	46	12
Latitude	51	14	17
	23	28	5

The mean of theſe two obſervations will give the declination of the ⊙ at the intermediate midnight very accurately = 23° 28′ 3″.

The

The corrections to be applied to the obſervation of the meridian altitude of a fixed ſtar to find its mean declination at the beginning of the year, are thoſe depending on refraction, preceſſion, aberration, nutation, and ſemi-annual ſolar equation.

When it is intended to obſerve the ſame ſtars frequently, it will be found very convenient to make a table of their mean refractions, with the change for each degree of the thermometer, and for each tenth of an inch of the barometer, as given in Mr. Wollaſton's tables, which are here ſubjoined.

Example. γ Pegaſi.

	Obſervation Cor. for Refract.	Barom.	Ther.	Refrac.
1800.		Inches.		
Nov. 3.	142° 50′ 27″.5	29.2	51°	42″.48
7.	37 9 27 .8	29.2	51	42 .81
11.	37 9 26 .9	29.6	48	43 .37

Mean refraction	-	43″.15	}
Barometer	-	.14	}
Thermometer	-	.11	}
Nov 3.	-	142° 50′ 27″.5	
Nov. 7 and 11, or Nov. 9.		37 9 27.4	
Sum	- -	179 59 54.9	
		180 0 0	
		5.1	
Error of Coll.	- -	2.55	
Z. D. Nov 6.	- = 37	9 29.95	
Aber. and Prec.	-	- +25.5	} +23.7
Nut.	- -	- 1.8	}
		37 9 53.5	
Co. lat.	- -	38 45 43	
Polar diſtance, Jan. 1800		75 55 36.5	

α Lyræ.

1800.	Obſervation.	Bar.	Ther.	Ret.
Oct. 31.	12° 37′ 42″.6	29″.9	50″	12″.7
Nov. 3.	167 22 9. 6	29.2	51	12.6

Mean refraction		12″.75	}
Barometer	-	.04	}
Thermometer	- -	.03	}
		12° 37′ 42″.6	
		167 22 9.6	
		172 59 52.2	
		180	
		7.8	
Error of coll.	-	3.9	
		12 37 46.5	
Ab. and Prec.	- -	+ 15.3	} + 7
Nut.	- - -	— 8.3	}
Carried over		12 37 53.5	
Brought over		12° 37′ 53″.5	
		38 45 43	
Polar diſt. Jan. 1800	-	51 23 36.5	

When the meridian altitude or zen. diſtance of a planet is obſerved: the calculation for finding its declination differs but little from that of a fixed ſtar, except that the correction for parallax and a b ration muſt be taken from the tables of the planet. If one of the principal fixed ſtars paſſes nearly at the ſame time, differing but little in altitude, the declination of the planet had better be calculated by comparing it with the fixed ſtar.

Obſervations made to determine the declination of the moon require ſome corrections that ſhould be particularly explained. It is uſual to obſerve either the upper or lower limb. If we wiſh to know what would have been the *obſerved* altitude of the centre, we muſt employ the ſemidiameter augmented according to its altitude, and diminiſhed by the difference of refraction correſponding to the limb and the centre; or, we may proceed to calculate the declination of the obſerved limb. This latter method we think preferable to the other.

The correction for parallax varies according to the altitude of the moon, and is ſubject to a ſmall equation depending on the latitude of the place, as will be more fully explained under PARALLAX: enough for the preſent purpoſe will be underſtood by referring to *Plate* V. *fig.* 45.

O repreſents the place of the obſerver, on the elliptic meridian, E P Q *p*. O *m*, the normal or continuation of the direction of the plumb-line; *Z*, the zenith; H *h*, or H′ *h*′, the horizon; the angle obſerved is M O Z, or its compl. M O H′. The declination of the lower limb required is the angle M C E. If the moon were in the line Z O, it would have no parallax, and its zenith diſtance would equal the angle which the vertical, O *m*, makes with the radius. If the moon were in the zenith Z, it would nevertheleſs have a ſmall parallax.

The equatorial parallax muſt be diminiſhed in the proportion of E C to O C.

Example, taken from the Greenwich Obſervations.

Sept. 1. 1806. The zenith diſtance of the moon's upper limb was obſerved 38° 48′ 32″.3. The error of collimation was 2″.9, and the error of the arc, (vide note to obſervations) was 1″ additive. The refraction was 45″.1.

Theſe corrections make the zenith diſtance 38° 49′ 21″.3.

The equatorial parallax by the tables was at that time 55′ 30″; this diminiſhed in the proportion of E C to O C (by Table XX.) is 55′ 24″, which is the horizontal parallax at Greenwich: this multiplied by the ſine of the zenith diſtance *minus* the angle which the radius makes with the vertical, or the angle C O *m* = 10′ 3″ (Tab. XX.) gives 34′ 36″.2 for the parallax in alt. which is to be ſubtracted from the zenith diſtance, and leaves 38° 14′ 45″.1.

The ſame tables which give the equatorial parallax 55′ 30″, give the ſemidiameter 15′ 8″.8, which added to the zenith diſtance of the upper limb gives the zenith diſtance of the centre 38° 29′ 54″; and this taken from the latitude, leaves for the declination of the moon at the moment of obſervation 12ʰ 58′ 46″.

1806, Sept. 1. ☽ UL. Zen. dist.		38° 48′ 32″.3
Error of collimation		+2.9
Additional correction		+1
		38 48 36.2
Refraction		45.1
		38 49 21.3
Parallax in altitude		34 36.2
		38 14 45.1
Semidiameter		15 8.8
		38 29 53.9
Latitude of Greenwich		51 28 40
Declination of the moon		12 58 46.1

Zen. dist. of ☽	38° 42′ 91″	
Diminished by angle of the vertical with radius	10 3	
	38 39 18	=9.7956278 Log. sine
Log. of 55′ 24″ = 3324″		=3.5216610
Par^{x}. in altitude = 2076′ 2″		=3.3172888
= 34′ 36″		

Equatorial parallax 55′ 30″ and sem. diam. 15′ 8″.8
Diminished 6″ . 55 24 = hor. par. for Greenwich.
55 24 + fine 38 39 18 = 34 36 = par^{x} in alt.

When a star whose declination is well known, and nearly on the same parallel with the moon, has been observed, it will perhaps be preferable to deduce the declination of the moon from a comparison with the star, as in the above

Example.—α Ophiuchi was observed the same day, and its

zenith distance was	38° 44′ 58″.7
Refraction	44.8
Correction as in the last example	3.9
Zen. distance corrected	38 45 47.4
Zen. distance of the moon	38 29 54
Difference of declination between ☽ and α Ophiu.	0 15 33.4
Declination of α	12 42 57.4
Declination of the moon	12 58 50.8

Declination Jan. 1800	12° 43′ 7″	
Precession in six years	0 0 18.6	
	12 42 48.4	
Prec. Aberr. &c.	+8.8	
Nut.	+0.2	
Declination	12 42 57.4	

On the Method of determining the Declinations of the Stars by Means of the repeating Circle.

It has been observed under the article *Circle*, that this instrument has not yet been received into such general use in this country as on the continent, where it has almost superseded every other of the kind. With us it is but little known, though brought to the greatest perfection by one of our first artists. Perhaps we have received an unfavourable impression of it from the accounts originally transmitted to us by the French astronomers themselves, from which we were led to suppose that it was merely an ingenious contrivance to obviate the errors of a very imperfect instrument. Even in this point of view it would possess great merit; but though it certainly derives its great superiority from its property of repeating the angle; it is so far from being imperfect as an instrument for single observations, that it is equal, and perhaps superior, to any instrument of its size now in use.

If the plane of the instrument be placed in the meridian, and the level retained in a given position by means of a contrivance which Mr. Troughton has applied to some of these circles, the instrument will then very much resemble, in its principle and mode of acting, the great circle which is now constructing for the Observatory at Greenwich, and with this additional advantage that its face may be turned either to the east or west, and as the position of the circle may be changed with respect to the level, the same stars may be observed on a new set of divisions, and the four verniers are much superior in accuracy to the two microscopes which are usually applied to instruments of the other construction. The English circles which we have described are at the same time, altitude, azimuth, and transit instruments, and are so well contrived to answer these several purposes, that no sacrifice has been made in the accuracy of one operation to enable them to perform the others. The repeating circle has no such pretensions, its use as an astronomical instrument is confined to the determination of zenith distance only.

Verification of the repeating Circle.

1. To make the axis of vision of the telescope parallel to the plane of the circle.

Choose for this purpose a very distant terrestrial object, or the pole star, when at its greatest elongation from the meridian, then with the plane of the circle in a vertical position, bisect the object or star with the vertical wire, and observe what is marked by the vernier on the azimuth circle. Turn the circle exactly half round in azimuth, and the telescope half round on the circle, and if the same object is bisected, the adjustment is already perfect; if not, half the error or deviation must be rectified by the screws that act on the micrometer wires, and the other half by the tangent screw of the azimuth circle.

2. To place the plane of the circle in a true vertical position.

This adjustment is very essential when zenith distances are intended to be taken with the greatest possible precision. There is usually a mark on the small semicircle made for this purpose by the maker, the coincidence of which with a line marked on the pedestal, indicates that the plane of the vertical circle is at right angles to the azimuth circle; so that if the latter be properly adjusted, the former may be brought by this mark to its true position. This verification may likewise be accomplished by suspending a plumb line on the back of the instrument. But a much more accurate method is by means of a level properly adapted to the back of the circle. This level may be adjusted and examined in the following manner:

Select an object of considerable altitude, as a steeple or neighbouring chimney, observe some well-defined part in it, both directly and by reflection in a saucer, of oil or treacle. If the same object be intersected accurately by the vertical wire in both cases, the plane of the circle will be very exactly vertical, and the level may be then adjusted, and should be occasionally examined by the same method.

To place the horizontal wire in its proper position, so that it may be parallel to the horizon when the circle is vertical, adjust the azimuth circle, and bring the repeating circle to its vertical position; bisect some well defined horizontal

zontal object at the extremity of the wire, move the object along the field of view by means of the tangent-ſcrew to the azimuth circle, and obſerve if it remain continually biſected till it arrives at the other extremity; if it does not, turn round the wires in their cell, till this verification is obtained.

Verification of the Verniers.

Call the vernier which is connected with the clamp-ſcrew No. 1, the others No. 2, No. 3, No. 4, in ſucceſſion, according to the diviſions of the circle. Place No. 1. at Zero, read off all the others, and ſet down their deviations with the ſign + or −, as they exceed or fall ſhort of their reſpective diviſions, add theſe quantities, and divide the ſum by 4. This quotient may be called the index error, and muſt be applied to the obſerved angle with a contrary ſign. *e. g.*

No. 1. . .	00″
2. . .	+05
3. . .	+10
4. . .	− 3
	4) +12
	+ 3″ Index error to be

ſubtracted from the obſerved angle: then ſuppoſe at the end of an obſervation the verniers ſtand thus:

No. 1. .	183°	14′	10″
2. .			7
3. .			14
4. .			20
			4) 51
	183	14	12.77
Deduct Index error		—	3
True Angle .	183	14	9.77

The obſerver ſhould take notice, that the circle, the level, and the front teleſcope, all turn round one common axis, independent of each other. Now, in obſerving, it muſt be remembered, that the circle muſt always be fixed to, and form one piece with one of the other two. In the front obſervation which begins the ſeries, it muſt be conſidered as forming one piece with the front teleſcope, and care muſt be taken on no account to touch the ſcrew that alters their relative poſition to each other. On the contrary, in the reverſe obſervation, the circle muſt be conſidered as forming one piece with the level, and equal care taken not to ſeparate them from their fixed poſition. The great danger to an unexperienced obſerver with this inſtrument is, that his whole ſeries of obſervations may be deſtroyed by improperly releaſing the piece which ought to remain fixed.

But a little conſideration and practice will render this operation eaſy and familiar.

A well regulated clock or watch is neceſſary for theſe obſervations; and they will be rendered much eaſier, if an aſſiſtant attends to the level, while the obſerver biſects the ſtar.

It may not be improper to remark, that it is of more importance to make good, than many obſervations. The errors of diviſion are ſo ſmall in our beſt conſtructed inſtruments, that a very few repetitions will render their effect quite inſenſible. The obſerver will ſoon find that it is the error of obſervation he has to contend with, ariſing from the ſmallneſs of the radius, and want of power in the teleſcope; for this reaſon, the obſervations ſhould not be hurried, but ſufficient time allowed for examining the true poſition of the level and the accurate biſection of the ſtar.

The corrections to be applied to the obſervations made with the repeating circle are, for the purpoſe of reducing the meridian altitude, from that obſerved a ſhort time before or after the paſſage of the ſtar over the meridian. The hour angle, or diſtance of the ſtar from the meridian, muſt, therefore, be correctly known; and in proportion as the rate of the clock is well aſcertained, may the obſervations be extended with confidence on each ſide of the meridian.

The pole-ſtar, from the ſlowneſs of its motion, being the beſt adapted for obſervation with this inſtrument, we have given a table of corrections for that particular ſtar, extending to half an hour from the meridian, beyond which the obſervations ſhould never extend. This table having been calculated for the latitude of Paris ſome years ſince, the numbers muſt now for the latitude of Greenwich be diminiſhed $\frac{1}{20}$th, that is, the whole correction multiplied by 0.95; and for the inferior paſſage of the ſtar the whole correction muſt be multiplied by 0.88.

Tables II. and III. are general tables for any ſtar, and for any latitude; they were calculated by Delambre from the following formula:

Let P = The hour angle,
L = Latitude,
D = Declination of the ſtar.
x = Corrections required.

If the ſtar paſs ſouthward of the zenith $x = -\frac{2 \text{ ſin.}^2 \frac{1}{2} P, \text{ cof. D, cof. L}}{\text{ſin. (L} - \text{D) ſin. 1}''} + \frac{1}{2}\left(\frac{2 \text{ ſin.}^4 \frac{1}{2} P, \text{ cof. D, cof. L}}{\text{ſin. L} - \text{D ſin. 1}''}\right)^2 \text{cof. L} - \text{D ſin. 1}''$.

If the dec. be ſouth, change the ſign of D.

If the ſtar paſſes to the north of the zenith, for L − D ſubſtitute D − L, and change the ſign of the terms.

But if the ſtar paſſes below the pole, D + L muſt be ſubſtituted for D − L, the ſigns remaining the ſame.

The numbers contained in theſe tables are the factors $\frac{2 \text{ ſin.}^2 \frac{1}{2} P}{\text{ſin. 1}''}$, and $\frac{2 \text{ ſin.}^4 \frac{1}{2} P}{\text{ſin. 1}''}$, the remainder of the calculation is thus reduced to finding the value of the other factors, $\left(\frac{\text{cof. D, cof. L}}{\text{ſin. D} - \text{L}}\right) = \text{F}$, and $\left(\frac{\text{cof. D, cof. L}}{\text{ſin. D} - \text{L}}\right) \text{cof. D} - \text{L} = f$.

Example of an Obſervation of the Pole Star, by the repeating Circle. Dec. 4th, 1807.

Diſtance from the Meridian		Correct. by Table I.				
′	″	″				
11	30	8.5				
10	20	6.9				
7	45	3.8				
6	30	2.7	147°	5′	50″	
3		0.6				
1	40	0.2				
1	30	0.2				
4	20	1.2	294	11	00	
7		3.2				
8	40	4.8	70	43	58	
12		9.3				
16	30	17.5	81	16	54	= 1ſt Vernier.
					50	= 2d
Sum 58.9					58	= 3d
					60	= 4th
						58.9

58.9 = Sum of the corrections
2.9 = $\frac{1}{20}$th

12)56″.0 cor. diminiſhed $\frac{1}{20}$th.

4.7 divided by the number of obſervations.

At the end of 12 obſervations the inſtrument gave -	81°	16′	55″.5
Index error - -			3.3
	81	16	58.8
	360		
	441	16	58.8
	12		
	36	46	24.9
Correction - - -			4.7
	36	46	20.2
The firſt four obſervations give	36	46	22.2
eight - -	36	46	19.6
ten - -	36	46	21.0
twelve - -	36	46	20.2

Example of the Uſe of the general Tables.

Hour Angle.	Tab. II.	Tab. III.	
11 30	259.6	0.163	D = 88° 17′
10 20	209.6	0.107	L = 51 30.20
7 45	117.9	0.033	
6 30	83.0	0.016	
3 0	17.7	0.001	
1 40	5.4	0.000	
1 30	4.4	0.000	
4 20	36.9	0.003	
7 0	96.2	0.022	
8 40	147.5	0.053	
12 0	280.7	0.194	
16 30	534.4	0.700	
	1793.3	1.292	

$$F = \frac{\text{cof. D, cof. L}}{\text{ſin. D} - \text{L}} \qquad f = \left(\frac{\text{cof. D, cof. L}}{\text{ſin. D} - \text{L}}\right)^2 \text{cof. D} - \text{L.}$$

Log. 1793.3	= 3.25358	Log. 1.292	= 0.11126
Co. log. 12.	= 8.92082	Co. log. 12	= 8.92082
Log. F	= 8.49337	Log. f	= 7.11313
	+ 4.″65 = 0.66777		6.14521

Tab. II. +4.″65
III. −0.″00

+4.″65 = correction.—The ſame very nearly as in the preceding example.

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

THOSE ſtars whoſe right aſcenſion is between 90° and 270° with north declination, and more than 270° and leſs than 90° with ſouth declination, have their annual variation of declination *ſubtractive*; and thoſe ſtars whoſe right aſcenſion is more than 270° and leſs than 90° with north declination, and between 90° and 270° with ſouth declination, have their annual variation of declination *additive*. This is to be underſtood with reſpect to a time *after* January 1, 1760; but, if the time *precede* that period, the variation of declination is to be applied with a *contrary* ſign.

Numb. of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion, Jan. 1, 1760.	An. Preceſ. in Right Aſcenſion,		Mean diſtance from N. Pole, Jan. 1, 1760.	An. Preceſ. in Declination,	
				1760.	1800.		1760.	1800.
			D. M. S.	S.	S.	D. M. S.	S.	S.
1	γ Pegaſi	2	0 13 35.1	45.95	45.99	76 9 5.3	20.01	20.01
2	ι Ceti	3	1 47 59.9	45.80	45 79	100 9 20.8	20.00	19.99
3	d Piſcium	5	2 4 1.0	46 01	46.04	83 8 39.7	20 00	19.99
4	δ Andromedæ	3	6 38 13.7	47.24	47.36	60 27 20.0	19.88	19.85
5	α Caſſiopeiæ	3	6 45 35.0	49.32	49.63	34 46 53.5	19.87	19.85
6	β Ceti	3	7 52 59.0	44.97	44.92	109 18 27.1	19.82	19.80
7	ζ Andromedæ	4	8 39 58.0	47.20	47.30	67 2 30.5	19 78	19.75
8	20 Ceti	5	10 11 19.0	45 78	45.78	92 27 8 0	19.70	19.66
9	γ Caſſiopeiæ	3	10 36 19.0	52.16	52.55	30 35 16.2	19.67	19.63
10	ε Piſcium	4	12 37 43.0	46.43	46.47	83 24 26.6	19.53	19.48
11	e Piſcium	5	14 0 30.0	46.30	46.33	85 37 30.8	19.42	19.37
12	β Andromedæ	2	14 6 29.2	49.26	49.41	55 39 32.6	19.41	19.36
13	η Ceti	3	14 7 48.0	44.94	44.92	101 27 39.4	19.41	19.36
14	θ Caſſiopeiæ	4	14 9 48.0	52.65	52.95	36 7 56.0	19 40	19.35
15	ζ Piſcium	4	15 18 18.0	46.52	46.55	83 42 0.3	19.30	19.25
16	δ Caſſiopeiæ	3	17 34 49.0	55.98	56.41	31 1 9.5	19.08	19.01
17	θ Ceti	3	18 0 33 0	44.90	44 90	99 25 40.6	19.03	18.97
18	μ Piſcium	5	19 24 35.0	46.50	46.54	85 6 0.5	18.88	18.81
19	η Piſcium	5	19 40 14.0	47.62	47.69	75 53 55.0	18.85	18.78
20	π Piſcium	5	21 6 13.0	47.32	47.38	79 5 39.7	18.67	18.60
21	105 Piſcium	5	21 41 38.0	47 93	48.02	74 49 11.7	18.60	18.52
22	ν Piſcium	4	22 14 26.0	46.49	46.53	85 44 7.3	18.52	18.45
23	o Piſcium	4	23 11 14.0	47.03	47.08	82 3 31.8	18.40	18.32
24	ε Caſſiopeiæ	3	24 21 0.0	61.76	62.32	27 31 26.8	18.23	18.13
25	γ Arietis	4	25 6 4.8	48.70	48.79	71 53 33.0	18.12	18 04
26	β Arietis	3	25 21 26.1	48.98	49.09	70 22 29.8	18.09	18.00
27	ι Arietis	5	26 4 13.5	48.56	48.64	73 21 50.6	17.98	17.89
28	λ Arietis	5	26 9 8.6	49.57	49.68	67 35 4.0	17.96	17.87
29	γ Andromedæ	2	27 19 7.0	53.96	54.18	48 50 2.0	17.78	17.68
30	α Piſcium	3	27 24 46.0	46.18	46.23	88 24 18.4	17.77	17.68
31	α Arietis	2	28 25 26.6	49.84	49 95	67 41 1.4	17.60	17.50
32	19 Arietis	5	30 0 8.0	48.46	48.53	75 51 23.8	17.33	17.23
33	1 ξ Ceti	5	30 4 35.0	47.30	47.34	82 17 23.2	17.32	17.22
34	1 θ Arietis	5	31 12 18.0	49.45	49.55	71 13 17.9	17.12	17.01
35	o Ceti, var.	2	31 48 41.0	45.18	45.20	94 4 44.7	17.01	16.91
36	2 ξ Ceti	4	33 51 24.0	47.37	47.43	82 37 41 0	16.62	16.51
37	δ Ceti	3	36 47 59.5	45 78	45.81	90 43 9.3	16.03	15.91
38	θ Perſei	4	36 58 56.0	59 39	59.68	41 48 13.4	15.99	15.84
39	ε Ceti	3	36 59 31.0	43.17	43.18	102 54 9.5	15.99	15.88
40	35 Arietis	4	37 21 28.0	52.03	52.16	63 19 43.2	15 91	15.78

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

Numb. of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion, Jan. 1, 1760.			An. Preceſ. in Right Aſcenſion,		Mean Diſtance from N. Pole, Jan. 1, 1760.			An. Preceſ. in Declination,	
						1760.	1800.				1760.	1800.
			D.	M.	S.	S.	S.	D.	M.	S.	S.	S.
41	γ Ceti	3	37	43	27 0	46.40	46.45	87	47	18.4	15 83	15.72
42	μ Ceti	4	38	0	6.0	47.90	47.96	80	54	46.8	15.77	15.65
43	π Ceti	3	38	10	39.0	42.64	42.65	104	53	14.5	15.73	15.63
44	τ Perſei	5	30	20	51.0	62.03	62.37	38	14	18.4	15.48	15.32
45	3 ϱ Arietis	5	40	43	55.0	49.93	50.02	72	56	57.0	15.17	15.03
46	η Eridani	3	41	10	45.0	43.64	43.66	99	51	58.0	15.06	14.95
47	ε Arietis	5	41	23	0.2	50.84	50 94	69	38	5.5	15.02	14.88
48	γ Perſei	3	41	53	38.0	63.36	63.71	37	28	13 7	14.90	14.73
49	α Ceti	2	42	26	24.1	46.67	46.72	86	51	59.8	14.77	14.64
50	β Perſei	3	43	9	52.0	57.42	57.62	49	59	15.8	14.60	14.44
51	δ Arietis	4	44	29	11.0	50.70	50.80	71	11	53.5	14.28	14.14
52	ζ Arietis	5	45	17	19 0	51.14	51.24	69	51	40.2	14.08	13.93
53	12 Eridani	3	45	28	7.0	37.73	37.70	119	56	51.6	14.04	13.93
54	ζ Eridani	3	46	2	54.0	43.46	43.48	99	43	32.8	13.89	13.77
55	α Perſei	2	46	49	50.0	62.71	62.99	41	0	50.9	13.69	13.51
56	2 τ Arietis	5	47	14	48.0	51.24	51.33	70	8	2.3	13.59	13.44
57	f Tauri	4	49	24	48.3	49.19	49.26	77	54	10.6	13.01	12.87
58	17 Eridani	4,5	49	41	48.0	44.35	44.38	95	54	46.8	12 95	12.81
59	δ Perſei	3	51	29	11.0	62.78	62.97	43	0	9.8	12.40	12.26
60	b Pleiadum	5	52	40	7.0	52.79	52.89	66	39	38.0	12.14	11.97
61	e Pleiadum	5	52	44	32.0	52.92	53.02	66	18	16.2	12.12	11.95
62	δ Eridani	3,4	52	56	33.0	42.94	42 96	100	35	32.4	12.06	11.92
63	d Pleiadum	5	53	2	1.0	52.77	52.87	66	49	6 5	12.03	11.87
64	η Tauri	3	53	18	55 2	52.85	52.95	66	39	22.1	11.96	11.79
65	γ Eridani	2	56	42	35.0	41.69	41.71	104	12	26.5	10.98	10.85
66	1 λ Perſei	4	57	12	6.0	67.75	65 99	40	19	28.9	10.84	10.62
67	A Tauri	4	57	38	1.0	52.55	52.64	68	35	37.4	10.71	10.54
68	φ Tauri	5	61	24	32.0	54.79	54.88	63	14	45.8	9.58	9.39
69	γ Tauri	3	61	32	26.2	50.65	50.71	74	58	20 8	9.54	9.34
70	χ Tauri	5	62	0	16.0	54.18	54.27	64	57	30.8	9.39	9.21
71	1 δ Tauri	4	62	16	57.0	51.32	51.39	73	2	28.6	9.31	9.13
72	2 δ Tauri	4	62	34	25.0	51.31	51 38	73	7	56.9	9.22	9.04
73	1 κ Tauri	5	62	46	34.0	53.02	53.09	68	16	36.0	9.16	8.97
74	2 κ Tauri	4	62	47	18.0	52.98	53.06	68	22	13.5	9 15	8.97
75	3 δ Tauri	5	62	54	33.0	51.50	51.56	72	38	31.5	9.11	8.93
76	1 υ Tauri	5	62	59	43.0	53.22	53.30	67	45	7.8	9.09	8.90
77	ε Tauri	2	63	39	28.5	51.97	52.04	71	22	25.3	8.88	8.70
78	1 θ Tauri	5	63	43	22.0	50.87	50.92	74	35	29.5	8.86	8.68
79	2 θ Tauri	5	63	44	47.0	50.84	50.90	74	40	59.0	8.85	8.67
80	Aldebaran	1	65	32	38.7	51.15	51.21	73	59	39.7	8.29	8.10
81	τ Tauri	5	66	58	5.0	53.55	53.61	67	31	33.3	7.83	7.64
82	1 π Orionis	4	69	23	16.0	48.72	48.75	81	31	55.1	7.05	6.87
83	7 Camelopard.	5	69	31	48.0	71.12	71.31	36	39	46.3	7.00	6.74
84	ι Tauri	4	72	11	37.7	55.33	53.38	68	46	31.5	6.11	5.91
85	m Tauri	5	73	19	12.0	52.27	52.31	71	42	1.2	5.74	5.55
86	105 Tauri	5	73	23	58.0	53.43	53.65	68	38	12.2	5.72	5.52
87	h Eridani	3	74	1	5.0	44.10	44,12	95	24	56.9	5.51	5.34
88	Capella	1	74	44	59.5	65.73	65.84	44	16	27.5	5.26	5.02
89	Rigel	1	75	45	10.9	43.03	43.05	98	29	50.7	4.93	4.76
90	β Tauri	2	77	47	7.0	56.49	56.54	61	37	12.0	4.23	4.02

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

Numb. of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion, Jan. 1, 1760.	An. Preceſ. in Right Aſcenſion,		Mean diſtance from N. Pole, Jan. 1. 1760.			An. Preceſ. in Declination,	
				1760.	1800.				1760.	1800.
			D. M. S.	S.	S.	D.	M.	S.	S.	S.
91	γ Orionis	2	78 4 8.0	48.02	48.05	83	53	20.7	4.14	3.95
92	o Tauri	5	78 18 35.0	53.73	53.86	68	17	30.7	4.06	3.85
93	2 ↓ Orionis	5	78 34 9.0	46 91	46 93	87	7	59 5	3.97	3.79
94	β Leporis	3	79 29 40.0	38.39	38.40	110	58	4.3	3 65	3.50
95	δ Orionis	2	79 56 22.0	45.76	45.77	90	29	50.1	3.50	3.32
96	α Leporis	3	80 32 21.0	39.51	39.52	108	0	43.0	3.29	3.14
97	ζ Tauri	3	80 49 41 8	53.50	53.53	69	1	37.4	3.19	2.98
98	ε Orionis	2	81 0 41.0	45.45	45.47	91	22	33.3	3.13	2.95
99	125 Tauri	5	81 13 4.0	55.46	55.51	64	15	44.3	3.06	2.84
100	132 Tauri	4	83 34 30.0	54.97	55.00	65	32	17.3	2.24	2.03
101	γ Leporis	3	83 37 3.0	37.67	37.68	112	32	47.0	2.22	2.08
102	136 Tauri	5	84 33 46.0	56.31	56.33	62	28	9.0	1.90	1.68
103	δ Aurigæ	4	84 46 44.3	73.60	73.65	35	45	53.2	1.82	1.54
104	1 χ Orionis	5	85 2 44.0	53.27	53.28	69	47	29.5	1.73	1.52
105	2 χ Orionis	5	85 11 7.0	53.06	53.07	70	19	42.7	1.68	1.47
106	α Orionis	1	85 32 47.2	48.50	48.51	82	39	34.5	1.55	1.37
107	θ Aurigæ	4	85 50 21.0	61.06	61.11	52	49	51.6	1.45	1.21
108	H Geminorum	5	87 23 1.0	54.52	54.53	66	44	51.9	0.91	0.70
109	κ Aurigæ	5	90 1 18.0	57.28	57.28	60	26	18.9	0.01	0.23
110	η Geminorum	4	90 5 52.8	54.24	54.24	67	26	51.7	0.03	0.25
111	μ Geminorum	3	92 6 34.1	54.26	54.25	67	23	13.3	0.74	0.95
112	ν Geminorum	4	93 40 39.7	53.34	53.32	69	39	34.6	1.28	1.49
113	23 Geminorum	5	95 32 4.0	52.08	52.06	—	—	—	1.93	2.13
114	γ Geminorum	2	95 57 37.3	51.85	51.84	73	25	8.4	2.08	2.28
115	26 Geminorum	5	97 6 20.0	52.33	52.31	72	8	33.2	2.48	2.68
116	ε Geminorum	3	97 17 20.7	55.33	55.30	64	39	19.7	2.54	2.75
117	28 Geminorum	5	97 23 5.0	57.04	56.99	60	48	41.5	2.57	2.79
118	Sirius	1	98 38 36.8	40.10	40.10	106	24	6.3	3.01	3.16
119	ζ Geminorum	4	102 27 57.0	53.39	53.35	69	6	2.1	4.32	4.52
120	51 Geminorum	5	104 53 40.0	51.67	51.70	73	27	21.8	5.14	5.34
121	19 Lyncis	5	105 48 8 0	74.16	73.97	34	17	49.0	5.45	5.73
122	λ Geminorum	5	106 4 22.0	51.78	51.75	73	2	54.7	5.54	5.73
123	δ Geminorum	3	106 26 38.0	53.84	53.79	67	35	53.7	5.67	5.86
124	q Geminorum	5	106 56 31.0	53.23	53.20	69	7	33.8	5.83	6.03
125	ι Geminorum	5	107 42 2.0	56.17	56.11	61	44	54.5	6.08	6.29
126	p Geminorum	5	108 22 8.0	53.57	53.51	68	5	12.0	6.31	6.50
127	n Canis major	2	108 39 8.0	35.48	35.48	118	30	57.0	6.40	6.53
128	Caſtor	1	109 48 45.7	57.87	57 39	57	36	36.0	6 78	6.99
129	υ Geminorum	4	110 16 34.1	55.66	55.59	62	35	36.0	6.94	7.14
130	f Geminorum	5	111 24 2.0	52.05	52.00	71	48	1.0	7.30	7.47
131	Procyon	1	111 40 56.8	47.82	47.79	84	10	36.0	7.39	7.56
132	x Geminorum	5	112 28 59.0	54.53	54.47	65	2	54.0	7.65	7.85
133	Pollux	1	112 39 3.7	55.99	55.91	61	24	56.8	7.71	7.90
134	g Geminorum	5	113 3 12.0	52.30	52.24	70	55	32.2	7.84	8.02
135	26 Lyncis	5	114 17 24.0	66.30	66.11	41	50	18.1	8.29	8.47
136	φ Geminorum	5	114 41 34.0	55.33	55.25	62	38	6.1	8.36	8.55
137	3 Cancri	5	116 57 4.0	52.03	51.96	71	7	2.8	9.07	9 25
138	μ Cancri	5	118 0 54.0	53.54	53.46	66	41	57.2	9.40	9.58
139	2 ↓ Cancri	4	118 59 26.0	54.55	54.46	63	46	59.2	9.70	9.88
140	β Cancri	3	120 52 13.0	48.93	48.88	80	5	35.0	10.27	10.43

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

Numb. of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion, Jan. 1, 1760.	An. Preceſ. in Right Aſcenſion,		Mean Diſtance from N. Pole, Jan. 1, 1760.			An. Preceſ. in Declination,	
				1760.	1800.				1760.	1800.
			D. M. S.	S.	S.	D.	M.	S.	S.	S.
141	θ Cancri	5	124 28 16.0	51.57	51.49	71	6	44.5	11.33	11.49
142	π Cancri	5	124 41 53 0	52.32	52.24	68	45	40.5	11.39	11.56
143	γ Cancri	4	127 20 30.0	52.46	52 36	67	41	9.1	12.14	12.30
144	δ Cancri	4	127 45 17.0	51.38	48.30	70	58	47.9	12.25	12 41
145	ι Urſæ major	4	130 40 2.0	63.37	63.09	41	2	3.1	13.04	13.23
146	1 α Cancri	4	130 41 58.3	49.30	49.23	77	28	22.1	13.05	13 19
147	2 α Cancri	4	131 20 4.8	49.33	49.37	77	13	43.7	13.22	13.36
148	κ Cancri	5	133 40 53.0	48.90	48 84	78	22	52.5	13 88	14.02
149	ξ Cancri	6	133 52 48.5	52.06	51.95	66	59	57.6	13 87	14.01
150	ω Leonis	5	138 53 50.0	48.27	48.21	79	54	42.5	15 08	15.20
151	α Hydræ	2	138 56 57.0	44.17	44.15	97	37	48.0	15.09	15.20
152	θ Urſæ major	3,4	139 10 9.0	63.14	62.79	37	14	35 0	15.14	15 30
153	ξ Leonis	4	139 44 49.0	48.81	48.69	77	39	4 3	15.27	15.39
154	10 Leon minor	4,5	139 51 36.6	55.82	55.63	52	33	6 3	15.30	15.44
155	10 Leonis	5	141 7 58.9	47.67	47.61	82	5	58.5	15.58	15.69
156	o Leonis	4	142 4 50.0	48.31	48.25	79	1	40.8	15.79	15.90
157	ε Leonis	3	143 2 44.0	51 50	51.39	65	7	59.5	15.99	16 11
158	ν Leonis	5	146 19 20.0	48.61	48.53	76	25	16.5	16.65	16.76
159	π Leonis	4	146 52 44.0	47.70	47.64	80	48	51.7	16.76	16.86
160	η Leonis	4	148 33 18.0	49.30	49.22	72	4	37.5	17.07	17.17
161	A Leonis	5	148 47 16.0	47.97	47.91	78	50	10.9	17.12	17.21
162	Regulus	1	148 53 32.5	48.34	48.27	76	52	9.1	17.14	17.23
163	ζ Leonis	3	150 49 28.0	50.39	50.28	65	23	47.8	17.47	17.56
164	γ Leonis	2	151 40 35.0	49.58	49.48	68	57	13 1	17.62	17.70
165	μ Urſæ major	3	151 59 9.0	54.60	54.37	47	18	10.5	17.67	17.76
166	ϱ Leonis	4	155 2 25.0	47.50	47.44	79	27	56.6	18.14	18 19
167	48 Leonis	5	155 34 0 0	47.12	47.06	81	49	5.0	18 22	18.29
168	37 Sextantis	6	158 23 42.0	46 91	46.87	82	22	6.4	18.61	18.67
169	38 Sextantis	6	158 42 21.0	46.90	46.85	82	23	40.1	18.65	18.71
170	55 Leonis	5	160 50 19.0	46.16	46.13	87	59	20.5	18.90	18.96
171	56 Leonis	6	160 53 17.0	46.79	46.74	82	32	24.0	18.91	18.96
172	β Urſæ major	2	161 47 56.0	55.80	55.40	32	20	13 9	19.01	19.07
173	d Leonis	5	162 2 29.0	46.46	46.42	85	5	55.0	19.04	19.09
174	c Leonis	5	162 4 30.0	46.73	46.68	82	36	53.1	19.04	19.09
175	α Urſæ major	1,2	162 10 35.0	57.97	57 45	26	57	33.2	19.05	19.12
176	χ Leonis	5	163 9 26.0	46.81	46.76	81	22	16.7	19.15	19.20
177	δ Leonis	3	165 19 38.0	47.96	47 87	68	9	53 3	19.36	19.40
178	θ Leonis	3	165 24 23.0	47.44	47.37	73	15	46.5	19.37	19.41
179	75 Leonis	5	166 14 1.0	46.20	46.18	86	40	21.8	19.44	19.48
180	76 Leonis	5	166 38 57.0	46.17	46.14	87	2	15.5	19.47	19.51
181	σ Leonis	5	167 11 17.0	46.50	46.46	82	39	30 3	19.52	19.55
182	79 Leonis	5,6	167 55 51.0	46.13	46.10	87	16	40.1	19.57	19.60
183	τ Leonis	4	168 53 51 0	46.21	46.18	85	49	27.5	19.64	19 67
184	e Leonis	5	169 30 53.0	45.82	45 80	91	40	54.8	19.68	19.71
185	υ Leonis	4	171 9 57.0	45.95	45 94	89	30	1.6	19.78	19.80
186	1 ξ Virginis	5	173 13 35.0	46.33	46.29	80	24	33.8	19.87	19.89
187	ν Virginis	5	173 22 41.0	46.25	46.21	82	7	35.0	19.88	19.89
188	β Leonis	1,2	174 11 59.0	46.50	46.45	74	5	13.0	19.91	19.9-
189	β Virginis	3	174 32 51.3	46.03	46.02	86	52	56.1	19.92	19.93
190	γ Urſæ major	2	175 16 25 0	48.29	48.00	34	58	16.1	19.95	19.96

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

Numb. of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion Jan. 1, 1760.	An. Preceſ. in Right Aſcenſion,		Mean Diſtance from N. Pole, Jan. 1, 1760,	An. Preceſ. in Declination,	
				1760.	1800.		1760.	1800.
			D. M. S.	S.	S.	D. M. S.	S.	S.
191	π Virginis	5	177 8 28.0	46.07	46.04	82 2 50.3	19.99	19.99
192	δ Urſæ major	3	180 51 27.0	45.44	45.16	31 37 54.1	20.01	20.00
193	γ Corvi	3	180 52 30.0	46.01	46.07	106 12 27.1	20.01	20.00
194	n Virginis	5	181 35 43.0	45.93	45.93	89 27 1.3	20.01	20.00
195	η Virginis	3	181 54 30.7	45.94	45.95	89 19 51.9	20.00	19 99
196	c Virginis	3	182 2 32.0	45.87	45.86	85 20 55.7	20.00	19.99
197	κ Draconis	3	185 46 32.0	40.04	39.67	18 53 2.6	19.91	19.89
198	χ Virginis	5	186 43 19.0	46.21	46.23	96 40 13 5	19.88	19.85
199	γ Virginis	3	187 22 45.9	45.93	45.95	90 7 43.5	19.85	19.82
200	ψ. Virginis	5	190 28 32.0	46 45	46.50	98 13 47.8	19.68	19.64
201	δ Virginis	3	190 52 54.0	45.62	45.62	85 17 32.5	19 65	19.61
202	ε Virginis	3	192 33 31.0	44 98	44.97	77 44 43.5	19 53	19.49
203	g Virginis	5	193 50 21.0	46.72	46.77	99 27 0.8	19.43	19.38
204	θ Virginis	4	194 23 16.0	46.30	46.33	94 15 3.2	19.39	19.34
205	Spica Virginis	1	198 8 44.1	47.01	47.07	99 54 3.0	19.02	18.96
206	ι Virginis	4	198 31 4.0	47.22	47.27	101 27 1.4	18.98	18.91
207	ζ Urſæ major	3	198 33 12.0	36.42	36.30	33 48 53.7	18.97	18.92
208	21 Virginis	5	199 52 44.0	46.52	46.57	95 0 28.8	18.82	18.75
209	m Virginis	5	202 15 44.0	46.92	46.98	97 28 57.5	18 52	18.45
210	η Urſæ major	2	204 31 1.0	35.85	35.77	39 28 51.7	18.21	18.15
211	α Draconis	2	209 28 38.0	24.29	24.31	24 28 18.2	17.42	17.33
212	κ Virginis	4	210 1 50.0	47.54	47.60	99 8 41.8	17.33	17.23
213	Arcturus	1	211 10 53.0	42.07	42.06	69 33 27.1	17.12	17.04
214	λ Virginis	4	211 32 26 0	48.20	48.27	102 15 12.3	17.06	16.95
215	θ Bootis	4	214 15 32.0	30.99	30.97	37 1 48.3	16.54	16.51
216	μ Libræ	5	219 3 4.0	48.87	48.95	103 8 2.5	15.54	15.42
217	α Libræ	2	219 24 40.6	49 35	49.42	105 1 44.5	15.46	15.35
218	2 ξ Libræ	5	220 56 46.0	48.34	48.41	100 25 30.5	15.12	14.99
219	18 Libræ	5	221 29 16.0	48.30	48.37	100 9 47.5	14.99	14.86
220	β Urſæ minor	3	222 55 17.0	−5.43	−4.78	14 51 44 5	14.06	14.67
221	1 ν Libræ	5	223 19 19.0	49.69	49.76	105 18 33.5	14.56	14.46
222	1 ι Libræ	3	224 38 51.0	50.73	50.83	108 51 58.7	14.24	14.10
223	β Libræ	2	226 1 57.5	48.08	48.14	98 28 51.5	13.89	13.76
224	4 ζ Libræ	4	229 50 59.8	50.32	50.40	106 1 11.9	12.90	12.75
225	γ Libræ	3,4	230 32 1.7	49.77	49.84	103 58 14.2	12.72	12.57
226	α Coron. Bor.	2	231 8 6.0	37.80	37.81	62 27 48.0	12.56	12.44
227	42 Libræ	5	231 32 12.0	52.58	52.68	113 1 3.0	12.45	12 29
228	κ Libræ	4	232 2 34 0	51.32	51.41	108 52 50.6	12.31	12.15
229	α Sepentis	2	233 7 0.0	43.91	43.93	82 48 11.2	12.01	11.87
230	1 A Scorpii	5	234 48 51.0	53.41	53.54	114 35 22.5	11.53	11.36
231	λ Libræ	4	234 51 40.0	51.70	51.78	109 25 48.8	11.52	11.35
232	ϑ Libræ	4	235 2 58.0	50.63	50.71	106 0 18.1	11.47	11.30
233	ε Serpentis	3	235 11 3.0	39.38	39.40	68 17 9.4	11.43	11.30
234	π Scorpii	3	236 5 47.0	53.81	53.91	115 23 41.2	11.16	10.99
235	ψ Libræ	4	236 11 53.0	49.94	50.01	103 34 0.4	11.13	10.97
236	δ Scorpii	3	236 32 44.0	52.65	52.73	111 55 1.7	11.03	10.86
237	β Scorpii	2	237 52 47.0	51.81	51.88	109 7 39.1	10.64	10.47
238	1 ω Scorpii	5	238 12 9.0	52.13	52.20	109 59 53.2	10.55	10.37
239	2 ω Scorpii	5	238 20 37 0	52.20	52.27	110 11 57.8	10.50	10.33
240	ι Hercules	5	238 50 11.0	27.75	27.77	43 17 29 0	10.36	10.26

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

Numb. of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion, Jan. 1, 1760.	An. Preceſ. in Right Aſcenſion,		Mean Diſtance from N. Pole, Jan. 1, 1760.	An. Preceſ. in Declination,	
				1760.	1800.		1760.	1800.
			D. M. S.	S.	S.	D. M. S.	S.	S.
241	ν Scorpii - - - -	4	239 31 18.0	51.80	51.88	108 48 58.2	10.15	9.98
242	δ Ophiuchi - - - -	3	240 26 54.0	46.86	46 90	93 3 26.9	9.87	9.71
243	19 Scorpii - - - -	5	241 33 35.0	53 60	53.69	113 34 2.5	9.53	9.34
244	σ Scorpii - - - -	4	241 39 40.0	54.14	54.21	114 59 41.1	9.50	9.31
245	ϕ Ophiuchi - - - -	5	242 31 27.0	52.20	52.27	109 27 16.5	9.23	9.05
246	g Ophiuchi - - - -	5	242 48 34.0	53.44	53.51	112 52 18.5	9.15	8.96
247	Antares - - - -	1	243 41 0.9	54.63	54.71	115 52 32.5	8.87	8.68
248	φ Ophiuchi - - - -	4	244 21 24.0	51.12	51.18	106 4 2.5	8.66	8.48
249	ω Ophiuchi - - - -	5	244 29 14.0	52.84	52.90	110 55 51.0	8.62	8.43
250	τ Scorpii - - - -	4	245 14 48.0	55.47	55.55	117 41 41.9	8.38	8.18
251	24 Scorpii - - - -	5	246 55 47.0	51.65	51.71	107 15 14.4	7.84	7.65
252	μ Draconis - - - -	4	255 5 46.3	18.51	18.56	35 12 23.0	5.15	5.08
253	A Ophiuchi dup. - - -	5	255 9 24.0	55.46	55.51	116 13 22.5	5.12	4.92
254	α Herculis - - - -	3	255 55 45.0	40.85	40.85	75 19 5.5	4.87	4.71
255	ρ Ophiuchi - - - -	4	256 39 35.0	53.40	53.37	110 49 49.6	4.62	4.41
256	ϑ Ophiuchi - - - -	3	256 49 28.0	54.90	54.95	114 44 1 9	4.56	4.34
257	43 Ophiuchi - - - -	5	257 4 19.0	56.25	56.30	117 53 1.5	4.48	4.26
258	B Ophiuchi - - - -	4	257 56 4.0	54.61	54.65	113 55 44.3	4.18	3.97
259	e Ophiuchi - - - -	5	259 11 56.0	54.58	54.58	113 45 7.5	3.75	3.54
260	α Ophiuchi - - - -	2	260 57 4.0	41.45	41.46	77 14 48.9	3.14	2.99
261	μ Ophiuchi - - - -	4	261 12 13.0	48.69	48.71	97 57 5.9	3.06	2.87
262	β Draconis - - - -	3	261 15 28.0	20.16	20.18	37 30 41.2	3.04	2.96
263	D Ophiuchi - - - -	5	262 15 59.0	53.76	53 78	111 32 29.8	2.69	2.48
264	p Sagittarii - - - -	3	263 7 5.0	56.36	56.38	117 42 45.1	2.40	2.18
265	b Sagittarii - - - -	5	266 17 18.0	54.72	54.79	113 46 5.5	1.30	1.08
266	γ Sagittarii - - - -	3,4	267 36 0.0	57.66	57.67	120 23 56.4	0.84	0.61
267	γ Draconis - - - -	2	267 45 50.0	20.76	20.76	38 28 23.6	0.78	0.70
268	1 μ Sagittarii - - - -	4	269 51 11.9	53.65	53.63	111 5 47.7	0.05	0.16
269	2 μ Sagittarii - - - -	4	270 13 34.0	53.52	53 52	110 46 28.4	0.08	0 29
270	δ Sagittarii - - - -	3	271 24 26.8	57.43	57.43	119 54 11.5	0.49	0 72
271	ε Sagittarii - - - -	2	272 3 44 0	59.66	59.65	124 28 12.1	0.72	0.95
272	λ Sagittarii - - - -	4	273 17 32.0	55.47	55.47	115 31 40.8	1.15	1.36
273	α Lyræ - - - -	1	277 12 11.0	30.09	30.06	51 25 33.7	2.51	2.63
274	φ Sagittarii - - - -	3	277 39 49.0	56.13	56.10	117 12 39.3	2.67	2.88
275	28 Sagittarii - - - -	5	277 57 59.0	54.19	54.16	112 37 4.5	2.77	2.98
276	c Draconis - - - -	5	279 29 44.0	17.42	17.40	34 41 45.7	3.30	3.37
277	1 ν Sagittarii - - - -	4	279 55 9.0	54.30	54.08	113 0 56.2	3.33	3.66
278	σ Sagittarii - - - -	3	280 5 40.0	55.78	55.74	116 34 7.3	3.51	3.72
279	2 ν Sagittarii - - - -	4	280 8 59.0	54.27	54.24	112 56 47.1	3.53	3.73
280	β Lyræ - - - -	3	280 18 26.0	33.09	53.09	56 53 47.8	3.58	3.71
281	1 ξ Sagittarii - - - -	6	280 46 8.0	53.45	53.42	110 56 44.3	3.74	3.94
282	2 ξ Sagittarii - - - -	5	280 51 5.0	55.63	53.60	111 23 51.8	3.77	3.97
283	1 ϑ Serpentis } - - -	3	281 4 20 9	44.59	44.58	86 5 29.3	3.84	4.01
284	2 ϑ Serpentis }		281 4 39.6	44.59	44 58	86 5 23.3	3.85	4.02
285	ζ Sagittarii - - - -	4	281 49 59.0	57.33	57.28	120 11 49.6	4.10	4.32
286	o Draconis - - - -	4	281 54 46.0	13.21	13.25	30 53 55 4	4.13	4.18
287	o Sagittarii - - - -	3	282 34 26.0	53.85	53.81	112 4 8.9	4.36	4.56
288	π Sagittarii - - - -	3	282 59 9.0	56.29	56.25	117 59 42.4	4.50	4.72
289	ζ Aquilæ - - - -	3	283 35 50.0	41.25	41.24	76 28 32.0	4.71	4.86
290	π Sagittarii - - - -	4	283 52 14.0	53.53	53.49	111 22 52.7	4.80	5.00

DECLINATION.

Dr. BRADLEY's CATALOGUE OF FIXED STARS.

Numb. of Stars.	Names of the Stars.	Magnitude	Mean Right Aſcenſion, Jan. 1, 1760.	An Preceſ. in Right Aſcenſion,		Mean diſtance from N Pole, Jan. 1. 1760.	An. Preceſ. in Declination,	
				1760.	1800.		1760	1800.
			D. M. S.	S.	S.	D. M. S.	S.	S.
291	ψ Sagittarii	4	285 12 11.0	55.20	55.15	115 38 42.5	5 25	5.45
292	d Sagittarii	4	285 53 43.0	52.69	52.65	109 21 26.0	5.48	5.73
293	1 χ Sagittarii	5	287 39 48.0	54 80	54.74	114 57 6.5	6.07	6.27
294	κ Cygni	4	287 53 20.0	20.71	20 69	37 3 57.0	6.15	6.22
295	∂ Draconis	3	288 6 35.0	0.59	0.45	22 45 34.5	6.22	6.22
296	∂ Aquilæ	3	288 20 56.0	45.05	45.03	87 20 44.3	6.30	6.46
297	2 h Sagittarii	5	290 31 10.0	54.82	54.76	115 23 28.8	7.02	7.21
298	ι Cygni	4	290 54 49.0	22.65	22 63	38 46 21.0	7.14	7.23
299	θ Cygni	4	292 30 0.0	24.15	24.13	40 19 30.3	7.66	7.74
300	f Sagittarii	5	293 5 6.0	52.74	52.68	110 19 2.0	7.85	8.03
301	γ Aquilæ	3	293 42 45.3	42.68	42.67	79 57 16.6	8.05	8.20
302	δ Cygni	3	294 22 9.0	27.98	27.97	45 26 39.1	8.26	8.35
303	α Aquilæ	1	294 46 0.7	43.29	43.28	81 44 51.1	8.38	8 54
304	ω Sagittarii	5	295 16 31.0	55.11	55.03	116 54 49.0	8.55	8.74
305	b Sagittarii	4	295 32 52.0	55.44	55.35	117 46 58.8	8.63	8.82
306	β Aquilæ	3	295 52 51.5	44.09	44.07	84 10 28.3	8.74	8.89
307	a Sagittarii	5	296 4 34.0	55.02	54.93	116 49 19.9	8.80	8.99
308	ε Draconis	5	297 13 20.0	−2.08	−2.37	20 20 26.6	9.15	9.15
309	θ Aquilæ	3	299 43 46.0	46.39	46.35	91 30 56.9	9.92	10.08
310	ς Draconis	5	300 24 52.0	4.89	4.69	22 48 29.2	10.13	10.15
311	1 α Capricorni	4	301 4 55.1	49.96	49.90	103 14 44.4	10.33	10.49
312	2 α Capricorni	3	301 10 49.9	49.97	49.83	103 16 22.0	10.38	10.52
313	1 σ Capricorni	5	301 22 43.0	52.10	52.02	109 50 54 5	10.42	10.59
314	2 σ Capricorni	5	301 23 12.0					
315	β Capricorni	3	301 52 36.5	50.65	50.5	105 31 14.5	10.57	10.73
316	ς Capricorni	5	303 47 15.0	51.52	51.44	108 35 19.0	11.13	11.29
317	υ Capricorni	5	306 35 19.0	51.45	51.37	108 57 56.8	11.93	12.09
318	α Delphini	3	307 7 27.0	41.63	41.62	74 55 13.4	12.03	12.20
319	α Cygni	1	308 18 51.3	30.53	30.54	45 33 59.9	12 41	12.50
320	ε Aquarii	4	308 40 1.0	48.78	48.72	100 21 28 1	12.50	12.65
321	ε Cygni	3	309 7 39.0	35.82	35.82	56 55 6 6	12.63	12.73
322	μ Aquarii	4	309 55 21.8	48.60	48.54	99 52 3.3	12.84	12.98
323	19 Capricorni	4	310 18 10.0	51.13	51.04	108 48 58.6	12.95	13.09
324	η Capricorni	5	312 40 43.0	51.51	51.42	110 47 13.2	13.66	13.71
325	θ Capricorni	4	313 6 23.4	50.72	50.64	108 10 12.1	13.74	13.81
326	1 χ Capricorni	5	313 41 40.0	51.82	51.72	112 8 35.8	13 83	13.96
327	ν Aquarii	5	314 7 30.0	49 07	49.00	102 19 42.8	13.93	14.07
328	φ Capricorni	5	315 29 5.0	51.49	51.39	111 37 59.2	14.27	14.41
329	29 Capricorni	5	315 36 34.0	49.98	49.90	106 9 13.2	14.30	14.43
330	α Equulei	4	315 57 23.0	44.89	44.86	85 43 52.8	14.39	14.50
331	ι Capricorni	4	317 12 50.0	50.30	50.22	107 50 30.7	14.69	14.82
332	α Cephei	3	318 12 28.0	21.29	21.24	28 25 26.7	14.92	14 97
333	ζ Capricorni	4	318 13 48.4	51.71	51.58	113 26 8.4	14.93	15.09
334	b Capricorni	5	318 45 3.0	51.46	51.38	112 50 16.9	15.05	15.18
335	β Aquarii	3	319 43 37.8	47.43	47.37	96 36 50.8	15.27	15.38
336	ε Capricorni	5	320 54 7.7	50.65	50.55	110 31 39.5	15 53	15.65
337	ξ Aquarii	5,6	321 14 24.0	47.89	47.83	98 55 2.7	15.61	15.72
338	ς Cygni	4	321 14 34.0	33.60	33.68	45 27 38.1	15.61	15.72
339	β Cephei	3	321 22 13.0	12.49	12.29	20 29 22.2	15.63	15.66
340	γ Capricorni	4	321 41 26.0	49.89	49.81	107 43 58.5	15.70	15.82

DECLINATION.

DR. BRADLEY's CATALOGUE OF FIXED STARS.

Numb of Stars.	Names of the Stars.	Magnitude.	Mean Right Aſcenſion, Jan. 1, 1760.			An. Preceſ. in Right Aſcenſion,		Mean Diſtance, from N. Pole, Jan. 1, 1760.			An. Preceſ. in Right Aſcenſion,	
						1760.	1800.				1760.	1800.
			D.	M.	S.	S.	S.	D.	M.	S.	S.	S.
341	κ Capricorni	5	322	18	23.0	50.37	50.27	109	56	48.1	15.84	15 95
342	λ Capricorni	5	323	23	57.0	48.56	48.49	102	27	37.7	16.07	16.18
343	δ Capricorni	3	323	26	28.3	49.62	49.53	107	12	12.9	16.08	16.18
344	2 π Cygni	5	324	29	11.0	32.92	33.13	41	47	33.7	16.29	16.36
345	μ Capricorni	5	325	2	44.4	48.93	48.85	104	40	7.9	16.40	16 51
346	ο Aquarii	5	327	43	23.5	46.54	46.50	93	18	12.3	16.92	17.01
347	α Aquarii	3	328	21	46.1	46.20	46.16	91	28	32.8	17.04	17.13
348	ι Aquarii	5	328	21	47.5	48.74	48.67	105	1	22.8	17.04	17.13
349	35 Aquarii	5	328	56	50.0	49.62	49.52	109	41	0 4	17.15	17.24
350	θ Aquarii	4	331	2	16.2	47.46	47.38	98	58	6.0	17.51	17.60
351	ε Aquarii	5	331	53	18.2	47.42	47.37	99	1	0.3	17.65	17.73
352	γ Aquarii	3	332	18	47.2	46 35	46.31	92	35	17.2	17.72	17.80
353	π Aquarii	4	333	15	13.1	45.90	45.87	89	49	54.6	17.87	17.95
354	ζ Aquarii	4	334	6	57.2	46.12	46.08	91	14	23.9	18.01	18.08
355	σ Aquarii	5	334	28	51.9	47.74	47.53	101	53	52.2	18 06	18.14
356	7 Lacertæ	4	335	21	45.0	36.31	36.40	40	56	41.6	18.19	18 25
357	υ Aquarii	5	335	22	53.7	49.17	49.07	111	15	41.8	18.19	18.27
358	η Aquarii	4	335	45	17.1	46.12	46.09	91	20	48.2	18.25	18.31
359	κ Aquarii	5	336	19	46.5	46.70	46.66	95	27	29.5	18.33	18.37
360	1 τ Aquarii	5	338	44	16.2	47.91	47.84	105	18	51.7	18.65	18.71
361	2 τ Aquarii	4	339	12	56.9	47.81	47.74	104	51	8.5	18.71	18.77
362	λ Aquarii	4	340	1	15.9	46.99	46.94	98	50	59.8	18.81	18.87
363	ι Cephei	4	340	17	54.0	31.50	31.61	25	3	28.9	18.84	18.88
364	δ Aquarii	3	340	28	21.6	47.98	47 91	107	5	26.6	18.86	18.92
365	Fomalhaut	1	341	5	5.0	49.81	49.67	120	53	14.0	18.93	18.99
366	β Piſcium	4	342	55	2.0	45.67	45.66	87	28	1.7	19.13	19.18
367	β Pegaſi	2	343	2	39 4	42.98	43.04	63	12	52.0	19.14	19.19
368	1 h Aquarii	6	343	9	29.0	46.84	46 80	98	59	1.8	19.15	19 20
369	2 h Aquarii	7	343	12	5.5	46.85	46.80	99	2	50.1	19.16	19.21
370	α Pegaſi	2	343	12	22.5	44.49	44.52	76	4	54.0	19.16	19 21
371	3 h Aquarii	7	343	20	30.6	46.86	46.81	99	13	25.7	19.17	19.22
372	φ Aquarii	4	345	28	15.9	46.56	46.54	97	20	17.5	19.37	19.41
373	1 ↓ Aquarii	5	345	49	32.6	46.83	46.78	100	23	26.6	19.40	19 44
374	χ Aquarii	6	346	5	59.4	46.69	46.65	99	1	50.3	19.43	19.47
375	2 ↓ Aquarii	5	346	21	15.7	46.80	46.75	100	29	18.5	19.45	19 49
376	3 ↓ Aquarii	5	346	36	55.3	46.82	46.77	100	55	6.3	19.47	19.51
377	96 Aquarii	5	346	44	13.0	46.45	46.41	96	25	55.7	19.48	19.52
378	d Caſſiopeiæ	5	348	34	10.0	38.77	38.99	29	1	52.2	19.62	19.64
379	1 κ Piſcium	5	348	39	34.0	45.93	45.92	90	3	17.9	19.62	19.65
380	1 λ Andromedæ	4	351	28	16.0	42.94	43.06	44	50	23.3	19.74	19.76
381	λ Piſcium	5	352	27	10.0	45.91	45.90	89	32	21.0	19.84	19.86
382	19 Piſcium	5	353	32	9 0	45.84	45.84	87	59	36.6	19.89	19 90
383	27 Piſcium	5	356	35	49.0	46 03	46.01	—	—	—	19.98	19.98
384	ω Piſcium	4	356	45	4.0	45.82	45.83	84	27	53.0	19.98	19.99
385	29 Piſcium	5	357	22	56.0	46.00	45.98	94	21	48.5	19.99	20.00
386	30 Piſcium	5	357	24	47.0	46.04	46.02	97	20	50.7	19 99	20.00
387	33 Piſcium	5	358	15	47.0	46.00	45.98	97	3	0.5	20.00	20.00
388	α Andromedæ	2	359	0	25.0	45.74	45.84	62	14	5.9	20.01	20.01
389	β Caſſiopeiæ	3	359	7	40.0	45 45	45.72	32	10	25.0	20.01	20 01

DECLINATION of ſome of the principal Fixed Stars, by Piazzi.

No.	Names of Stars.		Declin. Jan. 1, 1800.	Ann. Var.	AR.
			° ′ ″		h. ′
1	γ Pegaſi -	2 3	14 4 21 N	+20	0 3
2	ι Ceti - -	4	9 55 56 S	−20	9
3	κ Caſſiop. -	4	61 49 33 N	+19 9	22
4	ξ	4	52 47 41	+19 9	26
5	δ Andromedæ	3	29 45 55	+19 9	29
6	α Caſſiop. -	3	55 26 20	+19 9	29
7	β Ceti -	2 3	19 5 8 S	−19 8	34
8	γ Caſſiop. -	3	59 37 54 N	+19 6	45
9	Polaris -	3	88 14 24	+19 5	52
10	η Ceti -	3 4	11 15 39 S	−19 4	59
11	θ Ceti -	3	9 13 5	−19	I. 14
12	υ Perſei -	3 4	47 36 35 N	+18 6	26
13	ε Caſſiop. -	3 4	62 40 38	+18 1	40
14	γ Arietis -	4 5	18 18 38	+18 0	43
15	β Arietis -	3	19 49 32	+18 0	44
16	γ Andromedæ	3	41 21 46	+17 7	52
17	α Arietis -	2 3	22 30 40	+17 5	56
18	γ Ceti -	3	2 23 13	+15 7	II. 33
19	η Eridani -	3	9 42 1 S	−15 0	47
20	γ Perſei -	3 4	52 42 41 N	+14 7	50
21	θ Eridani -	2 3	41 6 37	−14 7	51
22	α Ceti -	2	3 17 52	+14 6	52
23	α Perſei -	2 3	49 8 14	+13 5	III. 10
24	δ Perſei -	3 4	47 8 3	+12 3	29
25	δ Eridani -	3 4	10 26 55 S	−11 9	34
26	ε Perſei -	3 4	39 25 7 N	+11 2	44
27	γ Eridani -	2 3	14 5 8 S	−10 9	49
28	γ Tauri -	3 4	15 8 3 N	+ 9 4	IV. 8
29	α -	1	16 5 42	+ 8 1	24
30	ζ Orionis -	4	2 6 12	+ 6 5	44
31	ε Aurigae -	4	43 30 42	+ 6 2	48
32	ζ -	4	40 46 5	+ 6 1	49
33	β Eridani -	3	5 21 18 S	− 5 3	58
34	Capella -	1	45 46 38 N	+ 5 0	V. 2
35	β Orionis -	1	8 26 35	− 4 8	5
36	β Tauri -	2	28 25 27	+ 4 0	14
37	γ Orionis -	2	6 9 23 N	+ 4 0	14
38	δ -	2	0 27 26	− 3 3	22
39	ε -	2 3	1 20 28	− 2 9	26
40	ξ -	3	2 3 33	− 2 6	31
41	α Columbæ -	2	34 11 17	− 2 4	32
42	κ Orionis -	3	9 45 3 S	− 1 9	38
43	δ Aurigæ -	3 4	54 14 59 N	+ 1 5	43
44	α Orionis -	1	7 21 26	+ 1 4	44
45	ζ Canis major	3	29 58 56 S	+ 1 1	VI. 13
46	β -	2	17 52 2 S	+ 1 2	VI. 14
47	γ Gemini -	3	16 33 29 N	+ 2 3	26
48	ε -	3	25 18 55	− 2 7	32
49	α Sirius -	1	16 27 5 S	+ 3 2	36
50	ε Canis major	2	28 42 29	+ 4 4	51
51	δ -	2	26 5 2	+ 5 2	VII. 0
52	δ Gemini -	3 4	22 20 20 N	− 5 9	8
53	η Canis -	2 3	28 55 16 S	+ 0 7	16
54	β Canis minor	3	8 40 56	− 6 5	16
55	Caſtor -	2	32 18 46	− 7 6	22
56	Procyon -	2	5 43 38	− 7 6	29
57	Pollux -	2	28 29 48	− 7 9	33
58	ζ Navis -		39 26 45	+ 9 7	VII. 57
59	δ Hydra -	3	6 23 33	−12 0	VIII. 27
60	ι Urſæ major	3 4	48 48 59 N	−13 2	45
61	2 α Cancri	4	12 37 24	−13 4	48
62	α Hydræ -	2	7 47 49 S	+15 2	IX. 18
63	θ Urſæ major	3	52 34 47 N	−15 3	19
64	Regulus -	1	12 56 26	−17 2	58
65	γ Leonis -	2	20 50 55	−17 7	X. 9
66	μ Urſæ major	3	42 30 0	−17 8	10
67	α Crateris -	4	17 14 4 S	+19 9	50
68	α Urſæ -	2	62 49 39 N	−19 1	51
69	β Crateris -	3 4	21 44 6 S	+19 4	XI. 2
70	δ Leonis -	3	21 37 3 N	−19 4	3
71	θ -	3	16 31 17	−19 4	4
72	β -	3	15 41 25	−19 9	39
73	γ Urſæ -	2	54 48 25 N	+20 0	43
74	α Corvi -	4	23 36 43 S	+20 0	58
75	δ -	3	58 8 40	−20 0	XII. 5
76	γ Corvi -	3	16 25 44 S	+20 0	6
77	η Virginis -	3 4	0 26 48 N	−20 0	10
78	δ Corvi -	3 4	15 23 58 S	+19 9	20
79	β -	2 3	22 17 16	+19 9	24
80	κ Draconis	3	70 53 34 N	−19 9	25
81	γ Virginis	3	0 20 56 S	+19 8	32
82	δ -	3 4	4 29 21 N	−19 6	46
83	Cor Caroli	2 3	39 24 7 N	−19 6	47
84	ε Virginis	3 4	12 2 18	−19 5	52
85	γ Hydra -	3 4	22 6 38 S	+19 1	XIII. 8
86	Spica Virginis	1	10 6 43	+19 0	15
87	ζ -	4	0 25 58	−18 7	24
88	η Urſæ -	3	50 19 0 N	−18 2	40
89	ζ Hydræ -	3	46 17 37 S	+18 0	43
90	η Bootis -	3	19 24 28 N	−17 9	45

No.	Names of Stars.		Declin. Jan. 1, 1800.			Ann. Var.		AR.	
			°	′	″			h.	′
91	α Draconis	3 4	65	20	8 N	−17	4	XIII.	59
92	κ Virginis	4	9	20	5 S	+17	2	XIV.	2
93	Arcturus -	1	20	13	40 N	−17	0		7
94	θ Bootis -	3	52	46	50	−16	5		18
95	γ -	3	39	11	23	−16	2		24
96	ζ -	3 4	14	35	43	−15	8		32
97	ε -	3	27	55	31	−15	5		36
98	2 α Libræ	3	15	12	4 S	+15	3		40
99	ξ Bootis -	3	19	56	22 N	−15	2		42
100	β Lupi -	3	42	18	54 S	+15	0		45
101	γ Scorpii	3 4	24	29	3	−14	6		52
102	β Bootis	3 4	41	11	13 N	−14	5		54
103	β Libræ	2 3	8	38	1 S	+13	8	XV.	6
104	β Cor. Bor.	4	29	48	15 N	−12	9		20
105	ι Draconis	3	59	40	16 S	−12	8		20
106	γ Urſæ minor	4	72	32	44 N	−12	8		21
107	δ Serpentis	3	11	13	5	−12	5		25
108	α Cor. Bor.	2	27	23	49	−12	4		26
109	ζ Urſæ minor	4	78	24	8	−10	6		52
110	β Scorpii	2	19	14	39 S	+10	5		54
111	δ Ophiuchi	3	3	9	59	+	9 7	XVI.	4
112	ε	3 4	4	11	32	+	9 4		8
113	γ Herculis	3 4	19	38	2 N	−	9 0		13
114	Antares -	1	25	58	25	+	8 7		17
115	η Draconis	3 4	61	58	16	−	8 4		21
116	β Herculis	2 3	21	56	9	−	8 3		22
117	ζ Ophiuchi	3	10	8	54 S	+	8 0		26
118	ζ Herculis	3	31	58	25 N	−	7 4		34
119	κ Ophiuchi	3 4	9	41	53	−	6 2		48
120	ε Herculis	3	31	13	48	−	5 9		53
121	η Ophiuchi	2 3	15	27	48 S	+	5 3		59
122	α Herculis	3 4	14	37	49 N	−	4 7	XVII.	6
123	δ	3 4	25	5	10	−	4 6		7
124	ε Urſæ minor	4	82	20	37 N	−	4 6		7
125	π Herculis	3	37	2	49	−	4 5		8
126	ζ Draconis	3	65	57	44	−	4 5		8
127	θ Ophiuchi	3	24	47	2	+	4 4		10

No.	Names of Stars.		Declin. Jan. 1, 1800.			Ann. Var.		AR.	
			°	′	″			h.	′
128	α		12	43	6 N	−	3 0	XVII.	26
129	β Draconis	2	52	27	20	−	3 0		26
130	β Ophiuchi	3	4	39	48	−	2 3		34
131	γ	4	2	47	46	−	1 9		38
132	γ Draconis	2	51	31	7	−	0 7		52
133	α Lyræ	1	38	36	22	+	3 0	XVIII.	30
134	δ Urſæ minor	3	86	33	43	+	3 2		37
135	γ Lyræ	3	32	25	31	+	4 5		51
136	ζ Aquilæ	3	13	34	45	+	4 9		56
137	δ Draconis	3	67	18	37	+	6 2	XIX.	12
138	δ Aquilæ	2	2	43	43	+	6 5		15
139	β Cygni	3	27	32	58	+	7 1		23
140	γ Aquilæ	3	10	8	15	+	8 3		37
141	β	3	5	55	14	+	8 9		45
142	α Capricorni	4	13	6	50 S	−	10 5	XX.	7
143	2 α	3	13	9	9	−	10 5		7
144	β	3 4	15	24	2	−	10 7		10
145	γ Cygni	3	39	37	26 N	+	11 1		15
146	β Delphini	4	13	54	35	+	12 1		28
147	α	3	15	13	0	+	12 2		30
148	α Cygni	1	44	34	22	+	12 5		35
149	γ Delphini	4	15	24	49	+	12 7		37
150	η Cephei	3 4	61	3	51	+	12 9		41
151	ζ Cygni	3	29	24	52	+	14 4	XXI.	4
152	β Aquarii	3 4	6	26	30 S	−	15 4		21
153	β Cephei	3	69	41	4 N	+	15 7		26
154	δ Capricorni	3	17	1	31 S	−	16 2		36
155	γ Aquarii	3 4	2	23	18	+	17 8	XXII.	11
156	ζ	4	1	2	16	−	18 1		19
157	ζ Pegaſi	3	9	47	33 N	+	18 5		31
158	δ Aquarii	3 4	16	52	44 S	−	18 9		44
159	Fomalhaut	1	30	40	38	−	19 0		47
160	β Pegaſi	2	27	0	7 N	+	19 2		54
161	α	1	14	7	59	+	19 2		55
162	γ Cephei	3	76	30	59	+	19 9	XXIII.	31
163	α Androm.	1	27	59	11	+	20 0		58
164	β Caſſiop.	2 3	58	2	49	+	20 0		59

A TABLE

DECLINATION.

A TABLE of the Declinations of ſome of the Principal Fixed Stars, taken from Mr. POND's obſervations in the Philoſophical Tranſactions for 1806.

	Greenwich.		Armagh.		Palermo.		Weſtbury. Co-lat. 38° 45′ 42″.8.		Mean of circular Inſtruments reduced to Jan. 1800.
	° ′ ″		° ′ ″		° ′ ″		° ′ ″		° ′ ″
γ Draconis	38 28 53.0	−0.6	38 28 53.8	+0.2	38 28 52.0	−1.6	38 28 53.6	0.0	38 28 53.6
Capella	44 13 21.5	+1.5	44 13 21.3	+1.3	44 13 18.5	−1.5	44 13 18.3	−1.7	44 13 20.0
α Cygni	45 25 41.4	+2.6	45 25 39.3	+0.5	45 25 38.4	−0.4	45 25 36.8	−2.0	45 25 38.8
α Lyræ	57 23 41.1	+4.6	51 23 37.1	+0.6	51 23 36.8	+0.3	51 23 35.8	−0.7	51 23 36.5
Caſtor	57 41 14.0	+1.0	*57 41 9.3	——	57 41 13.0	0.0	57 41 13.8	+0.8	57 41 13.0
Pollux	61 30 9.8	−2.5	*61 30 4.1	——	61 30 11.2	−1.1	61 30 13.5	+1.2	61 30 12.3
β Tauri	61 34 30.9	−2.1	61 34 32.3	−0.7	61 34 33.8	−0.6	61 34 33.5	+0.5	61 34 33.0
α Andromedæ	62 00 45.8	−1.7	62 00 45.0	−2.5	62 00 47.5	0.0	62 0 49.8	+2.3	62 0 47.5
α Coron. B.	62 36 10.5	+0.5	62 36 7.3	−2.7	62 36 9.8	−0.2	62 36 12.8	+2.8	62 36 10.0
α Arietis	67 29 20.1	−1.4	67 29 22.0	+0.5	67 29 21.7	+0.2	67 29 20.5	−1.0	67 29 21.5
Arcturus	69 46 7.8	−1.2	69 46 11.0	+2.0	69 46 10.3	+1.2	69 46 7.3	−1.7	69 46 9.0
Aldebaran	73 54 16.6	−0.3	73 54 18.3	+1.4	73 54 16.8	+0.1	73 54 15.3	−1.6	73 54 16.9
β Leonis	74 18 34.5	+1.0	74 18 34 0	+0.5	74 18 33.5	+0.5	74 18 32.3	−1.2	74 18 33.5
α Pegaſi	75 51 57.0	−2.7	75 52 1.0	+1.3	75 52 0.8	+1.1	75 51 57.8	− .9	75 51 59.7
γ Pegaſi	75 55 36.3	−1.9	75 55 37.5	−0.7	75 55 41.4	+3.2	75 55 36.8	−1.4	75 55 38.2
Regulus	77 3 35.1	+1.1	77 3 32.0	−2.0	77 3 36.0	+2.0	77 3 33.8	−0.2	77 3 34.0
α Ophiuchi	77 16 54.0	+0.8	77 16 53.4	+0.2	77 16 53.0	−0.2	77 16 53.3	+0.1	77 16 53.2
α Aquilæ	81 38 52.0	+1.0	81 38 50.6	−0.4	81 38 53.5	+2.5	81 38 51.3	+0.3	81 38 51.0
α Orionis	82 38 30.8	−0.9	82 38 31.8	+0.1	82 38 32.0	+0.3	82 38 31.3	−0.4	82 38 31.7
α Serpentis	82 56 1.2	−1.1	82 55 59.8	−2.4	82 56 5.0	+2.9	82 56 2.0	−0.3	82 56 2.3
Procyon	84 16 17.4	−3.6	84 16 19.3	−1.7	84 16 21.0	0.0	84 16 21.3	+0.3	84 16 21.0
α Ceti	86 42 6.1	−2.9	86 42 7.3	−1.3	86 42 9.8	+0.8	86 42 10.2	+1.2	86 42 9.0
β Virginis	87 6 26.3	−2.0	87 6 29.0	+0 7	87 6 27.5	−0.8	not obſerved.	——	87 6 28.3
α Aquarii	91 16 59.8	−4.3	91 17 4.6	+0.5	91 17 3.2	−0.2	91 17 4.6	+0.5	91 17 4.1
α Hydræ	97 47 49.1	−3.0	97 47 48.8	−3.2	97 47 54.0	+2.0	97 47 53.0	+1.0	97 47 52.0
Rigel	98 26 28.8	−6 0	98 26 33.0	−1.8	98 26 34.5	−0.3	98 26 36.3	+0.5	98 26 34.8
Spica Virginis	100 6 37.0	−3.8	100 6 38 8	−2.0	100 6 41.8	+1.0	100 6 42.8	+2.0	100 6 40.8
2 α Capricorni	103 9 3.2	−5.1	*103 9 13.3	——	103 9 8.2	−0.1	103 9 7.8	−0.5	103 9 8.3
α Libræ	105 11 55.6	−6.2	105 12 00.9	−0.9	105 12 2.7	+0.9	not obſerved.	——	105 12 1.8
Sirius	106 26 56.3	−7.2	106 27 4.1	+0.6	106 27 4.0	+0.5	106 27 1.8	−1.7	106 27 3.5
Antares	115 58 14.4	−9.7	115 58 24.3	——	115 58 24.0	——	not obſerved.	——	115 58 24.1
Fomalhaut	120 40 30.9	−9.3	——	——	120 40 40.2	——	not obſerved.	——	——
Polaris	1 45 34.5	——	1 45 34.5	——	1 45 36.2	——	1 45 37.0	——	1 45 36.0

The ſtars marked * are omitted in the compariſon.

The laſt column is the mean of the beſt obſervations the author could procure, compared with his own, and is probably correct to the neareſt ſecond.

Mr. WOLLASTON's TABLES.

Table I.

The mean right Aſcenſions and North-polar Diſtances of Thirty-ſix principal Fixed Stars, to the Beginning of the Year 1802; with their Annual Preceſſions, Annual Proper Motions, and Annual Variations, from the lateſt Obſervations.

Names of Stars.	Right Aſcenſion in Signs, Degrees, &c.	Annual Preceſſion.	Annual proper motion.	Annual Variation.	Right Aſcenſion in Time.	Annual Preceſſion.	Annual proper motion.	Annual Variation.	Number of Obſervations	Diſtance from the North Pole.	Annual Preceſſion.	Annual proper motion.	Annual Variation.	Magnitude.
	S. D. M. S.	S.	S.	S.	H. M S.	S.	S.	S.		D. M. S.	S.	S.	S.	
γ Pegaſi -	0 0 45 46.8	46.13	−0.09	46.04	0 3 3.12	3.075	−0.006	3.069	125	75 54 55.9	−20.05	−0.15N	−20.20	2
α Arietis -	0 29 0 34.1	50.08	+0.10	50.20	1 56 2.27	3.339	+0.007	3.347	85	67 28 45.2	−17.54	+0.07 S	−17.47	2.3
α Ceti -	1 12 59 6.3	46.84	−0.12	46.73	2 51 56.42	3.123	−0.008	3.115	29	86 41 36.6	−14.67	−0.08N	−14.75	2
Aldebaran	2 6 8 34 5	51.34	+0.03	51.39	4 24 34.30	3.423	+0.002	3.426	92	73 54 0.6	− 8.11	+0.12 S	− 8.00	1
Capella -	2 15 31 14.4	66.01	+0.21	66.23	5 2 4.96	4.401	+0.014	4.415	53	44 13 12.4	− 5.01	+0.44 S	− 4.57	1
Rigel -	2 16 15 24.1	43.17	−0.03	43.14	5 5 1.61	2.878	−0.002	2.876	56	98 26 19.0	− 4.76	−0.16N	− 4 92	1
β Tauri -	2 18 26 45.8	56.70	+0.01	56.71	5 13 47.05	3.780	+0.001	3.781	15	61 34 23.1	− 4.02	+0.10 S	− 3.91	2
α Orion -	2 26 6 48.9	48.65	+0.01	48.65	5 44 27.26	3 243	+0.001	3.243	115	82 38 27.8	− 1.36	−0.13N	− 1.49	1
Sirius -	3 9 6 21.8	40.21	−0.42	39.80	6 36 25.45	2.681	−0.028	2.653	56	106 27 4.7	+ 3.17	+1.04 S	+ 4.21	1
Caſtor -	3 20 29 7.7	57.95	−0.15	57.80	7 21 56.51	3.863	−0 010	3.853	31	57 41 28.0	+ 7.02	+0..4 S	+ 7.06	2
Procyon -	3 22 13 54.0	47.93	−0.80	47.13	7 28 55.60	3.195	−0.053	3.142	106	84 16 34.4	+ 7.59	+0.95 S	+ 8.53	1.2
Pollux -	3 23 17 40.2	56.05	−0.74	55.32	7 33 10.68	3.737	−0 049	3.688	68	61 30 25.7	+ 7.93	0.00	+ 7.93	2
α Hydræ -	4 19 27 49.5	44.28	−0.09	44.19	9 17 51.30	2.952	−0.006	2 946	27	97 48 19.3	+15.24	−0.14N	+15 10	2
Regulus -	4 29 27 12.0	48.41	−0.22	48.18	9 57 48.80	3.227	−0.015	3.212	65	77 4 9.5	+17.27	−0.08N	+17.19	1
β Leonis -	5 24 44 13.1	46.58	−0.57	46.01	11 38 56.87	3.105	−0.038	3.067	44	74 19 14.6	+19.97	+0.07 S	+20.04	1.2
β Virginis -	5 25 5 41.6	46.14	+0.74	46.88	11 40 22.77	3.076	+0.049	3.125	13	87 7 6.7	+19.98	+0.24 S	+20.22	3
Spica Virginis	6 18 41 40.5	47.22	−0.02	47.21	13 14 46.70	3.148	−0.001	3.147	66	100 7 14.6	+18.99	−0.19N	+18.80	1
Arcturus	7 1 39 28.8	42.18	−1.26	40.92	14 6 37.92	2.812	−0.084	2 728	174	69 46 45.4	+17.07	+1.72 S	+18.79	1
1 } α Libræ } 2	7 9 56 22.2	49.54	−0.11	49.44	14 39 45.48	3.303	−0.007	3.296	26	105 9 41.9	+15.37	−0.18N	+15.19	6
}	7 9 59 12.0	49.56	−0.11	49.45	14 39 56.80	3.304	−0.007	3.297	26	105 12 26 0	+15.36	−0.15N	+15.21	2
α Cor. Bor.	7 21 34 36.8	37.92	+0.26	38.18	15 26 18.45	2.528	+0.017	2.445	66	62 36 35.5	+12.46	+0.03 S	+12.49	2.3
α Serpentis	7 23 37 50.8	44.05	+0.11	44.18	15 34 31.39	2.937	+0.007	2.945	61	82 56 24.6	+11.89	−0.19N	+11.70	2
Antares	8 4 19 21.5	54.87	0.00	54.87	16 17 17.43	3.658	0.000	3.658	59	115 58 31.2	+ 8.69	−0.26N	+ 8.43	1
α Herculis	8 16 24 21.1	40.97	0.00	40.97	17 5 37.41	2.731	0.000	2.731	22	75 22 15.6	+ 4.71	−0 23N	+ 4.48	2
α Ophiuchi	8 21 26 12.1	41.58	+0.06	41.64	17 25 44.81	2.772	+0.004	2 776	190	77 17 0.0	+ 2.99	+0.05 S	+ 3.03	2
α Lyræ	9 7 33 29.5	30.20	+0.23	30.40	18 30 13.97	2.013	+0.015	2.027	67	51 23 35.3	− 2.64	−0.27N	− 2.91	1
γ } α } Aquilæ } β }	9 24 12 38.0	42.80	−0.11	42.69	19 36 50.53	2 853	−0.007	2.846	83	79 51 26.8	− 8.22	−0.16N	− 8.38	3
	9 25 16 46.9	43.40	+0.48	43.88	19 41 7.13	2.893	+0.032	2.925	- -	81 38 33.8	− 8.56	−0 54N	− 9.11	1.2
	9 26 23 46.1	44.21	−0.03	44.16	19 45 35.07	2.947	−0.002	2.944	78	84 4 33.0	− 8.91	+0.35 S	− 8.57	3.4
1 } α Capricorni } 2	10 1 39 55.3	50.04	0.00	50.04	20 6 39.69	3.336	0.000	3.336	13	103 6 22.9	−10.53	−0.28N	−10.80	3
	10 1 45 52.2	50.04	+0.05	50.09	20 7 3.48	3.336	+0.003	3.339	137	103 8 41.6	−10.56	−0.26N	−10.81	3
α Cygni -	10 8 40 13.7	30.63	−0.08	30.57	20 34 40.91	2.042	−0.005	2.038	48	45 25 16.4	−12.53	−0.03N	−12.56	1.2
α Aquarii -	10 28 54 6.4	46 29	−0.08	46.21	21 55 36.43	3.086	−0.005	3.081	136	91 16 25.1	−17.17	−0.19N	−17.36	3
Fomalhaut	11 11 40 12.1	49.80	+0.35	50.15	22 46 40 81	3.320	+0.023	3.343	25	120 39 52.7	−19.04	−0.06N	−19.10	1.2
α Pegaſi -	11 13 43 33.5	44.64	−0.06	44.60	22 54 54.23	2.976	−0.004	2 972	135	75 51 18.2	−19.25	−0.18N	−19.43	2
α Andromedæ	11 29 32 39.1	45.97	+0.08	46.05	23 58 10.61	3.063	+0.005	3.070	142	62 0 5.8	−20.05	+0.06 S	−19.99	2

TABLE II.

CORRECTIONS of R. A. in Time of the STARS in the preceding Catalogue to every Tenth Day in the Year: Copied exactly from Dr. MASKELYNE's; excepting α Herculis, which has been added.

N. B. In this Table an allowance is made for the Motion of each Star as set down at the bottom of its Column.

	γ Pegasi	α Arietis	α Ceti	Aldebaran	Capella	Rigel	β Tauri	α Orionis	Sirius	Castor	Procyon	Pollux	α Hydræ	Regulus	β Leonis	β Virginis
	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
Jan. 0	−0.19	+0.50	+0.75	+1.21	+1.77	+1.25	+1.44	+1.32	+1.41	+1.59	+1.33	+1.51	+1.07	+0.92	+0.39	+0.39
10	0.30	0.38	0.65	1.15	1.76	1.24	1.45	1.36	1.47	1.74	1.47	1.67	1.29	1.19	0.72	0.70
20	0.41	0.25	0.55	1.07	1.69	1.18	1.42	1.35	1.48	1.83	1.55	1.77	1.47	1.41	1.01	0.98
30	0.50	0.11	0.41	0.97	1.55	1.09	1.34	1.29	1.45	1.86	1.58	1.81	1.59	1.59	1.27	1.23
Feb. 9	0.57	−0.03	0.27	0.83	1.39	0 97	1.21	1.20	1.37	1.84	1.55	1.79	1.64	1.71	1.50	1.45
19	- -	0.17	0.13	0.69	1.18	0.81	1.05	1.07	1.24	1.77	1.50	1.74	1.71	1.79	1.64	1.62
Mar. 1	- -	0.28	−0.01	0.52	0.95	0.65	0.88	0.93	1.09	1.65	1.40	1.63	1.70	1.83	1.81	1.75
11	- -	0.38	- -	0.35	0 70	0.48	0.69	0.76	0.92	1.49	1.27	1.49	1.65	1.82	1.91	1.85
21	- -	- -	- -	0.19	0.46	0.31	0.51	0.59	0.74	1.31	1.12	1.32	1.56	1.77	1.95	1.89
31	- -	- -	- -	0.06	0.24	0.14	0.33	0.43	0.56	1.13	0.96	1.15	1.45	1.69	1.97	1.91
Apr. 10	- -	- -	- -	−0 05	0.04	0.00	0.18	0.27	0.38	0.93	0.80	0.96	1.32	1.59	1.95	1.89
20	- -	- -	- -	0.13	−0.09	−0.11	- -	0.15	0.22	0.75	0.65	0.79	1.19	1.48	1.90	1.85
30	- -	- -	- -	0.17	0.18	0.19	- -	0.05	0.08	0.59	0.51	0.63	1.05	1 34	1.83	1.79
May 10	- -	- -	- -	0.15	0.23	0.24	- -	−0.01	−0.04	0.46	0.39	0.50	0.91	1.22	1.74	1.72
20	+0 49	- -	- -	0.11	0 20	0.24	- -	0.02	0.13	0.36	0.30	0.40	0.79	1.10	1.64	1.67
30	0.79	- -	- -	0.00	0.13	0.19	- -	0.00	0.17	0.30	0.25	0.33	0 69	0.99	1.53	1.53
June 9	1.09	- -	- -	+0 15	0 00	0.09	- -	+0.06	0.17	0.28	0.22	0.30	0.58	0.90	1.43	1.44
19	1.41	+0.85	- -	0 33	+0.20	+0.04	- -	0.17	0.13	0.30	0.23	0.32	- -	0.82	1.33	1.34
29	1.73	1.17	+0.81	0.55	0.45	0.20	- -	0.31	0 06	0.37	0.28	0.37	- -	0.76	1.23	
July 9	2.03	1.49	1.09	0 81	0.75	0.40	- -	0.49	+0.05	0.48	0.35	0.46	- -	0.72	1.14	
19	2.33	1.82	1.39	1 08	1.08	0.63	- -	0.70	0.21	0.64	0.48	0.61	- -	0.71	1.06	
29	2.60	2.15	1.70	1.37	1.44	0.87	- -	0 93	0.38	0.82	0.62	0.76	- -	0.71		
Aug. 8	2.85	2.47	2.00	1.67	1.82	1.14	+1.57	1.19	0.58	1.04	0.80	0.97	- -	0.74		
18	3.06	2.76	2.29	1 97	2.22	1.41	1.89	1.46	0.81	1.29	1.00	1.19	- -	0.81		
28	3.23	3.03	2.57	2.29	2.63	1.70	2.22	1.74	1.06	1.56	1.22	1.44	- -	0.91		
Sept. 7	3.37	3.27	2.83	2.58	3.04	1.98	2.55	2.03	1.32	1.86	1.45	1.71	- -	1.03		
17	3.46	3.49	3.07	2.88	3.44	2.27	2.89	2.32	1.60	2.17	1.71	2.01	- -	1.19		
27	3.52	3.67	3.29	3.16	3.84	2.55	3.21	2.61	1.89	2.50	1.99	2.32	- -	1.37		
Oct. 7	3.55	3.82	3.47	3.43	4.23	2.81	3.53	2.90	2.18	2.84	2.27	2.64	+1.57	1.59		
17	3.55	3 94	3.63	3.67	4.59	3.07	3.83	3.18	2.46	3.19	2.57	2.98	1.83	1.83		
27	3.51	4.02	3.76	3.90	4.93	3.31	4.11	3.45	2.75	3.54	2.87	3.32	2.11	2.11	1.55	
Nov. 6	3.45	4.07	3.86	4 09	5.31	3.52	4.37	3.70	3.02	3.89	3.10	3.66	2.41	2.40	1.79	
16	3.37	4.09	3.93	4.27	5.52	3.71	4.61	3.93	3.28	4.24	3.45	4.00	2.72	2.71	2.06	2.05
26	3.28	4.08	3.97	4.41	5 75	3.87	4 82	4.13	3.51	4.56	3.73	4.31	3.03	3.04	2.36	2.34
Dec. 6	3.18	4.05	3.99	4.51	5.94	3.99	5.00	4.31	3.72	4.86	3.99	4.61	3.34	3.37	2.65	2.65
16	3.07	3.97	3.96	4.57	6.07	4.08	5.13	4.45	3.88	5.13	4.22	4.87	3.63	3.68	3.02	2.97
26	2.95	3.89	3.91	4.61	6.14	4.13	5.21	4.55	4.01	5.35	4.41	5.10	3.91	3.98	3.35	3.31
31	2.89	3.83	3.89	4.61	6.16	4.13	5.23	4.58	4.06	5.45	4.49	5.20	4.03	4.12	3.50	3.47
Mot.									″	″	″	″		″		
in R. A.	- -	- -	- -	- -	- -	- -	- -	- -	−0.042	−0.019	−0.053	−0.062	- -	−0.027		
in P. D.	- -	- -	- -	- -	- -	- -	- -	- -	+1.20							

TABLE II.—*continued.*

CORRECTIONS of R. A. in Time to every Tenth Day—*continued.*

	Spica ♍	Arcturus	α ♎ 2da	αCoronæ	α Serpentis	Antares	αHerculis	α Ophiuchi	α Lyræ	α Aquilæ	α 2da	α Cygni	α ♒	Fomalhaut	α Pegasi.	α Androm.
	″	″		″	″	″	″		″	″		″		″	″	″
Jan. 0	−0.19	−0.49	−0.63	−0.97	−0.88	−1.15	−1.26		−1.67	−1.27	- -	−1.59	- -	−0.73	−0.58	−0.23
10	+0.18	0 17	0.31	0.67	0.60	0.85	1.11	″	1.55	1.20	- -	1.64	- -	0.81	0.67	0.37
20	0.50	+0.17	+0.02	0.36	0.31	0.53	0.82	−0.83	1.38	1.09	- -	1.64	- -	0.87	0.73	0.49
30	0.80	0.48	0.35	0 04	0.00	0.20	0.54	0.53	1.17	0.95	- -	1.58	- -	0.91	- -	0.59
Feb. 9	1.08	0.79	0.67	+0.29	+0.31	+0.13	0.29	0.31	0.93	0.77	- -	1.47	- -	0.92	- -	0.68
19	1.33	1.08	0.97	0.61	0.61	0.48	+0.01	0.03	0.65	0.57	- -	1.31	- -	0.89	- -	0.73
Mar. 1	1.55	1.34	1.25	0.92	0.90	0.81	0.29	+0.27	0.35	0.36	- -	1.11	- -	0 82		
11	1.73	1.56	1.50	1.21	1.17	1.13	0.59	0.55	0.04	0.11	″ -	0.87	- -	0.71		
21	1.88	1.75	1.72	1.47	1.42	1.44	0.87	0.84	+0.29	+0.17	+0.13	0.58	- -	0.58		
31	1.99	1.91	1.92	1.70	1.65	1.73	1.15	1.12	0.63	0.44	0.41	0.27	- -	0.40		
Ap. 10	2.06	2.03	2.08	1.89	1.85	1.99	1.42	1.39	0 95	0.72	0.70	+0.07	- -	0.19		
20	2.11	2.11	2.21	2.07	2.02	2.23	1.65	1.65	1.27	1.02	0.99	0.41	- -	+0.06		
30	2.13	2.16	2.33	2.21	2.17	2.45	1.86	1.88	1.57	1.31	1.31	0.78	- -	0.35		
May 10	2.13	2.19	2.41	2.30	2.29	2.63	2.09	2.09	1.85	1.60	1.61	1.15	- -	0.65		
20	2.10	2.18	2.45	2.37	2.37	2.79	2.27	2.28	2.10	1.87	1.91	1.50	- -	0.98		
30	2.06	2.15	2.48	2.40	2 43	2.91	2.43	2.44	2.32	2.13	2.20	1.83	- -	1.32	+1.14	+0.78
June 9	2.00	2.10	2.47	2.40	2.46	3.00	2.53	2.56	2.49	2.37	2.47	2.14	″ -	1.67	1.46	1.11
19	1.92	2.03	2.45	2.37	2.46	3.05	2.63	2.65	2.63	2.58	2.71	2.41	+2.12	2.01	1.70	1.45
29	1.83	1.93	2.39	2.30	2.43	3.07	2.65	2.70	2.72	2.75	2.93	2.65	2.40	2.35	2.07	1.78
July 9	1.73	1.82	2 31	2.21	2.37	3.05	2.66	2.71	2.76	2.89	3.10	2.83	2.64	2.67	2.35	2.11
19	1.63	1.70	- -	2.09	2.29	2.99	2.61	2.70	2.75	2.99	3.24	2.97	2.87	2.95	2.61	2.41
29	1.53	1.57	- -	1.94	2.19	2.90	2.52	2.63	2.70	3.05	3.33	3.04	3.04	3.21	2.84	2.70
Aug. 8	1.42	1.41	- -	1.77	2.07	2.78	2.42	2.53	2.59	3.06	3.38	3.07	3.08	3.42	3.03	2.95
18	1.32	1.27	- -	1.60	1.91	2.64	2.25	2.41	2.44	3 03	3.38	3.03	3.28	3.59	3.18	3.17
28	1.24	1.15	- -	1.42	- -	2.47	2.12	2.26	2.25	2 96	3.34	2.95	3.33	3.71	3.28	3.34
Sept. 7	1.16	1.03	- -	1.24	- -	2.30	1.93	2.09	2.03	2.85	3.26	2.81	3.35	3.77	3.35	3.47
17	1.13	0.91	- -	- -	- -	2.14	1.76	1.91	1.79	2.74	3.15	2.64	3.33	3.80	3.37	3.57
27	1.11	0.84	- -	- -	- -	1.98	1.59	1.74	1.54	2.58	3.02	2.43	3.27	3.78	3.37	3.62
Oct. 7	1.14	0.80	- -	- -	- -	1.85	1.42	1.57	1.29	2.42	2 87	2.19	3.17	3.73	3.32	3.64
17	1.21	0.80	- -	- -	- -	1.75	1.28	1.43	1.04	2.25	2.71	1.94	3.07	3.63	3.25	3.63
27	1.33	0.85	- -	- -	- -	1.65	1.17	1.39	0.81	2.09	2.55	1.96	2.95	3.51	3.16	3.67
Nov. 6	1.42	0.95	- -	- -	- -	1.66	1.10	- -	0.62	1.94	2.41	1.43	2.81	3.37	3.05	3.50
16	1.65	1.09	- -	- -	- -	1.69	1.09	- -	0.47	1.82	2.29	1.19	2 68	3.23	2.93	3.40
26	1.93	1.27	- -	- -	- -	1.78	1.10	- -	0.35	1.72	2.19	0.97	2.56	3.07	2.81	3.29
Dec. 6	2.21	1.50	- -	- -	- -	1.93	1.15	- -	0.28	1.66	2.12	0.78	2.45	2.92	2.65	3.17
16	2.51	1.77	- -	+1.18	- -	2.13	1.24	- -	0.27	1.65	- -	0.62	2.35	2.72	2.57	3.03
26	2.83	2.07	- -	1.42	+1.92	2.37	1.40	- -	0.30	1.65	- -	0.50	2.25	2.67	2.46	2.91
31	3.00	2.22	+2.67	1.56	2.05	2.51	1.47	- -	0.35	1.68	- -	0.45	- -	2.61	2.41	2.83
Mot's		″														
in R.A.	- -	−0.093	- -	- -	- -	- -	- -	- -	- -	″						
in P. D.	- -	+2.01	- -	- -	- -	- -	- -	- -	- -	+0.038						

DECLINATION.

TABLE III.

CORRECTIONS of R. A. in Time to every Tenth Degree of Long. of ☽'s Ascending Node.
Copied from Dr. MASKELYNE's; with the Addition of α Herculis.

Arg. Long. of ☊	γ Pegasi.	α Arietis.	α Ceti.	Aldebaran.	Capella.	Rigel.	β Tauri.	α Orionis.	Spica ♍	Arcturus	α ♎ 2d
S ° S	″	″	″	″	″	″	″	″	″	″	″
O. o VI.	−0.16+	−0.23+	−0 03+	−0.07+	−0.17+	+0.03−	−0.07+	+0.01+	−0.11+	+0.20−	−0.13+
10	0.35	0 43	0.22	0.29	0.44	−0.15+	0.31	0.21	0.30	0 03	0 33
20	0.52	0.62	0 41	0.49	0.69	0.33	0.53	0 40	0 48	−0.15+	0 53
I. o VII.	0.68	0.79	0.58	0 67	0.93	0 49	0.73	0.58	0.65	0 33	0.70
10	0.82	0.94	0.73	0.84	1.13	0.63	0.92	0.75	0.80	0.49	0.85
20	0.94	1.05	0.87	0.98	1.31	0 77	1.07	0.89	0.93	0 63	0.98
II. o VIII.	1.03	1.14	0.97	1.09	1.44	0.87	1.20	1.00	1.02	0.77	1.08
10	1.08	1.19	1.05	1.17	1.53	0.95	1.29	1.09	1.09	0.87	1.15
20	1.10	1 21	1.10	1.21	1.57	1.00	1.33	1.14	1.12	0.95	1.18
III. o IX.	1.09	1.19	1 11	1.21	1.56	1.03	1.34	1,15	1.12	1.00	1.17
10	1.05	1.13	1.09	1.19	1.51	1.01	1.31	1 13	1 08	1.02	1.13
20	0.97	1.03	1.03	1.11	1.41	0.97	1.23	1.08	1.01	1.01	1.06
IV. o X.	0.87	0 91	0 95	1.01	1.27	0 90	1.13	0.99	0.91	0.97	0.95
10	0.73	0 76	0.83	0.88	1.09	0.80	0.98	0.88	0.79	0.90	0.81
20	0 58	0.59	0.69	0.73	0.87	0 67	0.81	0.73	0.64	0.80	0.65
V. o XI.	0.41	0.39	0.53	0.54	0.63	0.53	0.61	0.57	0.47	0.67	0.47
10	0.23	0.19	0.35	0.35	0 37	0.37	0.39	0.39	0.28	0.53	0.28
20	0.03	+0.02−	1.17	0.14	0.10	0.20	0.16	0.19	0.09	0.37	0.07
VI. o XII.	+0 16−	0.23	+0.03−	+0 07−	+0.17−	0.03	+0.07−	−0.01	0 .11−	0.20	+0.13−

Arg. Long. of ☊	α Coronæ	α Serps.	Antares.	α Herculis	α Ophiuchi.	Sirius.	Castor.	Procyon.	Pollux.	α Hydræ	Regulus.
S ° S.	″	″	″	″	″	″	″	″	″	″	″
O o VI.	+0.21−	+0.05−	−0.13+	+0.15−	+0.02−	−0 03+	+0.13−	+0.03−	+0.13−	−0.07+	+0 13−
10	0.05	−0.13+	0.36	0 03	−0.15+	0.19	−0.11+	−0.17+	−0.10+	0.25	−0.07+
20	−0.11+	0.31	0.57	−0 08+	0.31	0.35	0.34	0.37	0.33	0.42	0.27
I. o VII.	0 27	0 48	0.77	0.20	0.47	0.50	0.57	0.55	0.55	0.58	0.47
10	0.42	0.63	0 94	0.30	0.61	0.63	0.78	0.71	0.75	0.73	0.64
20	0.55	0.77	1.08	0.40	0.74	0.75	0.97	0.85	0.93	0.85	0.80
II. o VIII	0.67	0.88	1.19	0 49	0.84	0.84	1.12	0.97	1.09	0.94	0.93
10	0.77	0 97	1.27	0.56	0 92	0.91	1.25	1.06	1.21	1.01	1.03
20	0.85	1.02	1.30	0.62	0 97	0.95	1.33	1.11	1.29	1.05	1.11
III. o IX.	0 90	1.05	1.30	0·64	0.99	0.95	1.37	1.13	1.33	1.05	1.15
10	0.92	1.04	1.25	0 67	0.98	0.93	1.38	1.12	1.33	1.03	1.15
20	0.91	1.00	1.17	0.66	0.93	0.89	1,34	1.07	1.29	0 97	1.12
IV. o X.	0.88	0,93	1.05	0.64	0.87	0.81	1.26	0 99	1.22	0.88	1.06
10	0.82	0.83	0.91	0.59	0.77	0.71	1.14	0.89	1.11	0.76	0.96
20	0.74	0.71	0.71	0.52	0.65	0.59	0 99	0.75	0.96	0.63	0.83
V. o XI.	0.63	0.57	0 53	0.45	0.51	0.45	0.81	0.59	0.78	0.47	0.69
10	0.51	0.40	0.31	0.35	0 36	0.30	0.60	0.41	0 58	0.30	0.51
20	0.36	0.23	0.09	0 26	0.19	0.14	0.37	0.22	0.36	0 12	0.33
VI. o XII	0 21	0.05	+0.13−	0.15	0.02	+0.03−	0.13	0.03	0.13	+0.07−	0.13

Arg. Long. of ☊	β Leonis.	β Virginis	α Lyræ.	α Aquilæ.	α ♍ 2da.	α Cygni.	α ♒	Fomal.	α Pegasi.	α Androm.
S ° S	″	″	″	″	″	″	″	″	″	″
O o VI.	+0.17−	+0.03−	−0.06+	−0.04+	+0.08−	−0.39+	+0.01−	+0.36−	−0.15+	−0.33+
10	−0.02+	−0.15+	0.19	0 21	−0.13+	0.51	−0.17+	0.15	0.33	9.52
20	0.21	0.34	0.31	0.39	0.33	0.61	0.36	−0.07+	0.30	0.69
I. o VII.	0.40	0.52	0.41	0.55	0.53	0.70	0.54	0.28	0.66	0.83
10	0.58	0.68	0.51	0.69	0.71	0.77	0.69	0.49	0.79	0.95
20	0.73	0.81	0.59	0.81	0.86	0.81	0.83	0.67	0.91	1.05
II. o VIII.	0.87	0.93	0.65	0.91	0.99	0.83	0.95	0.85	0.99	1.11
10	0.98	1.02	0.99	0.98	1.09	0.81	1.03	0.99	1.05	1.13
20	1.06	1.07	0.72	1.02	1.15	0.78	1.08	1.10	1.07	1.13
III. o IX	1.11	1.09	0.72	1.03	1.19	0.73	1.10	1.19	1.06	1.09
10	1.12	1.09	0.69	1.01	1.18	0.65	1.09	1.23	1.01	1.01
20	1.10	1.04	0.65	0.95	1.14	0.55	1.04	1.23	0.94	0.91
IV o X.	1.05	0.97	0.59	0.87	1.07	0.43	0.96	1.21	0.84	0.77
10	0.96	0.86	0.51	0.76	0.96	0.31	0.85	1.14	0.71	0.62
20	0.85	0.73	0-41	0.63	0.82	0.17	0.72	1.04	0.57	0.44
V. o XI.	0.70	0.58	0.31	0.48	0.66	0.03	0.56	0.95	0.40	0.25
10	0.54	0.41	3.19	0.31	0.48	+0.11−	0.39	0.74	0.22	0.07
20	0.36	0.22	0.06	0.14	0.28	0.25	0.21	0.56	0.03	+0.14−
VI. o XII.	0.17	0.03	+0.06−	+0.04−	0.08	0.39	0.01	0.36	+0.15−	−0.33+

DECLINATION.

The following Tables are calculated to give the Corrections in N. P. D. for the Stars of Dr. Maſkelyne's Catalogue, as the foregoing, copied from his Tables XVII. and XVIII. do in R. A.

Table IV. compriſes the effects of præceſſion, aberration, and the ſolar inequality for every 10th day of the year.

Table V. compriſes the effect of nutation, for every 10th degree of longitude of the moon's node.

They neither of them contain any allowance for the motions in the ſtars themſelves; which ſeem, as yet, not to be ſufficiently aſcertained.

Theſe Tables are adapted to the year 1800; but the differences are inconſiderable, for many years before and after that period.

TABLE IV.

CORRECTIONS in N. P. D. for every 10th Day of the Year.

	γ Pegaſi	α ♈	α Ceti	Aldebaran	Capella	Rigel	β ♉	α Orionis	Sirius	Caſtor	Procyon	Pollux	α Hydræ	Regulus	β Leonis	β Virginis
	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
Jan. 0	−3.62	−5.82	+0.61	−1.33	−4.37	+2.89	−1.71	+1.21	+1.78	+3.73	+2.29	+3.94	+0.17	+5.14	+6.71	+2.56
10	2.87	5.56	1.24	1.11	5.68	4.33	2.27	2.01	3.17	3.30	3.49	3.82	2.32	6.50	8.38	4.55
20	1.92	5.14	1.84	.82	6.82	5.64	2.52	2.74	6.02	2.83	4.64	3.62	4.35	7.71	9.72	6.37
30	0.91	4.40	2.49	.54	7.80	6.80	2.74	3.30	7.86	2.13	5.40	3.11	6.12	8.41	10.74	7.84
Feb. 9	0.00	3.70	2.92	.31	8.52	7.70	2.99	3.85	9.98	1.42	6.13	2.60	7.89	9.07	11.58	9.26
19	+0.88	2.94	3.27	.06	8.92	8.36	3.11	4.27	10.73	.76	6.73	2.21	9.44	9.33	12.00	10.43
Mar. 1	1.78	2.12	3.49	+ .22	9.24	8.81	3.19	4.52	11.79	.06	7.14	1.49	10.65	9.69	12.29	11.36
11	2.61	1.07	3.74	.53	9.18	9.06	3.19	4.72	12.51	− .79	7.34	.86	11.56	9.52	12.11	11.95
21	3.13	.28	3.67	.78	8.81	8 98	2.92	4.77	12.99	1.22	7.45	.36	12.40	9.42	11.65	12.22
31	3.41	+ .47	3.48	.97	8.23	8.66	2.68	4.75	13.07	1.67	7.44	− .09	12.94	8.97	11.12	12.41
Apr. 10	3.54	1.20	3.17	1.18	7 34	8.36	2.57	4.62	13.08	2.03	7.26	.59	13-13	8.33	10.39	12.39
20	3.49	1.62	2.51	1.19	6.26	7.30	1.85	4.39	12.37	2.24	6.98	67	13.22	7.76	9.49	12.09
30	2.86	1.79	1.65	1.20	5.08	6.24	1.36	3.98	11.41	2.11	6 60	.70	13.09	7.28	8.40	11.65
May 10	2.11	1.74	.59	1.03	3.74	4.92	1.00	3.48	10.34	1.99	6.17	.72	12.83	6.73	7.56	11.13
20	.92	1.57	− .52	.69	2.36	3.44	.42	2.82	8.91	1.75	5.54	.69	12.15	5.99	6.44	10.50
30	− .51	.95	2.04	.33	1.01	1.78	.08	2.09	7.23	1.31	4.94	.65	11.47	5.50	5.66	9.96
June 9	2.27	.09	3.64	− .22	+ .24	− .05	+ .22	1.16	5.40	.75	4.10	.20	10.62	5.00	4.90	9.29
19	4.12	−1.13	5.39	1.12	1.40	2.03	.39	.26	3.38	.00	3.46	+ .42	9.72	4.66	4.37	8.73
29	6.12	2.36	7.07	1.80	2.50	3.95	.54	− .76	1.29	+ .52	2 70	.82	8.54	4.22	3.83	8.04
July 9	8.37	3.91	9.01	2 76	3.24	5.94	.42	1.82	− .84	1.26	1.78	1.33	7.39	4.04	3.45	7.40
19	10 62	5.66	10 72	3.88	3 87	7 82	.28	2.88	2.93	2.12	1.04	1.90	6.26	3.97	3.27	6.85
29	12.74	7.25	12.22	4.68	4.31	9.60	.11	3.99	4.93	2.78	.31	2.43	4.99	3.83	3.27	6.34
Aug. 8	14 81	9.23	13.80	5.80	4.53	11.15	− .05	4.85	6.73	3.54	− .33	3.07	3.94	3.99	3.54	6.05
18	16.79	11.15	15.28	6.77	4.52	12.46	.43	5.57	8.21	4.38	.88	3.77	3.02	4.31	4.05	5.91
28	18.66	12.98	16.64	7 70	4 28	13.49	.89	6.26	9.49	5.13	1.25	4.51	2.20	4.68	4.76	5.89
Sept. 7	20.26	14.59	17 24	8 43	3.97	4.11	1.28	6.71	10.37	5.90	1.43	5.19	1.25	5.28	5.59	5 97
17	21 50	16 25	17.97	9.15	3.33	14.41	1.69	6.99	10.83	6.71	13 4	5.89	1.34	6.10	6.65	6.29
27	22.84	17.74	18.43	9.72	2.63	14.23	2.08	7.04	10.94	7.45	.95	6.81	1.50	7.39	7.92	6.82
Oct. 7	23 75	19.11	18.64	10.13	1.75	13 90	2.51	6.88	10.53	8.30	.46	7.56	1.89	8.47	9.51	7.71
17	24.43	20.14	18.46	10 34	.71	13.17	2.86	6.49	9.65	8.95	+ .25	8.43	2.26	9.74	11.52	8.75
27	25.03	21.12	18.22	10.47	− .43	12.12	3.26	5.94	8.56	9.58	1.22	9.04	3.32	11.33	13.19	10.13
Nov. 6	25.36	22.00	17.83	10.50	1.64	10.81	3.80	5.23	6.94	10.05	2.36	9.77	4.65	13.05	15.26	11.70
16	25.43	22.69	17.27	10.46	3.01	9 34	4.49	4.37	4.83	10.69	3.75	10.52	6.31	14.86	17.47	13.51
26	25.27	23.00	16 53	10 28	4 38	7.69	5.11	3.45	3 02	10 88	4.93	11.26	7.99	16.50	19.47	15.24
Dec. 6	25.00	23.52	15.87	10.04	5.80	6.05	5.65	2.48	.83	11.04	6.38	11.67	10.00	18.31	21.69	17.32
16	24.65	23 50	15.16	9.83	7.25	4.37	6 13	1.52	+1.47	11.04	7.70	11.77	12.10	20.05	23.79	19.40
26	24.10	23.48	14.48	9.60	8.67	2.76	6.45	.61	3.80	10.90	9.21	11.78	14.29	21.81	25.81	21.55
31	23.53	23.27	14.08	9.49	9.34	1.95	6.59	.17	4.91	10.74	9.76	11.78	15.32	22.45	26.65	22.49

TABLE

TABLE IV.—*continued.*

CORRECTIONS in N. P. D. for every Tenth Day of the Year.—*continued.*

	Spica ♍	Arcturus	α ♎ 2da	αCoronæ	α Serpⁱˢ	Antares	α Herculis	α Ophiuchi	α Lyræ	α Aquilæ	α ♑ 2da	α Cygni	α ♒	Fomalhaut	α Pegasi.	α Androm.
	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
Jan. 0	−2.04	+7.56	−3.29	+5.68	+2.85	−3.64	+2.88	+2.25	+0.95	+0.09	+2.57	−6.29	+1.35	+9.85	−3.28	−8.15
10	.04	9.78	1.72	10.18	4.89	3.51	3.11	4.36	3.93	1.60	2.88	3.72	2.02	9.39	2.32	7.30
20	+1.97	11.72	.09	12.39	6.83	2.80	7.24	6.38	6.81	2.99	3.10	1.00	2.65	8.71	1.20	6.15
30	3.77	13.15	+1.41	14.23	8.46	2.07	9.10	8.20	9.60	4.62	3.36	+2.55	3.40	7.89	+ .10	4.73
Feb. 9	5.70	14.36	3.03	14.78	9.98	1.22	10.76	9.78	11.96	5.93	4.41	4.19	3.88	6 71	1.25	3.36
19	7.32	15.15	4.64	15.83	11.19	.37	12.08	11.10	13.99	7.04	3.35	7.00	4.21	5.28	2.51	1.89
Mar. 1	8.85	15.52	5.96	17.37	12.05	+ .51	12.96	12.08	15.65	7.89	3.14	9.33	4.37	3.63	3.29	.32
11	9.82	15.35	7.13	17.28	12.52	1.38	13.53	12.64	16.75	8.53	2.87	11.51	4.47	2.03	4.14	+1.20
21	10.90	14.92	8.25	16.87	12.73	2.25	13.68	12.84	17.34	8.79	2.22	13.11	4.18	− .09	4.78	2.46
31	11.76	14.15	9.21	16.01	12.63	3.08	13.70	12.24	17.30	8.66	1.62	14.03	3.65	2.13	5.01	3.56
Ap. 10	12.24	12.95	9.85	14.63	12.08	3.79	12.75	12.05	16.84	8.29	.88	14 63	3.02	4.11	5.17	4.48
20	12.68	11.64	10.47	13.02	11.26	4.46	11.72	11.06	15.67	7.56	− .17	14.56	1.98	6.45	4.78	5.08
30	12.93	10.14	10.92	11.12	10.47	5.11	10.36	9.84	14.06	6.30	1.30	13.64	.64	8.69	4.05	5.21
May 10	13.41	8.59	11.22	8.94	9.37	5.72	8.78	8.33	11.97	4.87	1.54	12.64	− .88	10.92	3.00	5.07
20	13.15	6.77	11.31	6.76	8.02	6.12	6.95	6.55	9.59	3.24	3.75	10.93	2.47	12.97	1.76	4.51
30	12.98	5.19	11.27	4.54	6.72	6.62	5.02	4.68	6.74	1.35	5.04	8.73	4.36	15.03	.05	3.45
June 9	12.64	3.64	11.18	2.37	5.39	7.03	3.01	2.71	3.74	− .78	6.35	6.06	6.35	16.92	−1.95	2.00
19	12.31	2.35	11.00	.37	4.15	7.45	1.09	.82	1.70	2.76	7.52	3.10	8.31	18.49	4.06	.36
29	11.66	1.08	10.67	− .48	2.87	7.69	− .84	−1.11	−2.40	4.74	8.50	.02	10.12	19.64	6.17	−1.67
July 9	11.08	.10	10.39	3.07	1.79	7.95	2.58	2.86	5.40	6.77	9.45	−3.32	12.01	20.61	8.55	3.87
19	10.55	− .56	10.00	4.34	.87	8.12	4.13	4.44	8.20	8.66	10.23	6.71	13.78	21.25	10.94	6.35
29	9.76	1.12	9.46	5.44	− .03	8.14	5.55	5.86	10.86	10.32	10.72	9.98	15.18	21.33	13.10	8.76
Aug. 8	9.11	1.19	8.96	6.02	.62	8.16	6.69	7.06	13.22	11.93	11.20	13.34	16.61	21.26	15.30	11.28
18	8.55	.99	8.50	6.19	.97	7.98	7.52	7.77	15.16	13.25	11.46	16.25	17.74	20.86	17.41	13.85
28	8.00	.51	7.89	6.06	1.15	7.76	8.06	8 61	17.11	14.29	11.61	19.06	18.72	20.14	19.31	16.36
Sept. 7	7.38	+ .16	7.36	5.85	1.20	7.35	8.41	9.00	17.98	15.26	11.62	21.48	19.26	19.06	20.66	18.63
17	7.10	1.29	6.95	4.67	.88	6.97	8.34	9.07	18.73	15.68	11.39	23.34	19.74	17.94	22.16	20.74
27	6.97	2.68	6.59	3.30	.36	6.42	8.04	8.84	18.96	16.05	11.22	25.23	20.02	16.66	23.21	22.70
Oct. 7	7.06	4.38	6.36	1.75	+ .42	5.98	7 39	8.34	18.78	16.27	10.98	26.53	20 12	15.42	24.34	24.46
17	7.18	6.17	6.23	+ .03	1.30	5.41	6.50	7.59	18.14	16.06	10.59	27.19	19.89	13.88	24.85	25.91
27	7.74	8.53	6.29	1.33	2.62	4.95	5.25	6.53	16.03	15.68	10.24	27.59	19.65	12.65	25.25	27.19
Nov. 6	8.56	10.73	6.63	5.88	4.05	4.56	3.78	5.22	15.54	15.09	9.93	27.49	19.32	11.57	25.45	28.21
16	9.69	13.34	7.24	7.57	5.80	4.28	1.99	3.61	13.62	14.25	9.54	26.81	18.82	10.58	25.38	28.78
26	10.82	15.90	7.84	10.30	7.54	3.88	.07	1.88	11.36	13.17	9.15	25.62	18.16	9.73	25.02	29.13
Dec. 6	12.38	18.37	8.88	13.12	9.51	4.03	+1.97	+ .02	9.04	12.00	8.79	24.46	17.58	9.28	24.56	29.26
16	14.11	20.98	10.03	15.99	11 58	4.16	4.18	2.06	6.18	10.71	8.47	22.42	16.94	9.06	23.93	29.10
26	16.04	23.51	11.45	18.84	13.71	4 48	6.51	4.41	2.98	9.24	8.13	20 06	16.26	9.11	23.11	28.64
31	16 94	24.53	12 09	20.14	14 75	4.62	7.51	5.21	1.55	8.46	7.97	18.72	15.83	9.16	22.31	28.31

DECLINATION.

TABLE V.

CORRECTIONS in N. P. D. for every 10° of Longitude of ☽'s ☊.

	γ Pegasi.	α ♈	α Ceti.	Aldebaran.	Capella.	Rigel.	β ♉	α Orionis.	Sirius.	Castor.	Procyon.
S ° S	″	″	″	″	″	″	″	″	″	″	″
O. o VI.	−0.10+	−4.37+	−6.13+	−8.16+	−8.71+	−8.75+	−8.82+	−8.97+	−8.89+	−8.30+	−8.27+
10	+1.08−	3.28	5.20	7.56	8.29	8.33	8.45	8.69	8.94	8.59	8.57
20	2.21	2.10	4 09	6.74	7.62	7.66	7.83	8.28	8.72	8.65	8.60
I. o VII.	3 23	.85	2.87	5.70	6.71	6 78	6.96	7.54	8.22	8.40	8.41
10	4 23	+.43−	1.55	4.50	5 59	5.66	5.90	6.58	7.48	7.89	7.92
20	5 07	1.68	.20	3.17	4.42	4.40	4.64	5.41	6.51	7 15	7.16
II. o VIII.	5 75	2.89	+1.18−	1.74	2.91	2.99	3.25	4 08	5.35	6.18	6.29
10	6.27	4.01	2 50	.25	1.40	1.47	1.76	2.63	4.03	5.02	5.16
20	6.59	5.01	3.76	+1.24−	+.13−	+.05−	.21	1.10	2.58	3.72	3.89
III. o IX.	6 70	5.85	4 90	2.70	1 67	1.59	+1 34−	+.47−	1.05	2.30	2.50
10	6.61	6.53	5.89	4.08	3.18	3.08	2.85	2 02	+.51−	.80	1.00
20	6.33	7.00	6.71	5.33	4.56	4.48	4 28	3.51	2.06	+.70−	+.07−
IV. o X.	5.85	7.26	7.31	6.42	5.81	5 75	5.56	4.89	3.53	2 20	1.98
10	5.21	7.31	7.69	7.32	6.88	6.83	6.70	6.13	4.91	3.62	3 41
20	4 38	7.11	7.83	7.98	7.75	7.72	7.60	7.18	6.14	4 93	4.74
V. o XI.	3.43	6 71	7.77	8.41	8.39	8.37	8.29	8.01	7.17	6.11	5.93
10	2.48	6.10	7.44	8.58	8 74	8 74	8.74	8.60	7.99	7.09	6.93
20	1.26	5.31	6.90	8.49	8.85	8.87	8.91	8.91	8.57	7.85	7.71

	Pollux.	α Hydræ	Regulus.	β Leonis.	β Virginis.	Spica ♍	Arcturus.	α ♎ 2	α Coronæ	α Serp.	Antares.
S ° S.	″	″	″	″	″	″	″	″	″	″	″
O o VI.	−8.22+	−5 84+	−4.60+	−0.86+	−0.78+	+2.84+	+4.69−	+5.71−	+6.98−	+7.17−	+8.04−
10	8.57	6.62	5.52	1.99	1.91	1.70	3.62	4.73	6.15	6.37	7.41
20	8.60	7.21	6.28	3.07	2.99	.51	2.45	3.62	5.15	5.39	6.56
I. o VII.	8.41	7.57	6.85	4.05	3.98	−.70+	1.21	2.39	3 98	4 23	5.50
10	7.93	7.70	7.21	4.91	4.85	1.89	−.07+	1.03	2.68	2.94	4.28
20	7.25	7.60	7.35	5.61	5.57	3.01	1.35	−.24+	1.32	1.58	2.94
II. o VIII	6.36	7.28	7.27	6.16	6.12	4.05	2.59	1.57	−.09+	.16	1.51
10	5.24	6.73	6.97	6.50	6.49	4 96	3.76	2.85	1.50	−1.26+	−0.02+
20	3.92	6 00	6.46	6.66	6.65	5.72	4.79	4.04	2.86	2.65	1 46
III. o IX.	2.59	5 04	5.76	6.62	6.62	6.32	5.69	5.11	4.14	3.96	2.91
10	1.09	3.95	4.86	6.36	6.39	6 70	6.43	6.02	5.29	5.15	4.26
20	+.44−	2 74	3 84	5.93	5.96	6.89	6 95	6.75	6.27	6.17	5.48
IV. o X.	1.86	1 45	2 69	5.30	5.35	6.89	7.27	7.28	7.08	7.01	6.54
10	3.36	.10	1.45	4.52	4.57	6.66	7.38	7.57	7.66	7.63	7.40
20	4.65	+1.39−	.17	3.60	3.67	6.23	7.25	7.65	7.99	8.02	8.03
V. o XI.	5.81	2.53	+1.11−	2.57	2.64	5.61	6.91	7.50	8.07	8.19	8.42
10	6 88	3.76	2.35	1.42	1.53	4 82	6.35	7.11	7.97	8.09	8.54
20	7.67	4.87	3.52	.30	.38	3.89	5.60	6.51	7.59	7.75	8.42

	α Herculis.	α Ophiuchi.	α Lyræ.	α Aquilæ.	α ♒ 2d.	α Cygni.	α ♒	Fomal.	α Pegasi.	α Androm.
S ° S	″	″	″	″	″	″	″	″	″	″
O o VI.	+8.72−	+8.82−	+8.85−	+8.10−	+7.65−	+6.98−	+4.66−	+2.84−	+2.55−	+0.10−
10	8.29	8.51	8.85	8.55	8.14	7.54	5.58	3.89	3.62	1.25
20	7.65	7.86	8.60	8.56	8.38	7.98	6.33	4.82	4.58	2.38
I. o VII.	6.76	7.13	8.09	8.41	8.37	8.12	6.89	5.61	5.40	3.43
10	5.67	6.11	7.33	7.99	8.10	7.99	7.24	6.23	6.06	4.38
20	4.39	4.90	6.38	7.36	7.59	7.65	7.37	6.73	6.54	5.18
II. o VIII	2.98	3 54	5.18	6.48	6.85	7.07	7.27	6.89	6.82	5.84
10	1.48	2 06	3.83	5.41	5.89	6.27	6.96	6.89	6.87	6.52
20	−.04+	.54	2.39	4.19	4.77	5.29	6.43	6.70	6.73	6.61
III. o IX	1.59	−1.01+	.86	2.82	3.49	4.14	5.71	6.31	6.40	6.69
10	3 08	2.53	−.69+	1.37	2.11	2.86	4.82	5.72	5.86	6.57
20	4 47	3.96	2.21	−.13+	.66	1.50	3.78	4.96	5.14	6.26
IV. o X.	5.74	5.29	3.68	1.61	−.80+	.83	2.62	4.05	4.27	5.75
10	6.88	6.45	5.06	3.04	2.24	−1.32+	1.38	3.01	3.27	5.06
20	7.70	7.40	6.23	4.38	3.61	2.69	.10	1.89	2.17	4.23
V. o XI.	8.34	8.14	7.23	5.60	4.88	3.98	−1.18+	.70	1.00	3.26
10	8.72	8 62	8.02	6.64	6.00	5.15	2.42	−.54+	−.21+	2.20
20	8.84	8.85	8.56	7.48	6.92	6.05	3.59	1.70	1.40	1.06

DECLINATION.

TABLE VI.

POLARIS.

Mean R. A. for Jan. 0. 1800.			Mean N. P. D. for Jan. 0. 1800.	
	h ′ ″	An. Præc.	As calculated from that given by Dr. Maskelyne to M. G. Roy.	
By Maskelyne's Obs. as deduced by La Lande -	0 52 23. 3			An Præc.
By Brinkley's Obs. -	0 52 24. 6	″		
Mean of the two - -	0 52 23.950	+12.911	1°45′34″.65	−19″.520
1801 - - -	0 52 36.861	- -	1 45 15.13	19.516
1802 - - -	0 52 49.839	- -	1 44 55.61	19.512
1803 - - -	0 53 2.844	- -	1 44 36.10	19.508
1804 - - -	0 53 15.956	- -	1 44 16.59	19.504
1805 - - -	0 53 29.135	- -	1 43 57.09	19.50
1806 - - -	0 53 42.381	- -	1 43 37.59	
1807 - - -	0 53 55.694	- -	1 43 18.10	
1808 - - -	0 54 9.074	- -	1 42 58.61	
1809 - - -	0 54 22.521	- -	1 42 39.12	
1810 - - -	0 54 36.035	+13.581	1 42 19.64	−19.48

Corrections for every 10th Day of the Year.			Corrections for every 10th Day of the Year.—*continued.*		
	R. A. in Time.	N. P. D.		R. A. in Time.	N. P. D.
Jan. 0	+ 2″.99	−19″.74	Nov. 6	+45″.00	−28″.33
10	− 3.20	19.21	16	41.39	31.43
20	9.61	19.54	26	36.80	34.12
30	15.57	18.48			
Feb. 9	21.20	17.18	Dec. 6	31.49	36.35
19	25.79	15.44	16	25.57	38.02
March 1	30.25	13.36	26	19.51	39.08
11	33.48	10.85	31	16.59	39.24
21	35.69	8.41			
31	36.66	5.90			
Apr. 10	36.57	2.81			
20	35.24	.21			
30	33.16	+ 2.23			
May 10	28.93	4.51			
20	24.35	6.64			
30	18.72	8.17			
June 9	12.51	9.27			
19	5.71	9.92			
29	+ 1.50	10.18			
July 9	8.92	9.68			
19	16.10	8.54			
29	22.84	7.05			
Aug. 8	29.54	4.78			
18	35.24	2.07			
28	40.29	− 1.29			
Sept. 7	44.31	4.71			
17	47.26	8.68			
27	49.12	12.76			
Oct. 7	49.67	16.35			
17	49.31	20.78			
27	47.72	24.71			

Corrections for every 10° of Longitude of ☽'s ☊.		
	R. A. in Time.	N. P. D.
S ° S	″	″
O. o VI.	−18.99+	− 2.06+
10	19.44	.90
20	19.33	+ .28−
I. o VII.	18.66	1.48
10	17.39	2.61
20	15.61	3.67
II. o VIII.	13.31	4.62
10	10.62	5.42
20	7.68	6.06
III. o IX.	4.44	6.52
10	1.05	6.77
20	+ 2.35−	6.81
IV. o XI.	5.68	6.68
10	8.79	6.32
20	11.69	5.77
V. o X.	14.25	5.04
10	16.35	4.17
20	17.95	3.16

TABLE VII.

A Table for calculating the Annual Præceſſion of a Star in R. A. in Time.

Argument.—The R. A. of the Star in Time.

Hours.	0 + 12 —	1 + 13 —	2 + 14 —	3 + 15 —	4 + 16 —	5 + 17 —	Hours.
	′ ″	″	″	″	″	″	′
	0 0.000	0.346	0.668	0.945	1.157	1.291	60
	2 0.011	.357	.678	.953	1.163	1.294	58
	4 .023	.369	.688	.961	1.169	1.297	56
	6 .035	.380	.698	.969	1.175	1.300	54
	8 .047	.391	.708	.977	1.180	1.302	52
	10 .059	.402	.718	.985	1.186	1.305	50
	12 .070	.413	.728	.993	1.191	1.307	48
	14 .081	.424	.738	1.001	1.196	1.310	46
	16 .093	.435	.747	1.009	1.201	1.312	44
	18 .105	.446	.757	1.017	1.206	1.314	42
	20 .117	.457	.767	1.024	1.211	1.316	40
	22 .128	.468	.776	1.031	1.216	1.318	38
	24 .139	.479	.786	1.039	1.221	1.320	36
	26 .151	.490	.795	1 046	1.226	1.322	34
	28 .163	501	.805	1.053	1 231	1.323	32
	30 .174	.512	.814	1.060	1.235	1.325	30
	32 .186	.522	.823	1.067	1.239	1.327	28
	34 .197	.533	.832	1.074	1.244	1.328	26
	36 .209	.543	.841	1.081	1.248	1.329	24
	38 .220	.554	.850	1.088	1.252	1.330	22
	40 .232	.565	.859	1.095	1.256	1.331	20
	42 .243	.576	.868	1.101	1.260	1.332	18
	44 .255	.586	.877	1.108	1.264	1.333	16
	46 .266	.597	.885	1.114	1.268	1.334	14
	48 .278	.607	.894	1.121	1.271	1.334	12
	50 .289	.617	.902	1.127	1.275	1.335	10
	52 .301	.627	.911	1.133	1.278	1.335	8
	54 .312	.638	.920	1.140	1.282	1.336	6
	56 .323	.648	.929	1.146	1.285	1.336	4
	58 .334	.658	.937	1.152	1 288	1.337	2
	60 0.346	0.668	0.945	1.157	1.291	1.337	0
Hours	11 + 23 —	10 + 22 —	9 + 21 —	8 + 20 —	7 + 19 —	6 + 18 —	Hours.

Minutes. Minutes.

The number of ſeconds and their decimals taken out of this Table being multiplied by the natural tangent of the ſtar's declination, and applied with their reſpective ſign to + 3″ 068 will give the annual præceſſion in R. A.

If the ſtar's declination be ſouth, the number ſo found muſt be applied with a contrary ſign.

TABLE VIII.

Decimal Numbers for multiplying the Annual Præceſſion of a Star in R. A. with their Complements.

	Dec.	Com.		Dec.	Com.		Dec.	Com.
Jan. 1	.01	.99	May 16	.35	.65	Sept. 4	.69	.31
3	.02	.98	19	.36	.64	9	.70	.30
6	.03	.97	22	.37	.63	14	.71	.29
9	.04	.96	25	.38	.62	19	.72	.28
12	.05	.95	28	.39	.61	24	.73	.27
15	.06	.94	31	.40	.60	29	.74	.26
19	.07	.93						
22	.08	.92	June 3	.41	.59	Oct. 4	.75	.25
25	.09	.91	6	.42	.58	9	.76	.24
28	.10	.90	9	.43	.57	14	.77	.23
			12	.44	.56	18	.78	.22
Feb. 1	.11	.89	15	.45	.55	23	.79	.21
4	.12	.88	18	.46	.54	27	.80	.20
8	.13	.87	21	.47	.53	31	.81	.19
12	.14	.86	24	.48	.52			
16	.15	.85	27	.49	.51	Nov. 4	.82	.18
21	.16	.84	29	.50	.50	8	.83	.17
25	.17	.83				11	.84	.16
			July 2	.51	.49	15	.85	.15
Mar. 2	.18	.82	5	.52	.48	18	.86	.14
7	.19	.81	8	.53	.47	21	.87	.13
12	.20	.80	11	.54	.46	24	.88	.12
17	.21	.79	14	.55	.45	27	.89	.11
22	.22	.78	17	.56	.44	30	.90	.10
27	23	.77	20	.57	.43			
			23	.58	.42	Dec. 3	.91	.09
Apr. 1	.24	.76	27	.59	.41	6	.92	.08
6	.25	.75	30	.60	.40	9	.93	.07
11	.26	.74				12	.94	.06
15	.27	.73	Aug. 3	.61	.39	15	.95	.05
20	.28	.72	6	.62	.38	18	.96	.04
24	.29	.71	10	.63	.37	21	.97	.03
28	.30	.70	14	.64	.36	23	.98	.02
			18	.65	.35	26	.99	.01
May 2	.31	.69	22	.66	.34	29	1.00	.00
5	.32	.68	26	.67	.33	31	1.01	−.01
9	.33	.67	30	.68	.32			
12	.34	.66						

N. B.—The ſmall ſemi-annual equation of præceſſion is allowed for in this Table.

For decimals of a year, ſee the Table of Multipliers after the Table for finding the annual præceſſion of a ſtar in N. P. D.

TABLE IX.

A Table for finding the Annual Preceſſion of a Star in N. P. D.

Argument.—The R. A. of the Star in Time.

Hours.	0 — 12 +	1 — 13 +	2 — 14 +	3 — 15 +	4 — 16 +	5 — 17 +	Hours.
	′ ″	″	″	″	″	″	′
Minutes.	0 20.05	19.37	17.36	14.18	10.02	5.19	60
	2 20.04	19.32	17.28	14.06	9.87	5.03	58
	4 20.04	19.27	17.19	13.93	9.72	4.85	56
	6 20.03	19.22	17.10	13.80	9.57	4.68	54
	8 20.03	19.17	17.00	13.67	9.41	4.51	52
	10 20.02	19.12	16.92	13.54	9.26	4.34	50
	12 20.02	19.07	16.82	13.41	9.10	4.17	48
	14 20.01	19.02	16.73	13.28	8.95	4.00	46
	16 20.00	18.96	16.62	13.15	8.79	3.83	44
	18 19.99	18.90	16.52	13 02	8.63	3.66	42
	20 19.98	18.84	16.42	12.89	8.47	3.48	40
	22 19.96	18.78	16.32	12.76	8.31	3.31	38
	24 19.94	18.72	16.22	12.62	8.15	3.14	36
	26 19.92	18.66	16.12	12.49	7.99	2.97	34
	28 19.90	18.59	16.01	12.35	7.83	2.79	32
	30 19.88	18.53	15.91	12.21	7.67	2.62	30
	32 19.85	18.46	15.80	12.07	7.51	2.44	28
	34 19.83	18.39	15.69	11.93	7.35	2.27	26
	36 19.80	18.32	15.58	11.79	7.19	2.09	24
	38 19.77	18.25	15.47	11.65	7.03	1.92	22
	40 19.74	18.17	15.36	11.50	6.86	1.75	20
	42 19.71	18.09	15.25	11.36	6.70	1.68	18
	44 19.68	18 02	15.13	11.21	6.53	1.40	16
	46 19.65	17.94	15.02	11.07	6.37	1.23	14
	48 19.61	17.86	14.90	10.92	6.20	1.05	12
	50 19.57	17 78	14.78	10.77	6.03	.88	10
	52 19.53	17.70	14.66	10.62	5.86	.70	8
	54 19.49	17.62	14.54	10.47	5.70	.53	6
	56 19 45	17.53	14.42	10.3	5.53	.35	4
	58 19.41	17.45	14.30	10.17	5.36	.18	2
	60 19.37	17.36	14.18	10.02	5.19	.00	0
Hours	11 + 23 —	10 + 22 —	9 + 21 —	8 + 20 —	7 + 19 —	6 + 18 —	Hours.

TABLE X.

Decimal Parts of a Year, with their Complements, for multiplying the Annual Præceſſion of a Star in N.P.D. : Applicable to any regular Annual Motion whatever.

	Dec.	Com.		Dec.	Com.		Dec.	Com.
Jan. 4	.01	.99	May 1	.33	.67	Sept. 2	.67	.33
7	.02	.98	4	.34	.66	5	.68	.32
11	.03	.97	8	.35	.65	9	.69	.31
15	.04	.96	11	.36	.64	13	.70	.30
18	.05	.95	15	.37	.63	16	.71	.29
22	.06	.94	19	.38	.62	20	.72	.28
26	.07	.93	22	.39	.61	24	.73	.27
29	.08	.92	26	.40	.60	27	.74	.26
			30	.41	.59			
Feb. 2	.09	.91				Oct. 1	.75	.25
6	.10	.90	June 2	.42	.58	5	.76	.24
9	.11	.89	6	.43	.57	8	.77	.23
13	.12	.88	10	.44	.56	12	.78	.22
16	.13	.87	13	.45	.55	16	.79	.21
20	.14	.86	17	.46	.54	19	.80	.20
24	.15	.85	21	.47	.53	23	.81	.19
27	.16	.84	24	.48	.52	27	.82	.18
			28	.49	.51	30	.83	.17
Mar. 3	.17	.83						
7	.18	.82	July 2	.50	.50	Nov. 3	.84	.16
10	.19	.81	5	.51	.49	6	.85	.15
14	.20	.80	9	.52	.48	10	.86	.14
18	.21	.79	13	.53	.47	14	.87	.13
21	.22	.78	16	.54	.46	17	.88	.12
25	.23	.77	20	55	.45	21	.89	.11
29	.24	.76	24	.56	.44	25	.90	.10
			27	.57	.43	28	.91	.09
Apr. 1	.25	.75	31	.58	.42			
5	26	.74				Dec. 2	.92	.08
9	.27	.73	Aug. 3	59	.41	6	.93	.07
12	.28	.72	7	.60	.40	9	.94	.06
16	.29	.71	11	.61	.39	13	.95	.05
20	.30	.70	14	.62	.38	17	.96	.04
23	.31	.69	18	.63	.37	20	.97	.03
27	.32	.68	22	.64	.36	24	.98	.02
			25	.65	.35	28	.99	.01
			29	.66	.34	31	1.00	.00

These Tables are intended for deducing the apparent R. A. and N. P. D. of a Star from its mean position; and the signs ± are set down accordingly. If the mean position is to be deduced from an observed or apparent place, the numbers must of course be applied with a contrary sign.

The mean R. A. and N. P. D. of a Star, being brought up to the day in question, by the respective annual præcessions multiplied by the Tables VIII. and X. its apparent R. A. for that day may be deduced by Tables XI. XII. and XIII. and its apparent N. P. D. by the Tables XIV. XV. XVI. and XVII.

TABLE XI.

For finding the Effect of Aberration on R. A. in Time, for every 10th Day of the Year, and each Hour of the *'s R. A.
These Numbers must be multiplied by the nat. secant of the *'s Declination.

	☉'s mo. Long.	h h 0 12	h h 1 13	h h 2 14	h h 3 15	h h 4 16	h h 5 17	h h 6 18	h h 7 19	h h 8 20	h h 9 21	h h 10 22	h h 11 23	h h 12 0	R. A. of the *
	s ° ′	″	″	″	″	″	″	″	″	″	″	″	″	″	
Jan. 0	9 9 54	−0.211+	+0.134−	+0.474−	+0.780−	+1.033−	+1.211−	+1.313−	+1.321−	+1.242−	+1.078−	+.837−	+.544−	+.211−	
10	19 45	.414	−.074+	.269	.595	.879	1.105	1.255	1.319	1.293	1.173	.982	.723	.414	
20	29 37	.608	.285	.063	.392	.701	.962	1.158	1.276	1.303	1.246	1.103	.885	.608	
30	10 9 28	.777	.485	−.160+	.178	.503	.793	1.028	1.195	1.280	1.278	1.189	1.020	.777	
Feb. 9	19 29	.928	.672	.369	.041	.289	.599	.868	1.075	1.216	1.270	1.238	1.120	.928	
19	29 11	1.050	.838	.568	−.258+	.068	.388	.681	.932	1.115	1.226	1.255	1.196	1.050	
Mar. 1	11 9 2	1.142	1.079	.749	.470	−.158+	.166	.477	.757	.985	1.148	1.228	1.227	1.142	
11	18 53	1.201	1.093	.912	.668	.378	−.066+	.256	.558	.822	1.030	1.169	1.226	1.201	
21	28 45	1.223	1.173	1.045	.845	.588	.289	.029	.344	.640	.885	1.073	1.188	1.223	
31	0 8 36	1.209	1.220	1.149	.995	.777	.505	−.198+	.123	.432	.715	.948	1.117	1.209	
Apr. 10	18 28	1.160	1.230	1.216	1.123	.946	.708	.422	−.107+	.214	.521	.792	1.010	1.160	
20	28 19	1.074	1.204	1.249	1.208	1.087	.889	.628	.331	−.008+	.314	.616	.875	1.074	
30	1 8 11	0.962	1.143	1.246	1.262	1.196	1.042	.823	.545	.232	.098	.421	.716	.962	
May 1	18 2	.818	1.051	1.204	1.279	1.267	1.169	.991	.745	.449	−.121+	.214	.534	.818	
20	27 53	.648	.919	1.123	1.257	1.298	1.259	1.133	.925	.655	.341	−.003+	.334	.648	
30	2 7 43	.465	.767	1.004	1.199	1.301	1.312	1.237	1.073	.837	.545	.216	.128	.465	
June 9	17 36	.264	.592	.878	1.109	1.259	1.325	1.302	1.186	.995	.734	.420	−.073+	.264	
19	27 28	.053	.306	.708	.980	1.178	1.300	1.331	1.272	1.128	.902	.620	.293	.053	
29	3 7 19	+.155−	.191	.526	.827	1.069	1.239	1.323	1.318	1.225	1.045	.792	.492	−.155+	
July 9	17 10	.361	+.019−	.324	.645	.923	1.141	1.274	1.323	1.283	1.148	.944	.678	.361	
19	27 2	.560	.230	111	.446	.750	1.003	1.188	1.291	1.306	1.232	1.075	.845	.560	
29	4 6 53	.734	.433	+.101−	.235	.556	.840	1.066	1.223	1.283	1.273	1.169	.986	.734	
Aug. 8	16 45	.891	.624	.315	.016	.345	.651	.913	1.110	1.236	1.275	1.228	1.094	.891	
18	26 36	1.020	.796	.517	+.203−	.126	.444	.734	.973	1.146	1.241	1.255	1.174	1.020	
28	5 6 27	1.122	.945	.704	.417	+.100−	.225	.529	.804	1.022	1.172	1.237	1.222	1.122	
Sept. 7	16 19	1.187	1.065	.871	.617	.321	+.008−	.315	.613	.867	1.065	1.188	1.230	1.187	
17	26 10	1.220	1.156	1.012	.800	.532	.230	.090	.403	.692	.927	1.103	1.202	1.220	
27	6 6 2	1.216	1.212	1.124	.958	.731	.450	+.139−	.181	.487	.762	.984	1.138	1.216	
Oct. 7	15 53	1.177	1.231	1.201	1.094	.904	.657	.365	+.048−	.272	.574	.836	1.042	1.177	
17	25 44	1.101	1.215	1.244	1.189	1.052	.844	.575	.275	.049	.369	.663	.915	1.101	
27	7 5 36	.995	1.161	1.252	1.254	1.168	1.006	.776	.491	+.174−	.155	.473	.760	.995	
Nov. 6	15 27	.858	1.078	1.218	1.278	1.252	1.137	.950	.695	.394	+.066−	.266	.583	.858	
16	25 18	.695	.956	1.136	1.267	1.294	1.239	1.096	.879	.601	.283	.053	.388	.695	
26	8 5 10	.517	.809	1.050	1.217	1.305	1.301	1.207	1.035	.791	.492	+.159−	.184	.517	
Dec. 6	15 1	.317	.639	.918	1.131	1.274	1.325	1.288	1.162	.957	.686	.370	+.024−	.317	
16	24 53	.110	.450	.756	1.017	1.202	1.312	1.328	1.254	1.095	.860	.569	.227	.110	
26	9 4 44	−.100+	.246	.577	.868	1.100	1.257	1.329	1.310	1.198	1.010	.748	.440	+.100−	
31	9 40	.205	.139	.479	.784	1.036	1.214	1.314	1.322	1.241	1.075	.833	.538	.205	

Table XII.

For finding the Effect of Nutation in R. A. in Time for every 10° of ☽'s ☊, and each Hour of ✳'s R. A.
These Numbers must be multiplied by the Natural Tangent of the ✳'s Declination, which will be Negative, if the Declination be South.

		h h 0 12	h h 1 13	h h 2 14	h h 3 15	h h 4 16	h h 5 17	h h 6 18	h h 7 19	h h 8 20	h h 9 21	h h 10 22	h h 11 2
S	°	"	"	"	"	"	"	"	"	"	"	"	"
O.	0	−0.600+	−0.578+	−0.520+	−0.424+	−0.301+	−0.155+	0.000	+0.155−	+0.301−	+0.424−	+0.520−	+0.578−
	10	.590	.589	.551	.473	.363	.228	− .078+	.078	.228	.363	.473	.551
	20	.564	.583	.564	.507	.414	.293	.153	− .001+	.150	.290	.411	.506
I.	0	.520	.559	.562	.525	.453	.350	.223	.081	.067	.208	.339	.443
	10	.460	.518	.541	.527	.479	.396	.287	.158	−0.019+	.122	.254	.369
	20	.385	.462	.505	.513	.489	.430	.342	.231	.104	.032	.163	.285
II.	0	.301	.390	.453	.485	.484	.451	.386	.297	.185	− .062+	.067	.189
	10	.205	.307	.388	.441	4.66	.457	.420	.352	.261	.152	− .032+	.089
	20	.104	.214	.310	.385	.433	.451	.440	.397	.329	.237	.130	− .012+
III.	0	.000	.115	.223	.316	.386	.432	.446	.432	.386	.316	.223	.115
	10	+ .104−	.212	.130	.237	.329	.397	.440	.451	.433	.385	.310	.214
	20	.205	+ .089	.032	.152	.261	.352	.420	.457	.466	.441	.388	.307
IV.	0	.301	.189	+ .067−	0 62	.185	.297	.386	.451	.484	.485	.453	.390
	10	.385	.285	.163	+ .032−	.104	.231	.342	.430	.489	.513	.505	.462
	20	.460	.369	.254	.122	.019	.158	.287	.396	.479	.527	.541	.518
V.	0	.520	.443	.339	.208	+ .067−	.081	.223	.350	.453	.525	.562	.559
	10	.564	.506	.411	.290	.150	.001	.153	.293	.414	.507	.564	.583
	20	.590	.551	.473	.363	.228	+ .078−	.078	.228	.363	.473	.551	.589
VI.	0	.600	.578	.520	.424	.301	.155	.000	.155	.301	.424	.520	.578
	10	.590	.589	.551	.473	.363	.228	+ .078−	.078	.228	.363	.473	.551
	20	.564	.583	.564	.507	.414	.293	.153	+ .001−	.150	.290	.411	.506
VII.	0	.520	.559	.562	.525	.453	.350	.223	.021	.067	.208	.339	.443
	10	.460	.518	.541	.527	.479	.396	.287	.158	+ .019−	.122	.254	.369
	20	.385	.462	.505	.513	.489	.430	.342	.231	.104	.032	.163	.285
VIII.	0	.301	.396	.453	.485	.484	.451	.386	.297	.185	+ .062−	.067	.189
	10	.205	.307	.388	.441	.466	.457	.420	.352	.261	.152	+ .032−	.089
	20	.104	.214	.310	.385	.433	.451	.440	.297	.329	.237	.130	+ .012−
IX.	0	.000	.115.	.223	.316	.386	.432	.446	.432	.386	.316	.223	.115
	10	− .104+	.012	.130	.237	.329	.397	.440	.451	.433	.385	.310	.214
	20	.205	− .089+	.032	.152	261	.352	.420	.457	.466	.441	.388	.307
X.	0	.301	.189	− .067+	.062	.185	.297	.386	.451	.484	.485	.453	.390
	10	.385	.285	.163	− .032+	.104	.231	.342	.430	.489	.513	.505	.462
	20	.460	.369	.254	.122	.019	.158	.287	.396	.479	.527	.541	.518
	0	.520	.443	.339	.208	− .067+	.081	.223	.350	.453	.525	.562	.559
	10	.564	.506	.411	.290	.150	.001	.153	.293	.414	.507	.564	.583
	20	.590	.551	.473	.363	.228	− .078+	.078	.228	.363	.473	.551	.589

Table XIII.

The Equation of the Equinoxes in R. A. in Time.
Argument. Long. of ☽'s ☊

S	0 6 − +	1 7 − +	2 8 − +	S
°	"	"	"	°
0	0.00	0.55	0.95	30
1	.02	.56	.95	29
2	.04	.58	.96	28
3	.06	.59	.97	27
4	.08	.61	.98	26
5	.10	.63	.99	25
6	.11	.64	1.00	24
7	.13	.66	1.00	23
8	.15	.67	1.01	22
9	.17	.69	1.02	21
10	.19	.70	1.03	20
11	.21	.72	1.03	19
12	.23	.73	1.04	18
13	.25	.74	1.04	17
14	.26	.76	1.05	16
15	.28	.77	1.05	15
16	.30	.79	1.06	14
17	.32	.80	1.06	13
18	.34	.81	1.07	12
19	.36	.82	1.07	11
20	.37	.84	1 08	10
21	.39	.85	1.08	9
22	.41	.86	1.08	8
23	.43	.87	1.08	7
24	.44	.88	1.09	6
25	.46	.89	1.09	5
26	.48	.90	1.09	4
27	.50	.92	1.09	3
28	.51	.93	1.09	2
29	.53	.94	1.09	1
30	.55	.95	1.09	0
S	5 11 − +	4 10 − +	3 9 − +	S

For finding the Effect of Aberration on N. P. D. for every 10th Day, and each Hour of R. A. of the *.
These Numbers must be multiplied by the nat. fine of the *'s Declination. If the * be fouth, the ± muft be changed.

	⊙'s me. Long.	h h 0 12	h h 1 13	h h 2 14	h h 3 15	h h 4 16	h h 5 17	h h 6 18	h h 7 19	h h 8 20	h h 9 21	h h 10 22	h h 11 23	h h 12 0	R. A. of the *
	s ° ′	″	″	″	″	″	″	″	″	″	″	″	″	″	
Jan. 0	9 9 54	−19.71+	−19.85+	−18.64+	−16.17+	−12.57+	− 8.14+	− 3.16 +	+ 2.05−	+ 7.13−	+11.70−	+15.48−	+18.22−	+19.71−	
10	19 45	18.82	19.78	19.40	17.69	14.78	10.86	6.20	− 1.11−	4.04	8.92	13.18	16.58	18.82	
20	29 37	17.39	19.21	19.59	18.70	16.54	13.25	9.07	4.26	0.85	5.89	10.53	14.47	17.39	
30	10 9 28	15.44	17.94	19.20	19.17	17.83	15.27	11.67	7.29	− 2.35+	2.65	7.54	11.89	15.44	
Feb. 9	19 20	13.03	16.19	18.24	19.06	18.57	16.81	13.92	10.05	5.52	− 0.63+	4.33	8.98	13.03	
19	29 11	10.25	13.96	16.76	18.37	18.77	17.88	15.75	12.56	8.53	3.89	0.99	5.81	10.25	
Mar. 1	11 9 2	7.15	11.35	14.77	17.19	18.42	18.40	17.13	14.70	11.26	7.06	− 2.37+	2.48	7.15	
11	18 53	3.85	8.38	12.34	15.45	17.53	18.39	17.99	16.40	13 67	10.01	5.66	− 0.93+	3.85	
21	28 45	0.43	5.16	9.54	13.28	16.10	17.82	18.34	17.60	17.68	12.67	8.80	4.35	0.43	
31	0 8 36	+ 3.00−	1.80	6.47	10.71	14.21	16.75	18.14	18.30	17 21	14.92	11.65	7.58	− 3.00+	
Apr. 10	18 28	6.34	+ 1.60−	3.23	7.82	11.89	15.17	17.39	18.45	18.23	16.77	14.20	10.62	6.34	
20	28 19	9.49	4.98	+ 0.14−	4.69	9.25	13.12	16.15	18.06	18.72	18.12	16.28	13.35	9.49	
30	1 8 11	12.36	8.21	3.49	1.43	6.31	10.73	14.42	17.13	18.68	18.94	17.91	15.67	12.36	
May 10	18 2	14.86	11.18	6.75	+ 1.83−	3.19	8.01	12.28	15.70	18.06	19.20	19.00	17.53	14.86	
20	27 53	16.93	13.84	9.79	5.07	+ 0.02−	5.05	9.75	13.81	16.92	18.88	19.55	18 88	16.93	
30	2 7 45	18.51	16.08	12.55	8.18	3.24	1.91	6.96	11.49	15.27	18.00	19.51	19.67	18.51	
June 9	17 36	19.54	17.84	14.94	11.01	6.36	+ 1.25−	3.95	8.86	13.18	16.60	18.88	19.89	19.54	
19	27 28	19.97	19.10	16.91	13.56	9.29	4.40	0.81	5.96	10.69	14.69	17.70	19.51	19.97	
29	3 7 19	19.84	19.76	18.35	15.69	11.94	7.40	+ 2.35−	2.86	7.89	12.38	16.01	18.56	19.84	
July 9	17 10	19.11	19.86	19.25	17.35	14.25	10.18	5.42	+ 0.28−	4.85	9.68	13.85	17.05	19.11	
19	27 2	17.82	19,36	19.60	18.48	16.13	12.66	8.32	3.45	1.68	6.71	11.26	15.07	17.82	
29	4 6 53	16.00	18.31	19.35	19.10	17.55	14.80	11.01	6.51	+ 1.54−	3.53	8.35	12.58	16.00	
Aug. 8	16 45	13.70	16.69	18.54	19.13	18.42	16.45	13.36	9.36	4.72	0.23	5.19	9.77	13.70	
18	26 36	11.00	14.60	17.21	18.62	18.76	17.64	15.31	11.92	7.76	+ 3.04−	1.86	6.66	11.00	
28	5 6 27	7.99	12.07	15.33	17.55	18.56	18.32	16.83	14.18	10.38	6.25	+ 1.49−	3.36	7.99	
Sept. 7	16 19	4.72	9.18	13.01	15.95	17.81	18.45	17.85	16.05	13 05	9.25	4.81	+ 0.04−	4.72	
17	26 10	1.35	6.04	10.31	13.90	16.52	18.02	18.31	17.33	15.17	12.00	7.99	3.45	1.35	
27	6 6 1	− 2.09+	2.71	7.31	11.43	14.76	17.08	18.25	18.17	16.85	14.38	10.94	6.75	+ 2.09−	
Oct. 7	15 53	5.47	− 0.72+	4.09	8.61	12.54	15.62	17.64	18.46	18.02	16.35	13.57	9.86	5.47	
17	25 44	8.69	4.12	0.74	5.65	9.98	13.72	16 53	18.22	18.67	17.84	15.81	12.66	8.69	
27	7 5 36	11.64	7.39	− 2.62+	2.32	7.10	11.41	14.92	17.43	18.75	18.80	17.55	15.09	11.64	
Nov. 6	15 27	14.25	10.45	5.92	− 0.99−	4.06	8.73	12.87	16.11	18.27	19.18	18.78	17.10	14.25	
16	25 18	16.44	13.18	9.02	4.26	0.81	5.83	10.43	14.33	17.26	19.00	19.44	18.59	16.44	
26	8 5 10	18.15	15.53	11.87	7.36	— 2.61+	2.74	7.70	11.97	15.74	18.28	19.58	19.52	18.15	
Dec. 6	15 1	19.33	17.43	14.37	10.31	5.54	− 0.41+	4.74	9.59	13.78	17.01	19.10	19.89	19.33	
16	24 53	19.92	18.83	16.43	12.92	8.55	3.57	1.64	6.73	11.38	15.25	18.06	19.66	19.92	
26	9 4 44	19.93	19.64	18.01	15.16	11.28	6.62	− 1.51+	3.70	8.66	13.03	16.52	18.88	19.93	
31	9 40	19.73	19.84	18.61	16.12	12.52	7.99	3.08	2.13	7.20	11.76	15.53	18.25	19.73	

TABLE XV.

FOR finding the farther Effect of Aberration on the N.P.D. of a Star for every 10th Day, and every 10° of Star's Decl.

Argument. ⊙'s Long. ± Star's Decl.

	✻'s Decl. 0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
	″	″	″	″	″	″	″	″	″	″
Jan. 0	+1.37	+1.35	+1.28	+1.18	+1.04	+0.87	+0.68	+0.46	+0.23	0.00
10	2.69	2.65	2.53	2.33	2.06	1.74	1.35	.92	.46	
20	3 94	3.88	3.70	3.41	3.02	2.53	1.97	1.34	.67	
30	5.07	4.99	4.77	4.39	3.88	3.25	2.54	1.73	.86	
Feb. 9	6 05	5.95	5.69	5.24	4.64	3.88	3.03	2.06	1.03	
19	6.85	6.74	6.44	5.92	5.24	4.40	3.43	2.33	1.17	
Mar. 1	7.44	7.32	6.99	6 43	5.69	4 77	3.72	2.54	1.28	
11	7.82	7.70	7.35	6 77	5.99	5.01	3.91	2.67	1 34	
21	7.96	7.84	7.48	6 89	6.10	5.11	3.98	2.71	1.37	0.00
31	7.87	7.75	7.41	6.81	6.02	5.06	3.94	2.69	1.35	
Apr. 10	7.56	7.44	7.11	6.55	5.79	4.88	3.78	2.58	1.30	
20	7.02	6.90	6.60	6.08	5.38	4.53	3.51	2.40	1.21	
30	6.26	6.16	5.88	5.42	4.79	4.01	3.13	2.14	1.08	
May 10	5.34	5.26	5.02	4.62	4.08	3.43	2.67	1.83	.92	
20	4.23	4.16	3.97	3.66	3.24	2.71	2.12	1.45	.73	
30	3.01	2.96	2.83	2.60	2.30	1.94	1.51	1.03	.52	
June 9	1.72	1.69	1.61	1.48	1.31	1.09	.86	.59	.30	
19	0.35	0.34	0.33	.30	.27	.22	.17	.12	.06	0 00
29	−1.02	−1.00	−0.95	− .89	− .78	− .65	− .51	− .35	− .17	0.00
July 9	2.36	2.32	2.22	2.04	1.80	1.51	1.18	.81	.41	
19	3.62	3.56	3.40	3.13	2.77	2.32	1.81	1.23	.63	
29	4.78	4.70	4.49	4.14	3.66	3.07	2.39	1.64	.83	
Aug. 8	5.81	5.72	5.46	5.03	4.45	3.73	2.91	1.98	1.00	
18	6.64	6.54	6.24	5.75	5.08	4.26	3.32	2.27	1.14	
28	7.31	7.20	6.87	6.32	5.59	4.70	3.60	2.50	1.26	
Sept. 7	7.75	7.63	7.28	6.71	5.93	4.99	3.88	2.66	1 35	
17	7.94	7.82	7.46	6.87	6.08	5.11	3.97	2.72	1 38	0.00
27	7.92	7.80	7.44	6.85	6.06	5.09	3.96	2.71	1.37	
Oct. 7	7.66	7.54	7.20	6.63	5.86	4.92	3 83	2 62	1.33	
17	7.18	7.07	6.75	6.21	5.49	4.60	3.59	2.45	1.25	
27	6.47	6.37	6.08	5.60	4.95	4 16	3.24	2.21	1.12	
Nov. 6	5.60	5.51	5.26	4.85	4.29	3.59	2.80	1.91	.97	
16	4.53	4.46	4.25	3.91	3.46	2.89	2.26	1.54	.78	
26	3.34	3.29	3.14	2.89	2.56	2.15	1.67	1.14	.58	
Dec. 6	2.06	2.02	1.93	1.78	1.58	1.32	1.03	0.71	.36	
16	0.72	0.71	0.67	.62	.55	.46	.36	.25	.12	
26	+0.66	+0.65	+0.62	+ .57	− .50	+ .42	+ .33	+ .22	+ .11	0.0
31	1.34	1.32	1.26	1.16	1.02	.86	.67	.46	.23	

For finding the Semiannual Solar Equation in N.P.D. for every 10th Day, and every Hour of R.A. of the Star.

	☉ Long. × 2	h h 0 12	h h 1 13	h h 2 14	h h 3 15	h h 4 16	h h 5 17	h h 6 18	h h 7 19	h h 8 20	h h 9 21	h h 10 22	h h 11 23	h h 12 0	R.A. of the *
	s. ° ′	″	″	″	″	″	″	″	″	″	″	″	″	″	
Jan. 0.	6 19 48	−0.16+	−0.04+	+0.08−	+0.20−	+0.31−	+0.40−	+0.45−	+0.48−	+0.47−	+0.43−	+0.37−	+0.27−	+0.16−	
10.	7 9 30	.31	.20	− .08+	.04	.16	.27	.37	.43	.47	.48	.45	.40	.31	
20.	29 14	.42	.34	.24	− .12+	.00	.12	.24	.34	.42	.46	.48	.46	.42	
30.	8 18 56	.47	.43	.37	.27	− .16+	− .04+	.08	.20	.41	.40	.45	.48	.47	
Feb. 9.	9 8 40	.47	.48	.45	.40	.31	.20	− .08+	.04	.16	.27	.37	.43	.47	
19.	22 22	.42	.46	.48	.46	.42	.34	.24	− .12+	.00	.12	.24	.34	.42	
Mar. 1.	10 18 4	.32	.41	.45	.48	.47	.42	.36	.25	− .15+	− .03+	.09	.23	.31	
11.	11 7 46	.18	.30	.39	.44	.48	.47	.44	.38	.29	.18	− .06+	.06	.18	
21.	27 30	.02	.14	.26	.36	.43	.47	.48	.45	.41	.32	.22	− .10+	.03	
31.	0 17 12	+ .14−	+ .01−	.11	.23	.33	41	.46	.48	.46	.42	.35	.25	− .14+	
Apr. 10.	1 6 56	.28	.17	+ .05−	.07	.19	.30	.39	.45	.48	.47	.44	.38	.28	
20.	26 38	.40	.31	.21	+ .08−	.03	.16	.26	.37	.43	.47	.48	.45	.40	
30.	2 16 22	.46	.42	.34	.24	+ .13−	.00	.11	.24	.34	.42	.46	.48	.46	
May 10.	3 6 4	.48	.47	.43	.37	.27	+ .16 −	+ .05−	.08	.19	.31	.40	.45	.48	
20.	25 46	.43	.47	.48	.45	.40	.31	.20	+ .08−	.04	.16	.27	.37	.43	
30.	4 15 30	.34	.42	.46	.48	.46	.42	.34	.24	+ .12−	.00	.12	.24	.34	
June 9.	5 5 12	.20	.31	.40	.45	.48	.47	.43	.37	.27	+ .16−	+ .04−	.08	.20	
19.	24 56	.04	.16	.27	.37	.43	.47	.48	.45	.40	.31	.20	+ .08 −	.04	
29.	6 14 38	− .12+	.00	.12	.24	.34	.42	.46	.48	.46	.42	.34	.24	+ .12−	
July 9.	7 4 20	.27	− .15+	− .03+	.09	.19	.31	.40	.45	.48	.47	.43	.37	.27	
19.	24 4	.40	.30	.20	− .07+	.04	.16	.28	.37	.43	.47	.48	.45	.40	
29.	8 13 46	.46	.42	.33	.23	− .11+	.01	.13	.24	.34	.42	.46	.48	.46	
Aug. 8.	9 3 30	.48	.47	.43	.36	.26	− .15+	− .03+	.09	.22	.34	.41	.45	.47	
18.	23 12	.44	.47	.48	.44	.39	.29	.18	− .07+	.05	.17	.28	.38	.44	
28.	10 12 54	.35	.42	.46	.48	.46	.42	.33	.23	− .11+	.01	.14	.25	.35	
Sept. 7.	11 2 38	.22	.32	.41	.45	.48	.47	.42	.36	.26	− .15+	− .03+	.09	.21	
17.	22 20	.06	.18	.30	.39	.44	.48	.47	.44	.38	.29	.18	− .06+	.06	
27.	0 12 2	+ .10−	.02	.14	.26	.36	.43	.47	.48	.45	.41	.32	.22	− .10+	
Oct. 7.	1 1 46	.25	+ .13−	+ .01−	.11	.23	.33	.42	.46	.48	.46	.42	.35	.25	
17.	21 28	.37	.27	.16	+ .04 −	.08	.20	.31	.40	.45	.48	.47	.43	.37	
27.	2 11 12	.45	.40	.31	.20	+ .08 −	.04	.16	.27	.37	.43	.47	.48	.45	
Nov. 6.	3 0 54	.48	.46	.42	.34	.24	+ .12−	.00	.12	.24	.34	.42	.46	.48	
16.	20 36	.45	.48	.47	.43	.37	.27	+ .16 −	+ .04−	.08	.20	.31	.40	.45	
26.	4 10 20	.37	.43	.47	.48	.45	.40	.31	.20	+ .08−	.04	.16	.27	.37	
Dec. 6.	5 0 2	.24	.34	.42	.46	.48	.46	.42	.34	.24	+ .12 −	.00	.12	.24	
16.	19 46	.08	.20	.31	.40	.45	.48	.47	.43	.37	.27	+ .16−	+ .04−	.08	
26.	6 9 28	− .08+	.04	.16	.27	.37	.43	.47	.48	.45	.40	.31	.20	+ .08−	
31.	19 20	.16	− .04 +	.08	.20	.31	.40	.45	.48	.47	.43	.37	.27	.16	

TABLE XVII.

For finding the Effect of Nutation on the N.P.D. for every 10° of ☽'s ☊ and every Hour of *'s R.A.

Arg. Long. of ☽ ☊	h h 0 12	h h 1 13	h h 2 14	h h 3 15	h h 4 16	h h 5 17	h h 6 18	h h 7 19	h h 8 20	h h 9 21	h h 10 22	h h 11 23	h h 12 0
° ′	″	″	″	″	″	″	″	″	″	″	″	″	″
0. 0	0.00	−2.33 +	−4.51 +	−6.36 +	−7.80 +	−8.69 +	−9.00 +	−8.69 +	−7.80 +	−6 36 +	−4.51 +	−2.33 +	0.00
10	+ 1.16 −	1.17	3.42	5.44	7.09	8.26	8.86	8.84	8.26	7.09	5.44	3.42	−1.16 +
20	2.29	+ 0.02 −	2.24	4.36	6.18	7.58	8.46	8.74	8 47	7.60	6.21	4.40	2.29
I. 0	3.35	1.22	1.00	3.14	5.08	6.66	7.80	8.39	8.43	7.88	6.80	5.25	3.35
10	4.31	2.38	+ 0.28 −	1.83	3.81	5 54	6.89	7.77	8.12	7.90	7.18	5.94	4.31
20	5.13	3.46	1.55	0.47	2.44	4 26	5.79	6.92	7.58	7.70	7.34	6.45	5.13
II. 0	5.80	4.44	2.78	+ 0.92 −	1.00	2.84	4.51	5.85	6.80	7.28	7.27	6.77	5.80
10	6.30	5.28	3.92	2.28	+ 0.48 −	1.34	3.07	4.60	5.81	6.62	6.99	6.86	6.30
20	6.60	5.96	4.93	3.56	1.94	+ 0 19 −	1.56	3.22	4.66	5.77	6.50	6.76	6.60
III. 0	6.70	6 47	5.80	4.74	3.35	1.73	0.00	1.73	3.35	4 74	5.80	6.47	6.70
10	6.60	6.76	6.50	5.77	4.66	3 22	+ 1.56 −	0.19	1.94	3.56	4.93	5.96	6.60
20	6.30	6.86	6.99	6.62	5 81	4.60	3.07	+ 1.34 −	0.48	2.28	3.92	5.28	6.30
IV. 0	5.80	6.77	7.27	7.28	6.80	5.85	4.51	2.84	+ 1.00 −	0.92	2.78	4.44	5.80
10	5.13	6.45	7.34	7.70	7.58	6.92	5.79	4.26	2.44	+ 0.47 −	1.55	3.46	5.13
20	4.31	5.94	7.18	7.90	8.12	7.77	6.89	5.54	3.81	1.83	0.28	2.38	4.31
V. 0	3.35	5.25	6.80	7.88	8.43	8.39	7.80	6.66	5.08	3.14	+ 1.00 −	1.22	3.35
10	2 29	4 40	6.21	7.60	8.47	8.74	8.46	7.58	6.18	4.36	2.24	0.02	2.29
20	1.16	3.42	5.44	7.09	8.26	8.84	8.86	8.26	7.09	5.44	3 42	+ 1.17 −	1.16
VI. 0	0.00	2 33	4.51	6.36	7 80	8 69	9.00	8.69	7.80	6.36	4.51	2.33	0.00
10	− 1.16 +	1.17	3.42	5.44	7.09	8.26	8.86	8.84	8 26	7.09	5.44	3.42	+ 1.16 −
20	2.29	− 0.02 +	2.24	4.36	6.18	7.58	8.46	8.74	8 47	7.60	6.21	4.40	2.29
VII. 0.	3.35	1 22	1.00	3 14	5 08	6.66	7.80	8.39	8.43	7.88	6.80	5.25	3.35
10	4.31	2.38	− 0.28 +	1 83	3.81	5.54	6.89	7.77	8.12	7.90	7.18	5.94	4.31
20	5.13	3.46	1.55	0 47	2.44	4.26	5.79	6.92	7.58	7.70	7.34	6.45	5.13
VIII. 0	5.80	4.44	2.78	− 0.92 +	1.00	2.84	4.51	5.85	6.80	7.28	7.27	6.77	5.80
10	6.30	5 28	3.92	2.28	− 0 48 +	1.34	3.07	4.60	5.81	6.62	6.99	6.86	6.30
20	6.60	5.96	4.93	3.56	1.94	− 0.19 +	1.56	3.22	4.66	5.77	6.50	6.76	6.60
IX. 0	6.70	6.47	5.80	4.74	3.35	1.73	0.00	1.73	3.35	4.74	5.80	6.47	6.70
10	6.60	6.76	6.50	5.77	4.66	3.22	− 1.56 +	0.19	1.94	3.56	4.93	5.96	6.60
20	6.30	6.86	6.99	6.62	5.81	4.60	3.07	− 1.34 +	0.48	2.28	3.92	5.28	6.30
X. 0	5.80	6.77	7.27	7.28	6.80	5.85	4.51	2.84	− 1.00 +	0.92	2.78	4.44	5.80
10	5.13	6.45	7.34	7.70	7 58	6.92	5.79	4.26	2.44	− 0.47 +	1.55	3.46	5.13
20	4.31	5.94	7.18	7.90	8.12	7.77	6.89	5.54	3.81	1.83	0.28	2.38	4.31
XI. 0	3.35	5.25	6.80	7.88	8.43	8.39	7.80	6.66	5.08	3.14	− 1.00 +	1.22	3.35
10	2.29	4.40	6.21	7.60	8.47	8.74	8.46	7.58	6.18	4.36	2.24	0.02	2.29
20	1.16	3.42	5 44	7.09	8.26	8 84	8.86	8.26	7.09	5.44	3.42	− 1.17 +	1.16

DECLINATION.

Table XVIII.

A Table of mean Refractions to every Ten Minutes of Zenith Distances.

App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.
° ′	″	″	° ′	″	″	° ′	″	″	° ′	″	″	° ′	″	″
0 0	0.00	.17	9 00	9.00	.17	18 00	18.50	.18	27 00	29.00	.22	36 00	41.40	.25
0 10	0.17	.16	9 10	9.17	.16	18 10	18.68	.19	27 10	29.22	.21	36 10	41.65	.25
0 20	0.33	.17	9 20	9.33	.17	18 20	18 87	.18	27 20	29.43	.22	36 20	41.90	.25
0 30	0.50	.17	9 30	9.50	.17	18 30	19.05	.18	27 30	29.65	.22	36 30	42.15	.25
0 40	0.67	.16	9 40	9.67	.16	18 40	19.23	.19	27 40	29.87	.21	36 40	42.40	.25
0 50	0.83	.17	9 50	9.83	.17	18 50	19.42	.18	27 50	30.08	.22	36 50	42.65	.25
1 0	1.00	.17	10 00	10.00	.18	19 00	19.60	.18	28 00	30.30	.22	37 00	42.90	.27
1 10	1.17	.16	10 10	10.18	.19	19 10	19.78	.19	28 10	30.52	.21	37 10	43.17	.26
1 20	1.33	.17	10 20	10.37	.18	19 20	19.97	.18	28 20	30.73	.22	37 20	43.43	.27
1 30	1.50	.17	10 30	10.55	.18	19 30	20.15	.18	28 30	30.95	.22	37 30	43.70	.27
1 40	1.67	.16	10 40	10.73	.19	19 40	20.33	.19	28 40	31.17	.21	37 40	43.97	.26
1 50	1.83	.17	10 50	10 92	.18	19 50	20.52	.18	28 50	31.38	22	37 50	44.23	.27
2 0	2.00	.17	11 00	11.10	.17	20 00	20.70	.20	29 00	31.60	.22	38 00	44.50	.27
2 10	2.17	.16	11 10	11.27	.16	20 10	20.90	.20	29 10	31.82	.21	38 10	44.77	.26
2 20	2.33	.17	11 20	11.43	.17	20 20	21.10	.20	29 20	32.03	.22	38 20	45.03	.27
2 30	2.50	.17	11 30	11.60	.17	20 30	21.30	.20	29 30	32.25	.22	38 30	45.30	.27
2 40	2 67	.16	11 40	11.77	.16	20 40	21.50	.20	29 40	32.47	.21	38 40	45.57	.26
2 50	2.83	.17	11 50	11.93	.17	20 50	21.70	.20	29 50	32.68	.22	38 50	45.83	.27
3 0	3.00	.17	12 00	12.10	.17	21 00	21.90	.18	30 00	32.90	.22	39 00	46.10	.28
3 10	3.17	.16	12 10	12.27	.16	21 10	22.08	.19	30 10	33.12	.21	39 10	46.38	.29
3 20	3.33	.17	12 20	12.43	.17	21 20	22.27	.18	30 20	33.33	.22	39 20	46.67	.28
3 30	3.50	.17	12 30	12.60	.17	21 30	22.45	.18	30 30	33.55	22	39 30	46.95	.28
3 40	3.67	.16	12 40	12.77	16	21 40	22.63	.19	30 40	33.77	.21	39 40	47.23	.29
3 50	3.83	.17	12 50	12.93	.17	21 50	22.82	.18	30 50	33.98	.22	39 50	47.52	.28
4 0	4.00	.17	13 00	13.10	18	22 00	23.00	.20	31 00	34.20	.23	40 00	47.80	.28
4 10	4.17	16	13 10	13.28	.19	22 10	23.20	.20	31 10	34 43	.24	40 10	48.08	.29
4 20	4.33	.17	13 20	13.47	.18	22 20	23.40	.20	31 20	34.67	.23	40 20	48.37	.28
4 30	4.50	.17	13 30	13.65	.18	22 30	23.60	.20	31 30	34.90	.23	40 30	48 65	.28
4 40	4.67	.16	13 40	13.83	.19	22 40	23.80	.20	31 40	35.13	.24	40 40	48.93	.29
4 50	4.83	.17	13 50	14.02	.18	22 50	24.00	.20	31 50	35.37	.23	40 50	49.22	.28
5 0	5.00	.17	14 00	14.20	.18	23 00	24.20	.20	32 00	35.60	.23	41 00	49.50	.30
5 10	5.17	.16	14 10	14.38	.19	23 10	24.40	.20	32 10	35.83	.24	41 10	49.80	.30
5 20	5.33	.17	14 20	14.57	.18	23 20	24.60	.20	32 20	36.07	.23	41 20	50.10	.30
5 30	5.50	.17	14 30	14.75	18	23 30	24.80	.20	32 30	36.30	.23	41 30	50.40	.30
5 40	5.67	.16	14 40	14.93	.19	23 40	25.00	.20	32 40	36.53	.24	41 40	50.70	.30
5 50	5.83	.17	14 50	15.12	.18	23 50	25.20	.20	32 50	36.77	.23	41 50	51.00	.30
6 0	6.00	.17	15 00	15.30	.17	24 00	25.40	.20	33 00	37.00	.23	42 00	51.30	.30
6 10	6.17	.16	15 10	15.47	.16	24 10	25.60	.20	33 10	37.23	.24	42 10	51.60	.30
6 20	6.33	.17	15 20	15.63	.17	24 20	25.80	.20	33 20	37.47	.23	42 20	51.90	.30
6 30	6.50	.17	15 30	15.80	.17	24 30	26.00	.20	33 30	37.70	.23	42 30	52.20	.30
6 40	6.67	.16	15 40	15.97	.16	24 40	26.20	.20	33 40	37.93	.23	42 40	52.50	.30
6 50	6.83	.17	15 50	16.13	.17	24 50	26.40	.20	33 50	38.16	.24	42 50	52.80	.30
7 0	7.00	.17	16 00	16.30	.18	25 00	26.60	20	34 00	38.40	25	43 00	53.10	.32
7 10	7.17	16	16 10	16.48	.19	25 10	26.80	.20	34 10	38.65	.25	43 10	52.42	.31
7 20	7.33	.17	16 20	16.67	.18	25 20	27.00	.20	34 20	38.90	.25	43 20	53.73	.32
7 30	7.50	17	16 30	16.85	.18	25 30	27.20	.20	34 30	39.15	.25	43 30	54.05	.32
7 40	7.67	.16	16 40	17.03	.19	25 40	27.40	.20	34 40	39.40	.25	43 40	54.37	.31
7 50	7.83	.17	16 50	17.22	.18	25 50	27.60	.20	34 50	39.65	.25	43 50	54.68	.32
8 0	8.00	17	17 00	17.40	.18	26 00	27.80	.20	35 00	39.90	.25	44 00	55.00	.32
8 10	8.17	.16	17 10	17.58	.19	26 10	28.00	20	35 10	40.15	.25	44 10	55.32	.31
8 20	8.33	.17	17 20	17.77	.18	26 20	28.20	.20	35 20	40 40	.25	44 20	55.63	.32
8 30	8.50	.17	17 30	17.95	.18	26 30	28.40	.20	35 30	40.65	.25	44 30	55.95	.32
8 40	8.67	.16	17 40	18.13	.19	26 40	28.60	.20	35 40	40.90	.25	44 40	56.27	.31
8 50	8.83	.17	17 50	18.32	.18	26 50	28.80	.20	35 50	41.15	.25	44 50	56.58	32

TABLE XVIII.—*continued.*

A Table of mean Refractions to every Ten Minutes of Zenith Distances.

App. Z. D.	Refraction.	Dif.	App. Z. D.	Refractions.	Dif.	App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.	App. Z. D.	Refraction.	Dif.
° ′	′ ″	″	° ′	′ ″	″	° ′	′ ″	″	° ′	′ ″	″	° ′	′ ″	″	° ′	′ ″	″
45 00	0 56.90	33	53 30	1 16.89	·47	62 00	1 46.80	0.76	70 30	2 39.80	1.48	79 00	4 46.35	4.33			
45 10	0 57.23	·33	53 40	1 17.36	·47	62 10	1 47.56	0.77	70 40	2 41.28	1.50	79 10	4 51.18	4.45			
45 20	0 57.56	33	53 50	1 17.83	47	62 20	1 48.32	0.78	70 50	2 42.78	1.53	79 20	4 55.63	4.58			
45 30	0 57.89	33	54 00	1 18.30	·47	62 30	1 49.11	0.79	71 00	2 44.30	1.53	79 30	5 0.21	4.72			
45 40	0 58.22	·34	54 10	1 18.77	·48	62 40	1 49.90	0.80	71 10	2 45.83	1.50	79 40	5 4.93	4.88			
45 50	0 58.56	·34	54 20	1 19.25	48	62 50	1 50.70	0.80	71 20	2 47.39	1.58	79 50	5 9.81	5.02			
46 00	0 58.90	·35	54 30	1 19.73	·49	63 00	1 51.50	0.80	71 30	2 48.97	1.62	80 00	5 14.83	5 16			
46 10	0 59.25	·34	54 40	1 20.22	·49	63 10	1 52.30	0.80	71 40	2 50.59	1.64	80 10	5 19.99	5 32			
46 20	0 59.59	·35	54 50	1 20.71	·49	63 20	1 53.10	0.81	71 50	2 52.23	1.67	80 20	5 25.31	5 50			
46 30	0 59.94	35	55 00	1 21.20	·51	63 30	1 53.91	0.82	72 00	2 53.90	1.72	80 30	5 30.81	5.68			
46 40	1 0.29	·36	55 10	1 21.71	·51	63 40	1 54.73	0.83	72 10	2 55.62	1.75	80 40	5 36.49	5.89			
46 50	1 0.65	·36	55 20	1 22.22	51	63 50	1 55.56	0.84	72 20	2 57.37	1.78	80 50	5 42.38	6 07			
47 00	1 1.00	35	55 30	1 22.73	·52	64 00	1 56.40	0.85	72 30	2 59.15	1.82	81 00	5 48.45	6.25			
47 10	1 1.36	·36	55 40	1 23.25	·52	64 10	1 57.25	0.87	72 40	3 0.97	1.85	81 10	5 54.70	6.47			
47 20	1 1.73	·37	55 50	1 23.77	53	64 20	1 58.12	0.88	72 50	3 2.82	1.88	81 20	6 1.17	6.71			
47 30	1 2.09	·36	56 00	1 24.30	·52	64 30	1 59.00	0.89	73 00	3 4.70	1.91	81 30	6 7.88	6.95			
47 40	1 2.46	·37	56 10	1 24.82	·52	64 40	1 59.89	0.90	73 10	3 6.61	1.94	81 40	6 14.83	7.22			
47 50	1 2.83	·37	56 20	1 25.34	53	64 50	2 0.79	0.91	73 20	3 8.55	1.98	81 50	6 22.05	7.50			
48 00	1 3.20	·37	56 30	1 25.87	·54	65 00	2 1.70	0.92	73 30	3 10.53	2.02	82 00	6 29.55	7.72			
48 10	1 3.56	·36	56 40	1 26.41	·54	65 10	2 2.62	0.93	73 40	3 12.55	2.06	82 10	6 37.27	8.02			
48 20	1 3.92	·36	56 50	1 26.95	55	65 20	2 3.55	0.94	73 50	3 14.61	2.09	82 20	6 45.29	8.35			
48 30	1 4.29	·37	57 00	1 27.50	·57	65 30	2 4.49	0.96	74 00	3 16.70	2.13	82 30	6 53.64	8.69			
48 40	1 4.66	·37	57 10	1 28.07	·57	65 40	2 5.45	0.97	74 10	3 18.83	2.18	82 40	7 2.33	9.06			
48 50	1 5.03	·37	57 20	1 28.64	·58	65 50	2 6.42	0.98	74 20	3 21.01	2.23	82 50	7 11.39	9.45			
49 00	1 5.40	·37	57 30	1 29.22	·59	66 00	2 7.40	1.00	74 30	3 23.24	2.27	83 00	7 20.84	9.74			
49 10	1 5.79	·39	57 40	1 29.81	·59	66 10	2 8.40	1.01	74 40	3 25.51	2.32	83 10	7 30.58	10.17			
49 20	1 6.19	40	57 50	1 30.40	·60	66 20	2 9.41	1.03	74 50	3 27.83	2.37	83 20	7 40.75	10.64			
49 30	1 6.59	·40	58 00	1 31.00	·59	66 30	2 10.44	1.04	75 00	3 30.20	2.41	83 30	7 51.39	11.12			
49 40	1 6.99	·40	58 10	1 31.59	·59	66 40	2 11.48	1.05	75 10	3 32.61	2.47	83 40	8 2.51	11.67			
49 50	1 7.39	·40	58 20	1 32.18	·60	66 50	2 12.53	1.07	75 20	3 35.08	2.52	83 50	8 14.18	12.23			
50 00	1 7.80	·41	58 30	1 32.78	·60	67 00	2 13.60	1.08	75 30	3 37.60	2.58	84 00	8 26.41	12.60			
50 10	1 8.19	·39	58 40	1 33.38	·61	67 10	2 14.68	1.10	75 40	3 40.18	2.63	84 10	8 39.01	13.24			
50 20	1 8.59	·40	58 50	1 33.99	·61	67 20	2 15.78	1.11	75 50	3 42.81	2.69	84 20	8 52.25	13.94			
50 30	1 8.99	40	59 00	1 34.60	·62	67 30	2 16.89	1.12	76 00	3 45.50	2.75	84 30	9 6.19	14.66			
50 40	1 9.39	·40	59 10	1 35.22	·62	67 40	2 18.01	1.14	76 10	3 48.25	2.81	84 40	9 20.85	15.46			
50 50	1 9.79	·40	59 20	1 35.84	63	67 50	2 19.15	1.15	76 20	3 51.06	2.88	84 50	9 36.31	16.19			
51 00	1 10.20	·41	59 30	1 36.47	·64	68 00	2 20.30	1.16	76 30	3 53.94	2.95	85 00	9 52.50				
51 10	1 10.62	·42	59 40	1 37.11	·64	68 10	2 21.46	1.17	76 40	3 56.89	3.02						
51 20	1 11.05	·43	59 50	1 37.75	·65	68 20	2 22.63	1.19	76 50	3 59.91	3.09						
51 30	1 11.48	·43	60 00	1 38.40	·67	68 30	2 23.82	1.21	77 00	4 3.00	3.15						
51 40	1 11.92	44	60 10	1 39.07	·67	68 40	2 25.03	1.22	77 10	4 6.15	3.25						
51 50	1 12.36	·44	60 20	1 39.74	·68	68 50	2 26.25	1.25	77 20	4 9.40	3.31						
52 00	1 12.80	·44	60 30	1 40.42	·69	69 00	2 27.50	1.28	77 30	4 12.71	3.42						
52 10	1 13.24	44	60 40	1 41.11	·69	69 10	2 28.78	1.30	77 40	4 16.13	3.49						
52 20	1 13.69	·45	60 50	1 41.80	·70	69 20	2 30.08	1.32	77 50	4 19.61	3.56						
52 30	1 14.14	45	61 00	1 42.50	·70	69 30	2 31.40	1.34	78 00	4 23.18	3.69						
52 40	1 14.59	45	61 10	1 43.20	·70	69 40	2 32.74	1.37	78 10	4 26.87	3.79						
52 50	1 15.04	·46	61 20	1 43.90	·71	69 50	2 34.11	1.39	78 20	4 30.66	3.88						
53 00	1 15.50	46	61 30	1 44.61	·72	70 00	2 35.50	1.41	78 30	4 34.54	3.99						
53 10	1 15.96	·46	61 40	1 45.33	·73	70 10	2 36.91	1.43	78 40	4 38.53	4.11						
53 20	1 16.42	·47	61 50	1 46.06	·74	70 20	2 38.34	1.46	78 50	4 42.64	4.21						

TABLE XIX.—Augmentation of the Moon's Semi-Diameter.

Appar. Alt.	Zenith Dist.	Semi-Diameter. 14° 30′	15° 0′	15° 30′	16° 0′	16° 30′	17° 0′
0	90°	0″00	0″00	0″00	0″00	0″00	0″00
3	87	0.71	0.75	0.80	0.86	0.92	0.97
6	84	1.41	1.50	1.60	1.71	1.83	1.94
9	81	2.11	2.25	2.40	2.56	2.73	2.90
12	78	2 81	3.00	3.20	3.41	3.63	3.86
15	75	3.50	3.74	3.99	4.25	4.52	4.80
18	72	4.17	4.46	4.76	5.07	5.39	5.73
21	69	4 84	5.18	5.52	5.89	6.26	6.65
24	66	5 49	5.88	6.27	6.68	7.11	7.54
27	63	6.13	6.56	7 00	7.46	7.93	8.42
30	60	6.75	7 23	7.71	8.22	8.74	9.28
33	57	7.35	7.88	8.40	8.96	9.52	10.12
36	54	7.93	8.50	9.07	9.67	10.28	10.92
39	51	8.49	9.10	9.72	10.36	11.02	11.66
42	48	9.03	9.68	10 34	11.02	11.72	12 44
45	45	9.55	10.23	10.93	11.65	12.39	13.15
48	42	10 05	10.76	11 49	12.25	13.03	13.83
51	39	10.52	11.26	12.02	12.81	13.63	14.46
54	36	10.95	11.72	12.52	13 34	14.19	15 06
57	33	11.35	12.15	12.98	13.83	14.72	15.62
60	30	11.72	12.55	13.40	14 29	15.20	16.13
63	27	12.06	12.91	13.79	14.70	15.64	16.60
66	24	12.37	13.24	14.14	15 08	16.04	17.03
69	21	12 64	13.53	14.46	15 41	16.39	17.40
72	18	12 88	13.79	14.73	15.70	16.70	17.73
75	15	13.08	14.01	14.96	15.95	16.96	18.01
78	12	13.24	14 18	15.15	16.15	17.18	18.24
81	9	13.37	14 32	15.30	16.31	17.35	18 42
84	6	13 46	14.42	15 41	16.42	17.47	18.55
87	3	13.52	14.48	15.47	16.49	17.54	18.62
90	0	13.54	14.56	15.49	16.51	17.57	18.65

TABLE XX.—Diminution of the Horizontal Parallax, the Equatorial Parallax being ſuppoſed

Lat.	Angle of the Vertical.	52°	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°
50	10′ 9″4	5″48	5″5	5″69	5″80	5″90	6″01	6″11	6″23	6″33	6″43	6″54
51	10 5.3	5.64	5.75	5.86	5.9	6.08	6.18	6.29	6.40	6.51	6.62	6.73
52	10 0.6	5.80	5.91	6.02	6.14	6.25	6.36	6.47	6.58	6.69	6.80	6.92
53	9 55.0	5.96	6.07	6.19	6.30	6.42	6.53	6.65	6.76	6.87	6.99	7.10
54	9 48.8	6.11	6.23	6.35	6.47	6.58	6.70	6.82	6.94	7.05	7.17	7.29
55	9 42.8	6.27	6.39	6.51	6.63	6.75	6.87	6.99	7.11	7.23	7.35	7.47
56	9 34.1	6.43	6.54	6.67	6.79	6.91	7.04	7.16	7.28	7.41	7.53	7.65

Ellipticity of the Earth is here ſuppoſed $\frac{1}{334}$.

TABLE XXI.—Deviation of the Horizontal Wire of an Aſtronomical Quadrant or Circle.

Altitude.	Diſtance of Star from the Vertical Wire. 10′	20′	30′	40′	50′	60′
5°	0″1	0″3	0″7	1″2	1″9	2″7
10	0 1	0.6	1.4	2.5	3.9	5.5
15	0.2	0.9	2.1	3.7	5.8	8.4
20	0.3	1.3	2.9	5.1	7.9	11.4
25	0.4	1.6	3.6	6 5	10.1	14.6
30	0.5	2.0	4.5	8.1	12.6	18.1
35	0.6	2.4	5.5	9.8	15.3	22 0
40	0.7	2 9	6.6	11.7	18.3	26.4
45	0.9	3.5	7.9	14.0	21.8	31.4
50	1.0	4.2	9.4	16.6	26.0	37.4
55	1 2	5.0	11.2	19.9	31.2	44.9
60	1.5	6 0	13.6	24.2	37.8	54.4
65	1.9	7.5	16.8	29 9	46.8	67.4

Tables to facilitate the Uſe of the Repeating Circle.

TABLE I.

Of the change in Altitude of the Pole Star, for Half an Hour on each ſide the Meridian.

	0′	1′	2′	3′	4′	5′	6′
0″	0″0	0″1	0″3	0″6	1″0	1″6	2″3
1	0 0	0.1	0.3	0.6	1.0	1.6	2.3
2	0.0	0.1	0.3	0.6	1.0	1.6	2.3
3	0.0	0.1	0.3	0.6	1.1	1.6	2.3
4	0.0	0.1	0.3	0.6	1.1	1.7	2.4
5	0.0	0.1	0.3	0.6	1.1	1.7	2.4
6	0.0	0.1	0.3	0.6	1.1	1.7	2.4
7	0.0	0.1	0.3	0.6	1.1	1.7	2.4
8	0.0	0.1	0.3	0.6	1.1	1.7	2.4
9	0.0	0.1	0.3	0.6	1.1	1.7	2.4
10	0.0	0.1	0.3	0.6	1.1	1.7	2.4
11	0.0	0.1	0.3	0.6	1.1	1.7	2.5
12	0.0	0.1	0.3	0.7	1.1	1.7	2.5
13	0.0	0.1	0.3	0.7	1.1	1.8	2.5
14	0.0	0.1	0.3	0.7	1.2	1.8	2.5
15	0 0	0.1	0.3	0.7	1.2	1.8	2.5
16	0.0	0.1	0.3	0.7	1.2	1.8	2.5
17	0.0	0.1	0.3	0.7	1.2	1.8	2.5
18	0.0	0.1	0.3	0.7	1.2	1.8	2.6
19	0.0	0.1	0.3	0.7	1.2	1.8	2.6
20	0.0	0.1	0.4	0.7	1.2	1.8	2.6
21	0.0	0.1	0.4	0.7	1.2	1.9	2.6
22	0.0	0.1	0.4	0.7	1.2	1.9	2.6
23	0.0	0.1	0.4	0.7	1.2	1.9	2.6
24	0.0	0.1	0.4	0.7	1.2	1.9	2.6
25	0 0	0.1	0.4	0.8	1.2	1.9	2.7
26	0.0	0 1	0.4	0.8	1.2	1.9	2.7
27	0.0	0.1	0.4	0.8	1.3	1.9	2.7
28	0.0	0.1	0.4	0.8	1.3	1.9	2.7
29	0 0	0.2	0.4	0.8	1.3	1.9	2.7
30	0.0	0.2	0.4	0.8	1.3	1.9	2.7
31	0 0	0.2	0.4	0.8	1.3	2.0	2.7
32	0.0	0.2	0.4	0.8	1.3	2.0	2.7
33	0.0	0.2	0.4	0.8	1.3	2.0	2.8
34	0.0	0.2	0.4	0.8	1.4	2.0	2.8
35	0 0	0.2	0.4	0.8	1.4	2.0	2.8
36	0.0	0.2	0.4	0.8	1.4	2.0	2.8
37	0.0	0.2	0.4	0.8	1.4	2.0	2.8
38	0 0	0.2	0.4	0.9	1.4	2.0	2.8
39	0.0	0.2	0.5	0.9	1.4	2.0	2.8
40	0 0	0.2	0.5	0.9	1.4	2.1	2.9
41	0 0	0.2	0.5	0.9	1.4	2.1	2.9
42	0.0	0.2	0.5	0.9	1.4	2.1	2.9
43	0.0	0.2	0.5	0.9	1.4	2.1	2.9
44	0.0	0.2	0.5	0.9	1.4	2.1	2.9
45	0.0	0.2	0.5	0.9	1.5	2.1	2.9
46	0 0	0.2	0.5	0.9	1.5	2.2	2.9
47	0.0	0.2	0.5	0.9	1.5	2.2	3.0
48	0.0	0.2	0.5	0.9	1.5	2.2	3.0
49	0.0	0.2	0.5	0.9	1.5	2.2	3.0
50	0.0	0.2	0.5	1.0	1.5	2.2	3.0
51	0.0	0.2	0.5	1.0	1.5	2.2	3.0
52	0 1	0.2	0.5	1.0	1.5	2.2	3.0
53	0.1	0.2	0.5	1.0	1.5	2.2	3.0
54	0.1	0.2	0.5	1.0	1.5	2.2	3.1
55	0 1	0.2	0.6	1.0	1.6	2.3	3 1
56	0.1	0.2	0.6	1.0	1.6	2.3	3.1
57	0.1	0.2	0.6	1.0	1.6	2.3	3 1
58	0.1	0.3	0.6	1.0	1.6	2.3	3.1
59	0.1	0.3	0.6	1.0	1.6	2.3	3.1
60	0.1	0.3	0.6	1.0	1.6	2.3	3.2

TABLE

DECLINATION.

TABLE I.—*continued.*

Of the Change of Altitude of the Pole-Star, for Half an Hour on each Side the Meridian.

	7′	8′	9′	10′	11′	12′	13′	14′	15′	16′	17′	18′	19′
0″	3″2	4″1	5″2	6″4	7″8	9″3	10″9	12″6	14″5	16″5	18″6	20″8	23″2
1	3.2	4.1	5.2	6.5	7.8	9.3	10.9	12.6	14.5	16.5	18.6	20.9	23.3
2	3 2	4.1	5.3	6.5	7.8	9.3	10.9	12.7	14.5	16.5	18.7	20.9	23.3
3	3.2	4.2	5.3	6.5	7.9	9.4	11.0	12.7	14.6	16.6	18.7	21.0	23.3
4	3.2	4.2	5.3	6.5	7.9	9.4	11.0	12.7	14.6	16.6	18.7	21.0	23.4
5	3.2	4.2	5.3	6.5	7.9	9.4	11.0	12.8	14.6	16.6	18.8	21.0	23.4
6	3.2	4.2	5.3	6 6	7.9	9.5	11.0	12.8	14.7	16.7	18.8	21.1	23.5
7	3.2	4.2	5.4	6.6	8.0	9.5	11.1	12.8	14.7	16.7	18.8	21.1	23.5
8	3.3	4.3	5.4	6.6	8.0	9.5	11.1	12.9	14.7	16.7	18 9	21.1	23.5
9	3.3	4.3	5.4	6.6	8.0	9.5	11.1	12.9	14.8	16.8	18.9	21.2	23.6
10	3.3	4.3	5.4	6.6	8 0	9.6	11.2	12.9	14.8	16.8	19.0	21.2	23.6
11	3.3	4.3	5.4	6.7	8.1	9.6	11.2	13.0	14.8	16.8	19.0	21.3	23.7
12	3.3	4.3	5.4	6.7	8.1	9.6	11.2	13.0	14.9	16.9	19.0	21.3	23.7
13	3.3	4.3	5.5	6.7	8.1	9.6	11.2	13.0	14.9	16.9	19 1	21.3	23.8
14	3.3	4.4	5.5	6 7	8.1	9.7	11.3	13.1	14.9	17.0	19.1	21.4	23.8
15	3.4	4.4	5.5	6.8	8.2	9.7	11.3	13.1	15 0	17.0	19.1	21.4	23.8
16	3.4	4.4	5.5	6.8	8.2	9.7	11.3	13.1	15.0	17.0	19.2	21.5	23.9
17	3.4	4.4	5.6	6.8	8.2	9.7	11.4	13.1	15.0	17.1	19.2	21.5	23.9
18	3.4	4.4	5.6	6.8	8.2	9.8	11.4	13.2	15.1	17.1	19.2	21 5	24.0
19	3.4	4.4	5.6	6.8	8.2	9.8	11.4	13.2	15.1	17.1	19.3	21.6	24.0
20	3.4	4.4	5.6	6.9	8.3	9.8	11.4	13.2	15.1	17.2	19.3	21.6	24.0
21	3.5	4.5	5.6	6.9	8.3	9.8	11.5	13.3	15.2	17.2	19.4	21.6	24.1
22	3.5	4.5	5.7	6.9	8.3	9.9	11 5	13.3	15.2	17.2	19.4	21.7	24.1
23	3.5	4.5	5.7	6.9	8.3	9.9	11.5	13.3	15.2	17.3	19 4	21.7	24.2
24	3.5	4.5	5.7	7.0	8 4	9 9	11.6	13.4	15.3	17.3	19.5	21.8	24.2
25	3.5	4.5	5.7	7.0	8.4	9.9	11.6	13.4	15.3	17.3	19.5	21.8	24.2
26	3.5	4.6	5.7	7.0	8.4	10.0	11.6	13.4	15.3	17.4	19.5	21.8	24.3
27	3.6	4.6	5.7	7.0	8.4	10.0	11.6	13.5	15.4	17.4	19.6	21.9	24.3
28	3.6	4.6	5.8	7.0	8.5	10.0	11.7	13.5	15.4	17.4	19.6	21.9	24.4
29	3.6	4.6	5.8	7.1	8.5	10.1	11.7	13.5	15.4	17.5	19 7	22.0	24.4
30	3.6	4.6	5.8	7.1	8 5	10.1	11.7	13.5	15.5	17.5	19.7	22.0	24.5
31	3.6	4.7	5.8	7.1	8.6	10.1	11.8	13.6	15.5	17.5	19.7	22.0	24.5
32	3.6	4.7	5.8	7.1	8.6	10.1	11.8	13 6	15.5	17.6	19.8	22.1	24.5
33	3.7	4.7	5.9	7.2	8.6	10.2	11.8	13.6	15.6	17.6	19 8	22.1	24.6
34	3.7	4.7	5.9	7.2	8.6	10.2	11.9	13.7	15.6	17.7	19.8	22.2	24.6
35	3.7	4.7	5.9	7.2	8.7	10.2	11.9	13.7	15.6	17.7	19.9	22.2	24.7
36	3.7	4.8	5.9	7.2	8.7	10.2	11.9	13.7	15.7	17.7	19.9	22.2	24.7
37	3.7	4.8	5.9	7.3	8.7	10.3	11.9	13.8	15.7	17.8	20.0	22.3	24.7
38	3.7	4.8	6.0	7.3	8.7	10.3	12.0	13.8	15.7	17.8	20.0	22.3	24.8
39	3.7	4.8	6.0	7.3	8 8	10.3	12.0	13.8	15.8	17.8	20.0	22.4	24.8
40	3.8	4 8	6.0	7.3	8 8	10.3	12.0	13.9	15.8	17.9	20.1	22.4	24.9
41	3.8	4.8	6.0	7.3	8 8	10.4	12.1	13.9	15.8	17.9	20.1	22 4	24.9
42	3.8	4.9	6.1	7.4	8.8	10 4	12.1	13.9	15.9	17.9	20.1	22.5	249
43	3.8	4.9	6.1	7.4	8.9	10.4	12.1	13.9	15.9	18.0	20.2	22.5	25.0
44	3.8	4.9	6.1	7.4	8.9	10.5	12.2	14.0	15.9	18.0	20.2	22.6	25.0
45	3.8	4.9	6.1	7.4	8.9	10.5	12.2	14.0	16.0	18.1	20.3	22.6	25 1
46	3.9	4.9	6.1	7.5	8.9	10 5	12.2	14.0	16.0	18.1	20.3	22.6	25.1
47	3.9	5.0	6.2	7.5	9.0	10.5	12.2	14.1	16.0	18 1	20.3	22.7	25.2
48	3.9	5.0	6.2	7.5	9.0	10.6	12.3	14.1	16.1	18.2	20.4	22.7	25.2
49	3.9	5.0	6.2	7.5	9 0	10.6	12 3	14.1	16.1	18.2	20.4	22.8	25.
50	3.9	5.0	6.2	7.6	9.0	10.6	12.3	14.2	16.1	18.2	20.5	22.8	25.
51	3.9	5.0	6.2	7.6	9.1	10.7	12.4	14.2	16.2	18.3	20.5	22.9	25.3
52	4.0	5.1	6.3	7.6	9.1	10.7	12.4	14.2	16.2	18.3	20.5	22.9	25.4
53	4.0	5.1	6.3	7.6	9.1	10.7	12.4	14.3	16.2	18.3	20.6	22.9	25.4
54	4.0	5.1	6.3	7.7	9.1	10.7	12.5	14.3	16.3	18.4	20.6	23.0	25.5
55	4.0	5.1	6.3	7.7	9.2	10.8	12 5	14.3	16.3	18.4	20.6	23.0	25.5
56	4.0	5.1	6.3	7.7	9.2	10.8	12.5	14.4	16.3	18.4	20.7	23.1	25.5
57	4.0	5.2	6.4	7.7	9.2	10.8	12.5	14.4	16.4	18.5	20.7	23.1	25.6
58	4.0	5.2	6.4	7.7	9.2	10.9	12.6	14.4	16.4	18.5	20.8	23.1	25.6
59	4.1	5.2	6.4	7.8	9.3	10.9	12.6	14.4	16.4	18.6	20.8	23.2	25.7
60	4.1	5.2	6.4	7.8	9.3	10.9	12.6	14.5	16.5	18.6	20.8	23.2	25.7

For the Obſervations above the Pole, multiply the Correction found by this Table by 0.95; for thoſe below the Pole by 0.88.

TABLE

TABLE 1.—*continued.*

Of the Change in Altitude of the Pole-Star, for Half an Hour on each Side the Meridian.

	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′
0″	25″7	28″3	31″1	34″0	37″0	40″2	43″4	46″8	50″4	54″0
1	25.8	28.4	31.1	34.0	37.1	40.2	43.5	46.9	50.4	54.1
2	25.8	28.4	31.2	34.1	37.1	40.3	43.5	46.9	50.5	54.1
3	25.8	28.5	31.2	34.1	37.2	40 3	43.6	47.0	50.5	54.2
4	25.9	28.5	31.3	34.2	37.2	40.4	43.7	47.1	50.6	54.2
5	25.9	28.6	31.3	34.2	37.3	40.4	43.7	47.1	50.7	54.3
6	26.0	28.6	31.4	34.3	37.3	40.5	43.8	47.1	50.7	54.4
7	26.0	28.7	31.4	34.3	37.4	40.5	43.8	47.2	50.8	54.5
8	26.1	28.7	31.5	34.4	37.4	40.6	43.9	47.3	50.8	54.5
9	26.1	28.7	31.5	34.4	37.5	40.6	43.9	47.4	50.9	54.6
10	26.1	28.8	31.6	34.5	37.5	40.7	44.0	47.4	51.0	54 6
11	26.2	28.8	31.6	34.5	37.6	40.7	44.0	47.5	51.0	54.7
12	26.2	28.9	31.7	34.6	37.6	40.8	44.1	47.5	51.1	54.8
13	26.3	28.9	31.7	34.6	37.7	40,9	44.2	47.6	51.1	54.8
14	26.3	29.0	31.8	34.7	37.7	40.9	44.2	47.6	51.2	54.9
15	26.4	29.0	31.8	34 7	37.8	41.0	44.3	47.7	51.3	55.0
16	26.4	29.1	31.9	34.8	37.8	41.0	44.3	47.8	51.3	55.0
17	26.4	29.1	31.9	34.8	37.9	41.1	44.4	47.8	51.4	55.1
18	26.5	29.2	32.0	34.9	37 9	41.1	44.4	47.8	51.4	55.1
19	26.5	29.2	32.0	34.9	38.0	41.2	44.5	47.9	51.5	55.2
20	26.6	29.3	32.1	35.0	38.0	41.2	44.6	48.0	51.6	55.3
21	26.6	29.3	32.1	35.0	38.1	41.3	44.6	48.0	51.6	55.3
22	26.7	29.3	32.1	35,1	38.1	41.3	44.7	48.1	51.7	55.4
23	26.7	29 4	32.2	35.1	38.2	41.4	44.7	48.2	51.7	55.4
24	26.7	29.4	32.2	35.2	38.2	41.4	44.8	48.2	51.8	55.5
25	26.8	29.5	32.3	35.2	38.3	41.5	44.8	48.3	51.9	55.6
26	26.8	29.5	32.3	35.3	38.4	41.6	44.9	48.3	51.9	55.6
27	26 9	29.5	32.4	35.3	38.4	41.6	44.9	48.4	51.0	55.7
28	26.9	29.6	32.4	35.4	38.5	41.7	45.0	48.5	51.0	55.8
29	27.0	29.7	32.5	35.4	38.5	41.7	45.0	48.5	52.1	55.8
30	27.0	29.7	32.5	35.5	38.6	41.8	45.1	48.6	52.2	55 9
31	27.1	29.8	32.6	35.5	38.6	41.8	45.2	48.6	53.2	56.0
32	27.1	29.8	32.6	35.6	38.7	41.9	45.2	48.7	52.3	56.0
33	27.1	29.8	32.7	35.6	38.7	41.9	45.3	48.7	52.4	56.1
34	27.2	29.9	32.7	35.7	38.8	42.0	45.3	48.8	52.4	56.1
35	27.2	29.9	32.8	35.7	38.8	42.0	45.4	48.9	52.5	56.2
36	27.3	30.0	32.8	35.8	38.9	42.1	45.5	48.9	52.5	56.3
37	27.3	30.0	32.9	35.8	38.9	42.2	45.5	49.0	52.6	56.3
38	27.4	30.1	32.9	35.9	39.0	42.2	45.6	49.0	52.7	56.4
39	27.4	30.1	33.0	35.9	39.0	42.3	45.6	49.1	52.7	56.5
40	27.5	30.2	33.0	36.0	39.1	42.3	45.7	49.2	52.8	56.5
41	27.5	30.2	33.1	36.0	39.1	42.4	45.7	49.2	52.8	56.6
42	27.5	30.3	33.1	36.1	39.2	42.4	45.8	49.3	52.9	56.6
43	27.6	30.3	33.2	36.1	39 2	42.5	45.9	49.3	53.0	56.7
44	27.6	30.4	33.3	36.2	39.3	42.5	45.9	49.4	53.0	56.8
45	27.7	30.4	33.3	36.2	39.4	42 6	46 0	49.5	53 1	56.8
46	27.7	30.4	33.3	36.3	39.4	42.6	46.0	49.5	53.2	56.9
47	27.8	30.5	33.3	36.3	39.5	42.7	46.1	49.6	53.2	57.0
48	27.8	30.5	33.4	36.4	39.5	42.7	46.1	49.6	53.3	57.0
49	27.8	30.6	33.4	36.4	39.6	42.8	46.2	49.7	53.3	57.1
50	27.9	30.6	33.5	36.5	39.6	42 9	46.3	49.8	53.4	57.1
51	27.9	30.7	33.5	36.6	39 7	42.9	46.3	49.8	53.5	57.2
52	28.0	30.7	33.6	36.6	39.8	43.0	46.4	49.9	53 5	57.2
53	28.0	30.8	33.6	36.7	39.8	43.0	46.4	49.9	53.6	57.3
54	28.1	30.8	33.7	36.7	39.8	43.1	46.5	50.0	53.6	57.4
55	28.1	30.9	33.7	36.8	39.9	43.2	46.5	50.1	53.7	57.5
56	28.2	30.9	33.8	36.8	40.0	43.2	46.6	50.1	53.8	57.5
57	28.2	31.0	33.8	36.9	40.1	43.3	46.7	50.2	53.8	57.6
58	28.3	31.0	33.9	36.9	40.1	43.3	46.7	50.2	53.9	57.6
59	28.3	31.1	33.9	37.0	40.2	43.4	46.8	50.3	54.0	57.7
60	28.3	31.1	34.0	37.0	40.2	43.4	46.8	50.4	54.0	57.8

TABLE II.

General Table of the Reduction to the Meridian. Part I. Argument. Hour Angle in Time.

Sec.	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′
0	0″0	2″0	7″8	17″7	31″4	49″1	70″7	96″2	125″7	159″0	196″3	237″5	280″7	331″8	384″7	441″6
1	0.0	2.0	8.0	17.9	31.7	49.4	71.1	96.9	126.2	159.6	197.0	238 3	283.5	332.6	385.6	442.6
2	0.0	2.1	8.1	18.1	31.9	49.7	71.5	97.1	126.7	160.2	197.6	239.0	284.2	333.4	386.5	443.6
3	0.0	2.2	8.2	18.3	32.2	50.1	71.9	97.6	127.2	160.8	198.3	239.7	285.0	334.3	387.5	444.6
4	0.0	2.2	8.4	18.5	32.5	50.4	72.3	98.1	127.8	161.4	198.9	240.4	285.8	335.3	388.4	445.6
5	0.0	2.3	8.5	18.7	32.7	50.7	72.7	98.5	128.3	162.0	199.6	241 2	286.6	336.0	389.3	446.5
6	0.0	2.4	8.7	18.9	33.0	51.1	73.1	99.0	128.8	162.6	200.3	241.9	287.4	336.9	390.2	447.5
7	0.0	2.4	8.8	19.1	33.3	51.4	73.5	99.4	129.4	163.2	200.9	242.6	288.2	337.7	391.1	448.5
8	0.0	2 5	8 9	19.3	33.5	51.7	73.9	99 9	129.9	163.8	201.6	243.3	289.0	338.6	392.1	449.5
9	0.0	2.6	9.1	19.5	33.8	52.1	74.3	100.4	130.4	164.4	202.2	244.1	289.8	339.4	393.0	450.5
10	0.1	2.7	9.2	19.7	34.1	52.4	74.7	100.8	131.0	165.0	202.9	244.8	290.6	340.3	393.9	451.5
11	0.1	2.7	9.4	19.9	34.4	52.7	75.1	101.3	131.5	165.6	203.6	245.5	291.4	341.2	394.8	452.5
12	0.1	2.8	9.5	20.1	34.6	53.1	75.5	101.8	132.0	166.2	204.2	246.2	292.2	342.0	395.8	453.5
13	0.1	2.9	9.6	20.3	34.9	53.4	75.9	102.3	132.6	166.8	204.9	247.0	293 0	342.9	396.7	454.5
14	0.1	3.0	9.8	20.5	35.2	53.8	76.3	102.7	133.1	167.4	205.6	247.7	293.8	343.7	397.6	455.5
15	0.1	3.1	9.9	20.7	35.5	54.1	76.7	103.2	133 6	168.0	206.3	248.5	294.6	344.6	398.6	456.5
16	0.1	3.1	10.1	20.9	35.7	54.5	77.1	103.7	134.2	168.6	206.9	249.2	295.4	345 5	399.5	457.5
17	0.2	3.2	10.2	21.2	36.0	54.8	77.5	104.2	134.7	169.2	207.6	249.9	296.2	346.3	400.5	458.5
18	0.2	3.3	10.4	21.4	36.3	55.1	77.9	104.6	135.3	169.8	208.3	250 7	297.0	347.2	401.4	459.5
19	0.2	3.4	10.5	21.6	36.6	55.5	78.3	105.1	135.8	170.4	208.9	251.4	297.8	348.1	402.3	460.5
20	0.2	3.5	10.7	21.8	36.9	55.8	78.8	105.6	136.4	171.0	209.6	252.2	298.6	349 0	403.3	461.5
21	0.3	3.6	10.8	22.0	37.2	56.2	79.2	106 1	136.9	171.6	210.3	252.9	299.4	349.8	404.2	462.5
22	0.3	3.7	11.0	22.3	37.4	56.5	79.6	106.6	137.4	172.2	211.0	253.6	300.2	350.7	405.1	463.5
23	0 3	3.8	11.1	22.5	37.7	56.9	80.0	107.0	138.0	172.9	211.6	254 4	301.0	351.6	406.1	464.5
24	0.3	3.8	11.3	22.7	38.0	57.3	80.4	107.5	138.5	173.5	212.3	255.1	301.8	352.5	407.0	465.5
25	0.3	3.9	11.5	22.9	38.3	57.6	80.8	108.0	139.1	174.1	213 0	255.9	302.6	353.3	408.0	466.5
26	0.4	4.0	11.6	23.1	38.6	58.0	81.3	108.5	139.6	174.7	213.7	256.6	303.5	354.2	408.9	467.5
27	0.4	4.1	11.8	23.4	38.9	58.3	81.7	109.0	140.2	175.3	214.4	257.4	304.3	355.1	409.9	468.5
28	0.4	4.2	11.9	23.6	39.2	58.7	82.1	109.5	140.7	175.9	215.1	258.1	305.1	356.0	410.8	469.5
29	0. 5	4.3	12.1	23.8	39.5	59.0	82.5	110.0	141 3	176.6	215.8	258 9	305 9	356.9	411.7	470.5
30	0.5	4.4	12.3	24.0	39.8	59.4	83.0	110.4	141.8	177.2	216.4	259.6	306.7	357.7	412.7	471.5
31	0.5	4.5	12.4	24 3	40.1	59.8	83.4	110.9	142.4	177.8	217.1	260.4	307.5	358.6	413.6	472.6
32	0.6	4.6	12.6	24.5	40.3	60.1	83 8	111.4	143.0	178.4	217.8	261.1	308.4	359.5	414.6	473.6
33	0.6	4.7	12.8	24.7	40.6	60.5	84.2	111.9	143.5	179.0	218.5	261.9	309.2	360.5	415.6	474.6
34	0.6	4.8	12.9	25.0	40.9	60.8	84.7	112.4	144.1	179.7	219.2	262 6	310.0	361.1	416.6	475.6
35	0.7	4.9	13.1	25.2	41.2	61.2	85.1	112.9	144.6	180.3	219.9	263.4	310.8	362.2	417.5	476.6
36	0.7	5 0	13.3	25 4	41.5	61.6	85.5	113.4	145.2	180 9	220.6	264.1	311.6	363.1	418.4	477.6
37	0.7	5.1	13.4	25.7	41.8	61.9	86.0	113.9	145.8	181.6	221.3	264.9	312.5	363.9	419.4	478.7
38	0.8	5.2	13.6	25.9	42.1	62.3	86.4	114 4	146.3	182.2	222.0	265.7	313.3	364.6	420.3	479.7
39	0.8	5.3	13.8	26.2	42.5	62.7	86.8	114.9	146.9	182.8	222 7	266.4	314.2	365.7	421.3	480.7
40	0.9	5.4	14.0	26.4	42.8	63.0	87.3	115 4	147.5	183.4	223.4	267.2	315.0	366.6	422.2	481.7
41	0.9	5.6	14.1	26.6	43.1	63 4	87.7	115.9	148.0	184.1	224.1	267.9	315.8	367.5	423.2	482.8
42	1.0	5.7	14.3	26.9	43.4	63.8	88.1	116.4	148.6	184.7	224.8	268.7	316.6	368.4	424.2	483.8
43	1.0	5.8	14.5	27.1	43.7	64.2	88.6	116.9	149.2	185.4	225.5	269.5	317.4	369.3	425.1	484.8
44	1.1	5.9	14.7	27.4	44.0	64.5	89.0	117.4	149.7	186.0	226.2	270.2	318.3	370.2	426.1	485.8
45	1.1	6.0	14.8	27.6	44.3	64.9	89.5	117.9	150.3	186.6	226.9	271.0	319.1	371.1	427.0	486.9
46	1.2	6.1	15.0	27.9	44.6	65.3	89.9	118.4	150.9	187.3	227.6	271.8	319.9	372.0	428.0	487.9
47	1.2	6.2	15.2	28.1	44.9	65.7	90 3	118.9	151.5	187.9	228.3	272.6	320.8	372.9	429.0	488.9
48	1.3	6.4	15.4	28.3	45.2	66.0	90.8	119.5	152.0	188.5	229.0	273.3	321.6	373.8	430.0	490.0
49	1.3	6.5	15.6	28.6	45.5	66.4	91.2	120.0	152.6	189.2	229.7	274.1	322.4	374.7	430.9	491.0
50	1.4	6.6	15.8	28.8	45.9	66.8	91.7	120.5	153.2	189.8	230 4	274.9	323.3	375.6	431.9	492.0
51	1.4	6.7	15.9	29.1	46.2	67.2	92.1	121.0	153.8	190.5	231.1	275.6	324.1	376.5	432.8	493.1
52	1.5	6.8	16.1	29.4	46.5	67.6	92.6	121.5	154.4	191.1	231.8	276.4	325.0	377.4	433.8	494.1
53	1.5	7.0	16.3	29.6	46.8	68.0	93.0	122.0	154 9	191.8	232.5	277.2	325.8	378.3	434.8	495.2
54	1.6	7.1	16.5	29.9	47.1	68.3	93.5	122.5	155.5	192.4	233.3	278.0	326.7	379.2	435.7	496.2
55	1.6	7.2	16.7	30.1	47.5	68.7	93.9	123.1	156.1	193.1	234.0	278.9	327.5	380.2	436.7	497.2
56	1.7	7.3	16.9	30.4	47.8	69.1	94.4	123.6	156.7	193.7	234.7	279.5	328.4	381.1	437.7	498.2
57	1.8	7.5	17.1	30.6	48.1	69.5	94.8	124.1	157.3	194.4	235.4	280.3	329.2	382.0	438.7	499.2
58	1.8	7.6	17.3	30.9	48.4	69.9	95.3	124.6	157.8	195.0	236.1	281.1	330.0	382.9	439.6	500.3
59	1.9	7.7	17.5	31.1	48.8	70.3	95.7	125.1	158.4	195.7	236.8	281.9	330.9	383.8	440.6	501.4

The Numbers in this Table are additive for the inferior Observations of Circumpolar Stars.

TABLE III.

The Numbers in this Table are always additive.

General Table. Part II. Argument. Hour Angle.

M. S.	S.	Diff.	M. S.	S.	Diff.	M. S.	S.	Diff.
0 0	0.000		8 10	0.041	4	12 10	0.205	12
1 0	0.000		20	0.045	4	20	0.217	12
2 0	0.000		30	0.049	4	30	0.229	12
3 0	0.001		40	0.053	4	40	0.241	13
4 0	0.002		50	0.057	4	50	0.254	13
5 0	0.006		9 0	0.061	5	13 0	0.267	14
10	0.007		10	0.066	5	10	0.281	14
20	0.008		20	0.071	5	20	0.295	15
30	0.009		30	0.076	5	30	0.310	16
40	0.010		40	0.081	6	40	0.326	16
50	0.011		50	0.087	6	50	0.342	17
6 0	0.012		10 0	0.093	7	14 0	0.359	17
10	0.013		10	0.100	7	10	0.376	18
20	0.014		20	0.107	7	20	0.394	19
30	0.016		30	0.114	7	30	0.413	19
40	0.018		40	0.121	8	40	0.432	20
50	0.020		50	0.129	8	50	0.452	21
7 0	0.022		11 0	0.137	8	15 0	0.473	21
10	0.024		10	0.145	9	10	0.494	22
20	0.026		20	0.154	9	20	0.516	23
30	0.029		30	0.163	10	30	0.539	24
40	0.032		40	0.173	10	40	0.563	24
50	0.035		50	0.183	11	50	0.587	25
8 0	0.038		12 0	0 194		16 0	0.612	

Explanation of the Tables.

I. That which claims a decided preference before all others, is a catalogue of 36 principal ſtars viſible in the northern hemiſphere, deduced from the obſervations of Dr. Maſkelyne.

II. A table of the corrections of RA in time for the ſtars in the preceding catalogue, to every tenth day of the year; copied exactly from Dr. Maſkelyne's, and printed by his permiſſion. This table contains the ſum of the preceſſion from the beginning of the year, aberration, and ſolar inequality of preceſſion; together with an allowance for the motions of ſome of the ſtars, the quantity of which allowance to each ſtar will be found in this copy at the bottom of its reſpective column. To this table, a column for α Herculis has been added in its place by the author.

III. A table of the corrections of RA in time for the ſame ſtars, to every 10th degree of longitude of the moon's node; compriſing the effect of nutation and the equation of the equinoxes.

IV. and V. are two ſimilar tables of the corrections of NPD for the ſame ſtars. The firſt compriſing the effects of preceſſion, aberration, and ſolar inequality, for every 10th day in the year. The ſecond, the effect of nutation for every 10th degree of longitude of the moon's node.

Theſe two, neither of them, contain any allowance for the motions in the ſtars themſelves; which ſeemed not to be ſufficiently aſcertained at the time theſe tables were conſtructed.

VI. A table of the mean RA and NPD of polaris for Jan. 0. 1800, and 10 years following; together with the corrections both in RA and NPD for every 10th day of the year, and every 10th degree of longitude of the moon's node.

Theſe new tables were calculated for the year 1800. Numbers IV. and V. will ſerve for many years before and after that epoch. Number VI. cannot long continue ſo correct; becauſe of the rapid annual increaſe of preceſſion in RA and decreaſe in NPD in that ſtar. But if its mean RA be brought up carefully to the beginning of a year, the numbers in the firſt part will ſcarcely err $1''$ at the utmoſt in RA; nor thoſe in the column for NPD $0''.01$; from the truth, if the table be rightly conſtructed.

Numbers VII. VIII. IX. and X. are copied from Dr. Maſkelyne; for finding the annual preceſſion of a ſtar in RA and NPD, with their reſpective multipliers. The only alteration that has been made in theſe is in Number VII. and IX. where the argument, the RA of the ſtar, is altered from the RA in degrees, &c. to RA in time; and a mean interpolation has been introduced between the numbers given by the aſtronomer royal.

Next follows a ſet of general tables, computed by the author on the plan of the foregoing; for deducing the apparent RA and NPD of any ſtar in any part of the heavens from its mean poſition; or, *vice verſâ*, by applying the numbers taken out of the tables with a contrary ſign, for deducing the mean poſition of any ſtar from its obſerved or apparent ſituation; *viz.*

Table XI. for finding the effect of aberration on a ſtar's RA in time, for every 10th day of the year, and each hour of the ſtar's RA.

Table XII. for finding the effect of nutation on the ſtar's RA in time, for every 10th degree of longitude of the moon's node, and each hour of the ſtar's RA.

Table XII. the equations of the equinoxes in RA in time, copied from Dr. Maſkelyne.

Theſe all relate to the RA of the ſtar, and its neceſſary corrections. The following give the corrections for NPD:

Table XIV. for finding the effect of aberration on the NPD of a ſtar, for every 10th day of the year, and each hour of the ſtar's RA.

Table XV. for finding the farther effect of aberration, for every 10th day, according to the declination of the ſtar.

Table XVI. for finding the ſemi-annual ſolar equation in NPD, for every 10th day, and each hour of the ſtar's RA.

Table XVII. for finding the effect of nutation on the NPD of the ſtar, for every 10th degree of longitude of the moon's node, and each hour of the ſtar's RA.

It is hoped theſe tables will be found as convenient to the practical aſtronomer as they have been to the author, who compiled them merely for his own uſe. He publiſhes them with diffidence; but flatters himſelf that they are not liable to many errors, at leaſt he does not feel conſcious of any which it was in his power to avoid.

The above tables were publiſhed by the Rev. Mr. Wollaſton in his faſciculus of aſtronomical obſervations: he has been ſo obliging as to comply with our requeſt to reprint them in this work. They are admirably calculated to diminiſh the labour of reducing obſervations of right aſcenſion and declination, and will no doubt be conſidered as a valuable acquiſition by the practical aſtronomer.

Table XVIII. contains the mean refractions to every 10 minutes of zenith diſtance, as derived from the obſervations of Dr. Bradley: it is taken from the Greenwich obſervations of 1797, as there given by the aſtronomer royal.

Table XIX. is the augmentation of the ſemi-diameter of the moon, requiring no explanation.

Table XX. is the diminution of the horizontal parallax of the moon, ariſing from the ſpheroidal figure of the earth: the ellipticity is here ſuppoſed $\frac{1}{334}$, according to the lateſt determinations of the figure of the earth.

Table XXI. contains the correction to be applied to an obſervation with a fixed inſtrument, when the ſtar has paſſed or not arrived at the vertical wire, to reduce it to that which would

would have been given *at the ſame moment* by the centre of the wires.

The three tables which follow are to facilitate the uſe of the repeating circle. They give the correction to be applied to an obſervation made at a given interval of time from the tranſit of a ſtar over the meridian.

The firſt table is calculated for the pole ſtar only.

This table having been calculated ſome years ſince for the latitude of Paris, theſe numbers muſt now be multiplied by 0.95 for the ſuperior tranſit, and by 0.88 for the inferior.

The uſe of the general Tables II. and III. has been explained in the text.

The above tables contain all the corrections that occur in obſervations for determining the declinations and right aſcenſions of the heavenly bodies, except ſuch as relate to the mechanical conſtruction of the tranſit inſtrument, which will be found under that article. But as ſome doubts are entertained relative to Dr. Bradley's refractions, we ſhall annex a comparative table of refractions, as derived from the obſervations of different aſtronomers, as given in the third vol. of Mr. Vince's Aſtronomy.

A Table of Refraction, according to different Authors. The Barometer $0^m.760$.

Zenith-diſtance.	Therm. centes.	Laplace.	Bradley.	Burg.	Mayer.	Piazzi.	Delambre.	Mayer.
	— 10	11″.1	10″. 9	11″.3	11″.0	11″.3	11″.3	
	0	10.4	10.6	10.9	10.6	10.8	10.8	10″.6
10°	+ 10	10.3	10.1	10 5	10.2	10.3	10.3	
	20	9.9	9.3	10.1	9.9	9.9	9.8	
	30	9.6	9.1	9.7	9.6	9.5	9.4	
	— 10	22.9	23.0	23.4	22.7	23.1	23.2	
	0	22.0	21.9	22.5	21.9	22.2	22.2	21.9
20	+ 10	21.2	20.9	21.6	21.1	21.0	21.2	
	20	20.4	20.0	20.8	20.4	20.1	20.3	
	30	19.7	18 8	20.1	19.7	19.4	19.5	
	— 10	36 2	36.5	37.1	36.0	36.8	36.9	
	0	34.8	34.8	35.7	34.7	35.2	35.2	34.7
30	+ 10	33.4	33.2	34.3	33.5	33.6	38.5	
	20	32.2	31.7	33.0	32.3	32.1	32.2	
	30	31.0	29.8	31.2	31.2	30.8	30.9	
	— 10	52.9	53.0	53.9	52.3	53.4	53.7	
	0	50.8	50.5	51.8	50.4	53.9	51.2	50.4
40	+ 10	48.9	48.2	49.8	48.6	48.6	48.9	
	20	47.1	46.0	47.9	46.9	46.5	46.8	
	30	45.4	43.9	46.0	45.4	43.8	44 9	
	— 10	75.0	75.2	76.5	74.2	75.7	76.2	74.3
	0	72.1	71.7	73.5	71.5	72.2	72.6	71.5
50	+ 10	69.3	68.4	70.7	68.9	69.0	69.4	68.9
	20	66.8	65.4	68.0	66.6	65.9	66.4	66.6
	30	64.4	62.3	65.3	64.4	63.3	63.7	64.4
	— 10	108.8	109.1	111.1	107.6	110.8	110.5	107.8
	0	104.6	100.4	104.4	103.7	105.7	105.4	103.8
60	+ 10	100.6	99.3	102.7	100.0	100.9	100.7	100.1
	20	96.9	94.9	96.0	96.6	96.6	96.5	96.7
	30	93.5	90.4	92.8	93.4	92.6	92.5	93.5
	— 10	171.8	172.5	175 8	170.1	175.2	174.6	170.2
	0	165.1	164.4	168.8	163.8	165.0	166.5	163.9
70	+ 10	158.8	157.0	162.4	158.0	159.6	159.1	158.1
	20	153.0	149.9	156.2	152.6	152.7	152.4	152.7
	30	147.6	142.8	150.0	147.5	146.4	146.1	147.7
	— 10	346.0	349.3	354.9	344.1	850.9	352.8	344.0
	0	332.5	332.8	340.9	331.1	334.7	336.4	331.3
80	+ 10.	319.8	317.8	327.9	319.0	319.5	321.4	319.6
	20	308.1	303.5	315.4	307.9	306.0	307.9	308.6
	30	297.9	289.1	302.9	296.6	287.7	295.2	298.4
	— 10	643.9	657.6	665.9	645.3	649.8	660.1	643.5
	0	617.8	626.7	640.1	619.6	618.2	629.3	619.8
85	+ 10	594.3	598.5	616.9	593.6	591.8	601.3	597.8
	20	572.5	571.4	593.4	573.3	566.7	576.0	577.1
	30	552.2	544.5	569.9	552.4	543.2	552.2	558.3
	— 10	2192.2	2200 2	2179.3	2100.0	2134.3	2113.1	2061.0
	0	2106.3	2096.5	2090.2	1985.9	2016.5	2014.7	1985.2
90	+ 10	2026.3	2002.1	2014.3	1884.8	1944.1	1925.0	1914.7
	20	1950.1	1911.7	1937.4	1784.5	1862.5	1843.8	1849.0
	30	1882.8	1821.1	1860.8	1696.3	1781.6	1767.8	1778.1

DECLINATION.

Declination, *Circle of*, is a great circle of the ſphere paſſing through the poles of the world; and on which the declination of a ſtar is meaſured. See Declination, in *Aſtronomy*.

Declination, *Parallax of*, is an arc of the circle of declination, whereby the parallax of the altitude increaſes or diminiſhes the declination of a ſtar.

Declination, *Refraction of the*, an arc of the circle of declination, whereby the declination of a ſtar is increaſed or diminiſhed by means of the refraction.

Declination, from the Latin *declinatio*, in a general ſenſe, means the variation from a fixed point. The *declination of the magnetic needle*, or of the mariner's compaſs, is its variation from the true meridian of the place; for it hardly ever happens at any time in any place, that the magnetic needle points due north and ſouth; or that the magnetic meridian coincides with the aſtronomical meridian of the place. The quantity of this declination is uſually meaſured by an arc of the horizon, or of an horizontal circle, intercepted between the true north point of the horizon, and the north extremity of the magnetic needle. Thus, when the declination is ſaid to be twenty degrees weſt, the meaning is, that if a ſtraight line be drawn through the centre, or point of ſuſpenſion, of the needle, and through the true north point of the horizon, then the north half of the needle lies on the weſt of that line, and makes an angle of 20 degrees with it. If the declination is ſaid to be 12° eaſt, the meaning is, that the north half of the magnetic needle lies on the eaſt ſide of the line which paſſes through its centre and the true north point of the horizon, making an angle of 12° with it. It is evident that when the north half of the needle lies on the eaſt of the above-mentioned line, which, in fact, is the meridian of the place; the other half of the needle muſt lie on the oppoſite, *viz.* on the weſt ſide of that meridian line, making the ſame angle with it. But in expreſſing the declination, the north end of the needle is always underſtood.

In a manuſcript Latin letter of Peter Adſiger, on the properties of the magnet, dated in the year 1269; which is preſerved amongſt the manuſcripts of the univerſity of Leyden; expreſs mention is made of the declination of the magnetic needle. This curious letter was lately publiſhed by Mr. Cavallo, in the Supplement to his Treatiſe on Magnetiſm, which ſee. The conſtruction, however, of the magnetic needle, as deſcribed in this letter, being very rude and unfit for navigation, it is moſt probable that the compaſs began to be uſed at ſea many years after the above-mentioned date, and of courſe its declination remained likewiſe unknown to the generality of people, until the time of Columbus's firſt voyage to America, which took place in the year 1492; for it is expreſsly mentioned in his life, that the declination of the magnetic needle from the true meridian was firſt diſcovered in that expedition, and that this diſcovery in an unknown ocean produced a great degree of conſternation and terror in the minds of the crew; for it ſeemed as if nature herſelf had ſuſpended its uſual laws, and had forſaken them in that perilous ſituation. Some writers have attributed the original diſcovery of the declination to Sebaſtian Cabot, a Venetian, who, they ſay, diſcovered it in the year 1500; but Columbus's claim is certainly prior to that year.

The declination, when firſt diſcovered, was ſuppoſed to be permanent or unalterable; but ſome time after it was found that the quantity of it varied in the ſame place, ſo as to be different at different times. The diſcovery of this variation of the magnetical declination is generally attributed to Mr. Gellibrand, a profeſſor in Greſham college, who firſt obſerved it about the year 1625; yet Mr. Bond, in his "Longitude Found," page 5 and 6, ſays that the declination was found to vary and to decreaſe firſt by Mr. John Mair, ſecondly by Mr. Gunter, thirdly by Mr. Gellibrand, and then by himſelf in the year 1640. Since that time it has been found that the magnetic needle not only varies after a conſiderable period, but that it is continually fluctuating, ſo that the variation of it may generally be obſerved within the period of an hour or two, and often in a much ſhorter time.

The declination is not only ſubject to a continual variation in the ſame place, but it is different in different parts of the world. It alſo varies differently in each particular place; ſo much ſo, that notwithſtanding the exertions of the greateſt philoſophers and mathematicians, no theory nor rule has been diſcovered which might furniſh the means of foretelling with accuracy the declination of the magnetic needle, for any future period, at any particular place.

That the declination is not owing to any imperfection in the conſtruction of the needles or compaſſes, or to the various ſtrength of the magnets, is proved by obſerving that all the magnetic needles of compaſſes that are ſituated near the ſame ſpot, ſhew exactly the ſame declination, provided they are freely ſuſpended, and out of the influence of each other, as well as of any other ferruginous ſubſtances.

The uncertainty of the declination at different times, and in different places, being one of the greateſt impediments to the perfection of navigation; philoſophers, mathematicians, navigators, and mechanics, have endeavoured, with admirable aſſiduity, firſt, to contrive inſtruments fit to ſhew the exact quantity of it at any particular place; ſecondly, to make, and to regiſter, the obſervations in a manner that might prove uſeful to future navigators and obſervers; and thirdly, to inveſtigate the cauſe of it, principally with a view of deriving therefrom an uſeful and ſatisfactory theory. It is now incumbent upon us to treat ſucceſſively of theſe various and important particulars.

1. The inſtruments which, according to the preſent ſtate of knowledge, are beſt adapted to ſhew the declination of the magnetic needle, will be found deſcribed under the article Compass. They are of two ſorts, *viz.* one which is to be uſed at ſea, and the other which is to be uſed upon land. That which is to be uſed at ſea, on board of ſhips, is called the *azimuth compaſs*, becauſe with it the magnetic azimuth of the ſun, or other celeſtial object, is to be aſcertained at the ſame time that the true azimuth of that ſame object is obſerved by means of a ſextant; for, from the compariſon of theſe contemporary azimuths, the declination of the magnetic needle is aſcertained, according to the rules given under the above-mentioned article *Compaſs*. But it muſt not be expected that the declination, thus determined at ſea, ſhould be very accurate. With the beſt inſtruments, and the moſt expert obſervers, the declination thus found may at moſt be depended upon within eight or ten minutes; but with the common leſs perfect inſtruments, and the ordinary claſs of nautical obſervers, the reſult of the obſervations hardly ever differs from the truth leſs than half a degree; and this ariſes principally from the difficulty of obſerving the exact magnetical azimuth of the ſun, and from the difficulty of taking the true and the magnetical azimuths at the very ſame moment. Another ſource of error ariſes from the influence of iron upon the compaſs, which at ſea is almoſt impoſſible to be avoided. Captain Flinders, who made ſeveral important experiments relative to this particular, ſays (Phil. Tranſ. for 1805.) "Whilſt ſurveying along the ſouth coaſt of New Holland in 1801 and 1802, I obſerved a conſiderable difference in the direction of the magnetic needle, when there was no other apparent cauſe for it than that of the ſhip's head, being in a different direction. This occaſioned much perplexity in laying down the bearings, and in allowing

allowing a proper variation upon them, and put me under the neceſſity of endeavouring to find out ſome method of correcting or allowing for theſe differences." This gentleman then relates ſome ineffectual attempts he made for the purpoſe of removing the cauſe of the above-mentioned difference, which often amounted to ſome degrees, and was at laſt induced to draw the following inferences.

1. "I ſuppoſe," he ſays, "the attractive power of the different bodies in the ſhip, which are capable of affecting the compaſs, to be collected into ſomething like a focal point or centre of gravity, and that this point is nearly in the centre of the ſhip where the ſhot are depoſited, for here the greateſt quantity of iron is collected together."

2. "I ſuppoſe this point to be endued with the ſame kind of attraction as the pole of the hemiſphere where the ſhip is; conſequently, in New Holland the ſouth end of the needle would be attracted by it, and the north end repelled."

3. "That the attractive power of this point is ſufficiently ſtrong in a ſhip of war to interfere with the action of the magnetic poles upon a compaſs placed upon or in the binnacle."

With fixed inſtruments upon land, a much greater degree of accuracy has been attained; and it is in conſequence of this accuracy that the daily or hourly variation has been diſcovered; for the quantity of it from hour to hour is exceedingly ſmall. This accuracy, however, is to be obtained only by paying due attention to all the known particulars which have an influence on the motion and the indications of the needle. Theſe particulars principally are; 1ſt. that the magnetic meridian, or the poles of the needle, be exactly in the axis of its figure. But as this is ſeldom the caſe, the only expedient by which the error ariſing therefrom may be aſcertained and allowed for, is to turn the needle with the under ſide uppermoſt, (for which purpoſe the cap of it is generally made to fit both ſides,) and to obſerve its direction again with the laſt-mentioned ſide uppermoſt; for if the two obſervations agree, it may be concluded that the magnetic poles are in the axis of the needle; otherwiſe a mean of the two obſervations will give the true direction, and will point out the deviation of the magnetic axis of the needle from that of its figure, which, when once aſcertained, may afterwards be allowed for, without any farther inverſions of the needle. 2dly. A true meridian line muſt be had, in order to compare the direction of the needle with it. See MERIDIAN *Line*. 3dly. Care muſt be taken that the needle be not within the influence of any maſs of iron or other ferruginous matter that may be contained in the building, in the ground, or about the perſon of the obſerver. We have no better means of conveying to our readers a clear idea of the practical method of aſcertaining the above-mentioned cauſes of error, and of compenſating for their effects, than by ſubjoining part of Mr. Gilpin's account of his very careful obſervations on the variation of the magnetical declination made at the apartments of the Royal Society. This account is publiſhed in the Phil. Tranſ. for the year 1806; and the very inſtructive part of it which we allude to is as follows:

1. "The compaſs in the houſe, at the time of obſervation, was placed in the middle window, on the ſouth ſide of the ſociety's meeting-room, upon a ſtrong mahogany board. Againſt the oppoſite building the dial-plate of a watch is fixed, making an angle with the true meridian of 31° 8′.8 to the eaſtward, as a mark to which the teleſcope of the compaſs was adjuſted. To obtain the angle that this mark made with the true meridian, I fixed a tranſit-inſtrument on the mahogany board above-mentioned, preciſely in the ſame place where the compaſs had been placed, and having adjuſted its teleſcope to the ſaid mark, the tranſits of the ſun and ſtars over a vertical circle paſſing through the zenith and this mark, were obſerved; and the angle contained between the ſaid mark and the true meridian, was found by computation to be 31° 8′.8 as above.

2. "For the purpoſe of aſcertaining what error there might be, from a want of paralleliſm between the line joining the indices and the magnetiſm of the needle, and thereby to determine whether, in the uſual method of obſerving, the indices ſhew the true angle which the direction of magnetiſm makes with the firſt diviſion or zero, a great many obſervations were made on both ends of the needle, and with both ſides of the needle uppermoſt, (the cap of the needle being made to fit on readily on either face for this purpoſe); *viz.* north end and ſouth end in its upright poſition, and north end and ſouth end with the needle inverted, and the mean of the four giving the angle greater by 2′, than that ſhewn by the north end in the upright poſition of the needle, (which was the end always uſed in thoſe obſervations,) two minutes have been added to all the obſervations read from the inſtrument, as the correction for this error to angles on the eaſt ſide of zero, and ſubtracted from angles on the weſt ſide, to obtain the true angle; which error to angles on the weſt ſide, however, only occurred, when the inſtrument was taken out of doors to determine the effect of the iron-work of the building.

3. "The variation compaſs being placed in the houſe for obſervation, could not be ſuppoſed to be entirely out of the influence of iron; I was, therefore, deſirous to aſcertain how far that influence might extend; for the determination of which, the following method was adopted.

"Having cauſed to be ſunk into the earth to ſome depth a ſtrong poſt, in the wood-yard of Somerſet-houſe, at a conſiderable diſtance from the influence of any iron, on which the compaſs might be placed, and from which ſtation there was a convenient mark at a proper diſtance to which its teleſcope could be adjuſted, I took the compaſs there at thoſe times of the day when the needle was ſtationary; *viz.* morning and afternoon; before the compaſs was carried out of doors, obſervations were made in the room; then it was taken out of doors to the above-mentioned ſtation for obſervation there; and the obſervations were again repeated after the compaſs had been reſtored to its ſituation in the room; ſo that, had any alteration taken place in the interval, ſuch alteration would have been detected; but, during the whole ſeries, no material difference occurred between the obſervations made in the houſe before, and after, thoſe taken in the yard.

"The obſervations, therefore, made in the yard, compared with thoſe taken in the houſe, both before and after thoſe taken out of it, formed the compariſon for obtaining the error, or the effect of the iron-work of the room on the needle in the houſe; and there is reaſon to believe that conſiderable accuracy has been obtained. They are as follows:

"By a mean of 20 ſets, or 200 obſervations taken with the compaſs in the yard, compared with twice that number taken in the houſe, before and after thoſe taken in the yard, the variation obſerved in the houſe was found to be greater than that obſerved in the yard by 5′.4. The mean of nine ſets of obſervations taken in the morning giving for the error 5′.5. And the mean of eleven, taken in the afternoon, giving for the error 5′.3. The variation in thoſe tables have therefore been leſſened by the above-mentioned quantity 5′.4; as the error for the effect of the iron-work of the room on the needle in the houſe."

II. The obſervations of the quantity of magnetical declination which have been made and regiſtered in journals and other

other books, may, for the ſake of perſpicuity, be divided into thoſe which have been made in the ſame place at different times, and thoſe which have been made at different places and different times. We ſhall, in the firſt place, ſtate the obſervations made in London at different times.

Direction of the Magnetic Needle obſerved in London at different Times.

Years.	Declination.		
1580	11°	15′	E.
1612	6	10	
1622	6	0	
1633	4	5	
1634	4	6	
1657	0	0	
1665	1	22	W.
1666	1	35	
1672	2	30	
1683	4	30	
1692	6	0	
1700	8	0	
1717	10	42	
1723	14	17	
1740	15	40	
1745	16	53	
1748	17	40	
1750	17	54	
1760	19	12	
1765	20	0	
1773	21	09	
1780	22	10	
1785	22	50	
1787	23	19	
1790	23	39	
1791	23	36	
1792	23	44	
1793	23	50	
1794	23	54	
1795	23	58	
1796	24	0	
1797	24	0	
1798	24	0	
1799	24	1	
1800	24	2	
1801	24	3	
1802	24	6	
1803	24	7.9	
1804	24	8.4	
1805	24	7.8	
1806	24	8.6	

It may be obſerved, with reſpect to the ſtatements of the preceding table, eſpecially with thoſe previous to the year 1800, that they are not to be depended upon within leſs than three or four minutes; not ſo much on account of the imperfection of the inſtruments, or of the want of accuracy in the obſervers, as for the different times of the year, or of the day in which the obſervations were taken, which, as will preſently appear, occaſion a very material difference. And it is for this reaſon, principally, that when the declination for the ſame year is given by different obſervers about the ſame place, their ſtatements ſeldom agree.

The firſt remark which obviouſly occurs in examining the preceding table, is, that when the declination was firſt obſerved in London, the north end of the needle ſtood on the eaſt of the meridian. From that time the declination was obſerved to decreaſe, until about the year 1657, when the needle was found to point due north and ſouth; and ſoon after it was obſerved to proceed towards the weſt. But for want of a continued ſeries of obſervations, we cannot preciſely ſay when the change from eaſt to weſt actually took place.

If we take the number of years elapſed ſince the firſt obſervation was made, as ſtated in the table; *viz.* 226 years, and divide the whole angular motion of the magnetical needle, made during that period; *viz.* from 11° 15′ eaſt, to 24° 8′ weſt, we ſhall find that the mean annual motion of the declination amounts to about 9′.4; but from an inſpection of the table, and a ſeparate calculation for the number of years elapſed between each pair of contiguous obſervations, it evidently appears that the real increaſe or decreaſe of the declination has been ſo very irregular, as to indicate no rule whatever by which the declination might be foretold for any future time. Latterly, however, the decreaſe of the declination has been ſo very ſmall, as hardly to amount to ¾ of a minute annually. And from this we are led to expect that the declination has reached its ultimate limit towards the weſt, and that the north end of the needle will ſoon begin to move back towards the meridian; but no great ſtreſs ſhould be laid upon this indication; conſidering that the movements of the magnetic needle follow no certain and determinate law. Having thus ſtated the moſt remarkable obſervations relative to the annual variation of the declination, it will now be neceſſary to ſtate thoſe which relate to monthly and diurnal variation. The ingenious Mr. John Canton was the firſt who took particular care to examine the daily variation of the magnetic needle, and an account of his obſervations is contained in the 31ſt vol. of the Phil. Tranſ. His ſtatement is as follows:

The Declination obſerved at different Hours of the ſame Day.
June 27th, 1759.

	Hours.	Min.	Declin.	Weſt.	Fahr. therm.
Morning	0	18	19°	2′	62°
	6	4	18	58	62
	8	30	18	55	65
	9	2	18	54	67
	10	20	18	57	69
	11	40	19	4	68½
Afternoon	0	50	19	9	70
	1	38	19	8	70
	3	10	19	8	68
	7	20	18	59	61
	9	12	19	6	59
	11	40	18	51	57½

The mean Variation for each Month in the Year.

January	7′	8″
February	8	58
March	11	17
April	12	26
May	13	0
June	13	21
July	13	14
Auguſt	12	19
September	11	43
October	10	36
November	8	9
December	6	58

Lately Mr. Gilpin made a great many accurate obſervations of the ſame nature at the apartments of the Royal Society, and on account of the diſtance of time, it will be uſeful to compare the mean reſult of his obſervations with

the preceding table of Mr. Canton. During 16 months, *viz.* from September 1786, to December 1787, Mr. Gilpin obſerved the direction of the magnetic needle at different ſtated hours of the day, and his obſervations are regiſtered in 16 pages of the Philoſophical Tranſactions for the year 1806, to which we muſt refer ſuch of our readers as are deſirous of examining the particulars minutely; but we ſhall ſubjoin his table of the mean monthly variation at different times of the day, which has been deduced from the above-mentioned 16 pages.

Mean Monthly Variation of the Magnetic Needle.

1786.	6 A. M.	7 A. M.	8 A. M.	10 A. M.	12 A. M.	1 P. M.	2 P. M.	4 P. M.	6 P. M.	8 P. M.	10 P. M.	11 P. M.
September	23° 0′.0	23° 7′.9	23° 10′.1	23° 14′.5	23° 22′.2	23° 23′.7	23° 23′.9	23° 19′.0	23° 15′.3	23° 13′.5	23° 12′.4	23° 0′.0
October		10.4	11.3	15.2	24.4	26.1	26.1	21.1	17.7	15.6	14.5	13.8
November		12.2	12.5	15.3	21.6	22.5	22.0	20.3	17.6	15.9	15.1	14.7
December			14.5	16.1	20.6	22.0	22.2	20.0	17.4	15.8	15.0	15.0
1787.												
January		14.0	14.2	17.1	22.3	24.1	24.5	21.8	18.4	15.6	14.5	14.8
February		14.2	15.1	17.1	23.3	24.8	25.1	23.6	18.8	15.3	15.8	12.8
March		12.8	12.8	15.3	26.5	27.7	27.8	18.4	19.0	15.9	15.5	15.7
April	9.7	9.9	9.7	13.9	23.6	27.0	27.4	22.6	17.8	15.7	15.7	15.6
May	7.6	7.5	7.4	13.5	25.2	26.6	26.2	21.0	17.7	17.1	16.8	17.0
June	8.4	8.2	8.8	16.0	26.6	28.1	28.1	22.6	18.7	17.9	17.8	17.7
July	9.5	9.6	10.3	17.8	27.6	29.3	29.4	23.2	19.4	18.9	19.3	19.1
Auguſt	11.9	12.0	12.8	19.7	30.3	31.7	31.5	25.6	19.3	18.7	18.9	18.8
September	15.0	15.1	15.3	20.2	29.8	30.7	30.5	24.7	20.1	19.1	19.2	19.2
October		17.5	17.3	21 1	30.8	31.9	31.6	27.4	21.9	20.8	20.2	19.6
November		19.4	19.7	20.6	29.7	31.1	30.2	27.7	22.7	21.4	21.3	21.4
December		20.4	21.0	21.8	28.2	29 0	29.0	26.2	22.9	21.9	21.6	

From the whole of the above ſtated obſervations it appears, that the magnetic needle generally is ſtationary at about ſeven or eight o'clock in the morning, at which time the variation is leaſt; and at about one or two o'clock in the afternoon, when its variation is greateſt. The mean monthly diurnal variation of the declination was found, in March 1787, to be 15′; in June 19′.6; in July 19′.6; in September 14′.8; and in December 7′.6. But on a mean of twelve years obſervations, from the year 1793 to 1805, Mr. Gilpin found that the diurnal alteration of variation in March was only 8′.5; in June 11′.2; in July 10′.6; in September 8′.7; and in December 3′.7. By a mean of the above-mentioned twelve years, the variation appears to increaſe or go weſtward, from the winter ſolſtice to the vernal equinox, 0′.8; it decreaſes or goes eaſtward, from the vernal equinox to the ſummer ſolſtice, 1′.43; increaſes again, from the ſummer ſolſtice to the autumnal equinox, 2′.43; and continues nearly the ſame, only decreaſing 0′.14, from the ſaid equinox to the winter ſolſtice.

Other obſervers in other parts of the world have remarked magnetic periods ſomewhat different from the above. Mr. Cotte's obſervations, on the diurnal variation, ſhew that the magnetic needle becomes ſtationary four times in the courſe of the year; *viz.* from January to March it retires from the meridian, then approaches it till May; is ſtationary in June, retires in July, approaches it till October, and retires from it in November and December. At Fort Marlborough in the iſland of Sumatra, during the year 1794, Mr. Macdonald made ſeveral accurate obſervations on the daily variation of the declination; from which it appears that the declination at that place (where it was little more than 1° E.) increaſed from about 7 in the morning, till 5 in the afternoon, and that it decreaſed till 7 in the morning. Mr. Macdonald likewiſe obſerved that this diurnal variation of the magnetical declination in time of thunder is greater than uſual. Phil. Tranſ. for 1796.

The ſame gentleman made ſimilar obſervations in the iſland of St. Helena in the courſe of the years 1795 and 1796. The declination, which at that place was 15° 48′ $34\frac{1}{2}''$ weſt, in November 1796, at a mean appeared to vary about 3′ 55″; *viz.* the magnetic needle is ſtationary from about ſix o'clock in the evening, till ſix in the morning, when it begins to move and the weſt variation increaſes, till it amounts to its maximum, at about 8 o'clock; diminiſhing afterwards, till it becomes ſtationary. Phil. Tranſ. for 1798.

In the iſland of Jamaica Mr. Robertſon aſſerts, (Phil. Tranſ. for 1806) that the declination is conſtantly 6° 30′ eaſt. But he is led to make this aſſertion from having obſerved old plans of eſtates, made ſoon after the year 1660; whereon the magnetic meridian was marked, and which appeared to coincide with the magnetic meridian which Mr. Robertſon obſerved on purpoſe, about 140 years after the above-mentioned period. To this, however, it may be obviouſly objected, that the declination may, during the above mentioned interval, have moved backwards and forwards; and have at laſt returned to the ſame point. Beſides, it muſt be remarked, that ſurveying inſtruments, as they were made about 140 years ago, were not capable of that degree of accuracy, which is neceſſary to ſhew the true declination of the magnetic needle.

Having thus far endeavoured to give our readers a ſufficient account of the declination and its variation in the ſame place, we may now proceed to ſtate the moſt important particulars relative to the declination at different places; which is of the utmoſt conſequence to navigators.

On account of the uncertain movements of the magnetic needle in different places on the ſurface of the globe; the ſafeſt expedient which navigators can, and do, adopt, is to aſcertain the actual declination at any particular place, where it may be deemed neceſſary, by uſing the azimuth compaſs, after the manner ſhewn under the article Compass. And thus, indeed, a great many obſervations are continually made at ſea; which might be of uſe to future navigators at no great

great diſtance of time; but they are ſeldom preſerved and publiſhed; and, if publiſhed, they are to be found ſcattered in a variety of books, ſuch as tranſactions of learned ſocieties, accounts of voyages, &c. which would be too bulky and expenſive to the mariner.

The following table is a ſpecimen of the declination of the magnetic needle in different parts of the world. It conſiſts of four columns, which contain the latitude and longitude of the place, the declination, and the year in which it was obſerved.

Latitude, North.	Longitude. Weſt.	Declination, Eaſt.	Years in which the Obſervations were made.
° ′	° ′	° ′	
70 17	163 24	30 21	1779
69 38	164 11	31 0	1778
66 36	167 55	27 50	
65 43	170 34	27 58	
63 58	165 48	26 25	
59 39	149 8	22 54	
58 14	139 19	24 40	
55 12	135 0	23 29	
53 37	134 53	20 32	
		Weſt.	
50 8	4 40	20 36	1776
48 44	5 0	22 38	
40 41	11 10	22 27	
33 45	14 50	18 7	
31 8	15 30	17 43	
28 30	17 0	14 0	
23 54	18 20	15 4	
20 30	20 3	14 35	
19 45	20 39	13 11	
16 37	22 50	10 33	
15 25	23 36	9 15	
13 32	23 45	9 25	
12 21	23 54	9 48	
11 51	24 5	8 19	
8 55	22 50	8 58	
6 29	20 5	9 44	
4 23	21 2	9 1	
3 45	22 34	8 27	
2 40	24 10	7 42	
1 14	26 2	5 35	
0 51	27 10	4 59	
0 7	27 0	4 27	
South.			
1 13	28 58	3 12	
2 48	29 37	2 52	
3 37	30 14	2 14	
4 22	30 29	2 54	
5 0	31 40	1 26	
6 0	32 50	0 6	
		East.	
6 45	33 30	0 35	
		Weſt.	
7 50	34 20	0 7	
8 43	34 20	0 15	
		East.	
9 1	34 50	0 44	
		Weſt.	
10 4	34 49	0 38	
		East.	
12 40	34 49	1 12	
13 23	34 49	1 1	1776
14 11	34 49	1 9	
15 33	34 40	1 15	
16 12	35 20	2 4	
18 30	35 50	3 2	
20 8	36 1	5 26	
21 37	36 9	3 24	
24 17	36 8	3 24	
26 47	34 27	3 44	
28 19	32 20	1 58	
30 25	26 28	2 37	
		Weſt.	
33 43	16 30	4 44	
35 37	9 30	5 51	
38 52	23 20	22 12	
	East.	East.	
40 36	173 34	13 47	
42 4	167 32	13 17	
		Weſt.	
44 52	155 47	9 28	
46 15	144 50	14 48	
48 41	69 10	27 39	

The firſt perſon who paid particular attention to the declination of the magnetic needle in different parts of the world, was the celebrated Dr. Halley; who, in the year 1685, undertook two voyages expreſsly for this purpoſe. He collected, as far as it was in his power, all the obſervations made in different places relative to the declination of the magnetic needle, and its variation. And in order to render them uſeful to navigators in general, he marked them on a chart, which he called the *declination chart*. His method was as follows: He took a general map of the world, and he marked with dots all thoſe places in which the declination of the magnetic needle had been aſcertained; he then drew lines, whether crooked or ſtraight, through all thoſe points or places in which the declination was the ſame; for inſtance, he drew a line through all thoſe places in which the declination was 5°; he drew another line through all thoſe places in which the declination was 10°; and ſo forth. But through the points in which there was no declination either eaſtward or weſtward, he drew a double line by way of diſtinction, which of courſe is called *the line of no declination*; for in that line the magnetic needle pointed due north and ſouth. All the above-mentioned lines are called *declination lines*, or (from their firſt projector) the *Halleyan lines*. This chart was formed in the year 1700. About 60 years after, Meſſrs. Mountaine and Dodſon publiſhed a ſimilar chart of declinations, which were principally derived from obſervations made in the courſe of the years 1744 and 1756. Phil. Tranſ. for 1757.)

In Dr. Halley's chart, the line of no declination croſſes the meridian of London at about the 55th degree of ſouth latitude; it then proceeds in an arched direction towards the weſt of that meridian; and increaſing its curvature as it advances up into the northern hemiſphere, it terminates at Charles town on the coaſt of North America. In Mountaine and Dodſon's chart, the line of no declination paſſes more weſtward of the meridian of London, it advances with a more irregular curvature, and it terminates on the coaſt of Florida, at about the 30th degree of north latitude. The lines of eaſt declination are on the concave ſide of

of the above-mentioned line, and the lines of weſt declination are on its convex ſide, advancing for a conſiderable extent with nearly the ſame curvature as the line of no declination: but, as you come on this ſide of the tropic of Cancer, the lines of weſt declination, in both charts, are almoſt perpendicular to the meridians. In the Indian ſea, and in the ſea between the iſland of Madagaſcar and the ſouth pole, the declination lines are vaſtly more irregular.

There is one remarkable circumſtance to be obſerved with reſpect to the lines of declination on theſe charts, which is that they never croſs each other.

In the Berlin Memoirs for the year 1757, the celebrated Mr. Euler publiſhed his reſearches on the magnetic needle, together with a map containing the ſtate of the declination lines at about the middle of the laſt century. According to this author, the north magnetic pole of the earth ſeems, at that time, to have been ſituated near the meridian which paſſes by Cape St. Lucar, the ſouth point of California; and between the latitudes of 70° and 80° north. See the article MAGNETISM *of the Earth*.

In the year 1768, Mr. Wilcke of Sweden alſo publiſhed a declination map, wherein the lines of declination differ conſiderably from thoſe of the preceding maps.

Beſides theſe, all the moſt accurate charts of particular ſeas, ſtraits, channels, &c. generally contain the declinations of the magnetic needle at the moſt remarkable ſpots within their limits, and according to the lateſt obſervations previous to the publication of the chart. It may be obviouſly obſerved, with reſpect to the nature and the uſe of theſe declination charts, firſt, that moſt of the declination lines are drawn principally by conjecture, having not above two or three points only aſcertained, and thoſe probably not in a very accurate manner; ſecondly, that the declinations at thoſe points have been obſerved at different times; and thirdly, that though made in the moſt accurate manner imaginable, theſe charts cannot be uſeful for more than a very limited number of years. A compendious idea of the general movement of the declination lines is given by Dr. Lorimer in the following words:

"At London and Paris, where the moſt accurate obſervations have been made, towards the latter end of the ſixteenth century (and we cannot pretend to much earlier informations), there was between 11° and 12° of eaſt declination, which gradually decreaſed; ſo that in leſs than an hundred years afterwards, there was no declination at all in thoſe places. From 1657 at London, and 1666 at Paris, a weſt declination began, and has ever ſince increaſed gradually, though not uniformly, or in the direct proportion of the times; for, ſuch is the nature of the magnetic declination, that, like the apparent motion of the planets, ſometimes it is faſter, ſometimes ſlower, at other times it is ſtationary; analogous alſo to the elongations of the inferior planets, at one time it is to the eaſt, and at another time to the weſt, alternately.

"We may farther obſerve, that the declination lines of the ſame name have always reſpectively paſſed London ſome years before the ſame lines arrived at Paris; and the like obſervations have been made in other parts of the northern hemiſphere; that is, in this hemiſphere the Halleyan lines have regularly paſſed thoſe places firſt which lay moſt weſterly, and ſo in order thoſe which lay more to the eaſtward. For in the latter end of the ſixteenth century, there was an eaſtern declination over moſt parts of Europe, while on the coaſt of North America a weſt declination prevailed; the line of no declination being then ſituated about the Azores. This line of no declination has ever ſince moved gradually eaſtward, the lines of eaſt declination receding before it, while the lines of weſt declination have gradually followed it.

"In the ſouthern hemiſphere, however, it is quite otherwiſe; for, about the latter end of the ſixteenth century, a line of no declination paſſed near to the Cape of Good Hope, upon the eaſt ſide of which there was weſt declination, and upon the weſt ſide thereof eaſt declination; each of which declinations, in going eaſtward or weſtward, gradually increaſed to a certain degree, and then in the ſame manner decreaſed to nothing, ſomewhere to the eaſtward of Java, one of the Eaſt India iſlands.

"The declination in the Pacific ocean has not as yet (1775) been ſo fully aſcertained; only in general we find, that the declination is eaſterly over moſt part of that extenſive ocean. The line of no declination, which was then ſituated a little to the eaſtward of the Cape of Good Hope, has ever ſince been moving to the weſtward, and the lines of eaſt declination have gradually receded before it, while thoſe of the weſt declination have followed it with a proportional pace; ſo that at the Cape of Good Hope, there is now a conſiderable weſt declination (about 24° according to the obſervations of colonel Gordon, then commander of the Dutch forces at the Cape), and the line of no declination has moved many degrees to the weſtward thereof.

"From the preceding obſervations, then, it plainly appears, that the Halleyan lines in the ſouthern hemiſphere do gradually move from eaſt to weſt, while the motion of thoſe lines in the northern hemiſphere is from weſt to eaſt."

III. We ſhall now proceed to treat of the theory of magnetic declination, and of its variation; previouſly to which it will be proper barely to enumerate the following facts, the particular nature of which may be ſeen at large under other articles of this Cyclopædia. 1. The earth is a vaſt magnet, endowed with all the properties which have been obſerved in common magnets. 2. The magnetic needle owes its directive property to the vicinity of this great magnet, in the ſame manner as when a ſmall magnetic needle is ſimilarly ſituated upon a common globular magnet (called a *Terrella*). 3. A magnet, whether natural or artificial, may, and moſtly has, its poles not diametrically oppoſite to each other, but in any other poſition. It may alſo have more than two poles. 4. The direction of the needle muſt either coincide with, or deviate from, the meridian, according as the magnetic poles of the earth happen to be ſituated. See MAGNETISM *of the Earth*. 5. The power of a magnet is diminiſhed by heating, and is increaſed by cooling; both effects, however, within certain limits. 6. The attraction between iron and the magnetic needle is increaſed to a certain degree by the action of ſulphuric acid upon the former. (See Cavallo's Treatiſe on Magnetiſm.) 7. Laſtly, the magnetic needle has been obſerved to be diſturbed in a remarkable manner; *viz.* ſo as to vibrate and to vary irregularly, at the time of an aurora borealis, of thunder and lightning, of violent winds, of the eruptions of volcanoes, and of earthquakes.

That the earth, on account of its containing immenſe maſſes of iron, and other ferruginous minerals, is a vaſt and irregular magnet, has occurred to a variety of perſons almoſt ever ſince the diſcovery of the magnetic needle; and that as ſuch it muſt act upon the needle. But Dr. Hailey, conſidering the above-mentioned influence of iron mines, &c. as a ſecondary power, imagined that the principal movements of the needle were occaſioned by the action of a large magnet placed in or near the centre of the earth, ſo

as to form a ſort of nucleus to the earth. He alſo ſuppoſed that this magnetic nucleus had a peculiar ſlow motion, whence aroſe the declination and its variation.

Æpinus entertained nearly the ſame idea, but inſtead of admitting the peculiar motion of the nucleus, he thought that its magnetic poles only changed place; and this occaſioned the variation of the declination on the ſurface of the earth. Upon this ſuppoſition it is equally difficult to account for the change of the magnetic poles in the nucleus, as in any other part of the earth. It is mentioned by Mr. De Lalande, that Mr. Tobias Mayer ſent him an extract of an unpubliſhed memoir of his, which contains his hypotheſis concerning the magnetical movements. Mayer ſuppoſes that a very ſmall magnet, having two poles, exiſts within the earth. The centre of this magnet is removed, he ſuppoſes, from the centre of the earth by one ſeventh of its radius, and recedes from it each year one thouſandth part of that diſtance. The line drawn from the centre of the earth through that of the magnet, was, in 1750, at 201° of longitude, and 17° of north latitude: the longitude increaſes 8′ every year, and the latitude 14′.

Mr. Biot has likewiſe endeavoured to explain, by means of an interior magnet, all the declinations of the magnetic needle, that have been obſerved by Mr. Humboldt in his travels. He has attempted to determine, from the obſervations of La Peyrouſe, and Von Humboldt, all the elements of the magnetic theory of the globe; and he has given the neceſſary formula for calculating what the declination and dipping of the needle (ſee DIPPING *Needle*) ſhould be in any given place. But the calculations made, according to this formula, have not been found to agree with the actual obſervations made by Meſſrs. Humboldt, and Gay-Luſac, in their travels through Italy, France, and Germany.

Some perſons have attributed the movements of the needle to the action of celeſtial bodies, or to ſome aerial current of magnetic or electrical fluid.

Upon an attentive conſideration of all the particulars that have been aſcertained by means of experiments, and long continued obſervations, the idea of a moveable or immoveable internal magnet ſeems to be the leaſt warranted either by analogy, or by any coincidence of the theory with the obſervations. That the various parts of the earth, according to their nature, act more or leſs forcibly upon the magnetic needle, admits of no doubt. It is alſo certain that the different concurrence of heat, cold, electricity, decompoſition, and derangement, muſt continually tend to alter the quantity of the above-mentioned actions upon the magnetic needle; hence the variations of the latter muſt, according to the ſtricteſt philoſophical reaſoning, be derived from theſe adequate cauſes, without recurring to ſuppoſitions purely chimerical.

Dr. Lorimer's theory, which endeavours to explain the movements of the magnetic needle by the action of the ſolar heat upon the earth, being the moſt rational and moſt intelligible, we ſhall conclude this article with a ſtatement of it. —"It muſt be allowed, according to the obſervations of ſeveral ingenious gentlemen, that the collective magnetiſm of this earth ariſes from the magnetiſm of all the ferruginous bodies therein contained, and that the magnetic poles ſhould therefore be conſidered as the centres of the powers of thoſe magnetic ſubſtances. Theſe poles muſt therefore change their places, according as the magnetiſm of ſuch ſubſtances is affected; and if, with Mr. Canton, we allow that the general cauſe of the diurnal variation ariſes from the ſun's heat in the forenoon and afternoon of the ſame day, it will naturally occur, that the ſame cauſe, being continued, may be ſufficient to produce the general variation of the magnetic needle for any number of years. For we muſt conſider, that ever ſince any attentive obſervations have been made on this ſubject, the natural direction of the magnetic needle in Europe has been conſtantly moving from weſt to eaſt, and that in other parts of the world it has continued its motion with equal conſtancy.

"As we muſt therefore admit, that the heat in the different ſeaſons depends chiefly on the ſun, and upon the whole, that the months of July and Auguſt will probably be found the hotteſt, while January and February are the coldeſt months of the year; and that the temperature of the other months falls into the reſpective intermediate degrees; though from calculation we can ſcarce pretend to aſcertain the abſolute heat of any particular month or day; ſo we muſt conſider the influence of heat upon magnetiſm to operate in the like manner; *viz.* that for a ſhort time it ſcarcely manifeſts itſelf; yet in the courſe of a century, the conſtancy and regularity thereof becomes ſufficiently apparent. It would therefore be idle to ſuppoſe, that ſuch an influence could be derived from an uncertain and fortuitous cauſe; but if it be allowed to depend upon the conſtancy of the ſun's motion, and this appears to be a cauſe ſufficient to explain the phenomena, we ſhould, agreeably to Newton's firſt rule of philoſophizing, look no farther.

"As we therefore conſider the magnetic powers of the earth to be concentrated in the magnetic poles, and that there is a diurnal variation of the magnetic needle, theſe poles muſt perform a ſmall diurnal revolution proportional to ſuch variation, and return again to the ſame point nearly. Suppoſe then that the ſun in his diurnal revolution paſſes along the northern tropic, or along any parallel of latitude between it and the equator, when he comes to that meridian in which the magnetic pole is ſituated, he will be much nearer to it than in any other; and in the oppoſite meridian he will of courſe be the fartheſt from it. As the influence of the ſun's heat will therefore act moſt powerfully at the leaſt, and leſs forcibly at the greateſt diſtance, the magnetic pole will conſequently deſcribe a figure ſomething of the elliptical kind; and as it is well known that the greateſt heat of the day is ſome time after the ſun has paſſed the meridian, the longeſt axis of this elliptical figure will lie north-eaſterly in the northern, and ſouth-eaſterly in the ſouthern hemiſphere. Again, as the influence of the ſun's heat will not from thoſe quarters have ſo much power, the magnetic poles cannot be moved back to the very ſame point from which they ſat out; but to one which will be a little more northerly and eaſterly or more ſoutherly and eaſterly, according to the hemiſpheres in which they are ſituated. The figures therefore which they deſcribe, may more properly be termed elliptical ſpirals. The north magnetic pole may by this means be carried, with a ſlow but conſtant motion, more and more to the north-eaſtward, till it arrives at the region of the greateſt cold.

"In this manner the variation of the magnetic needle in the northern hemiſphere may be accounted for. But, with reſpect to the ſouthern hemiſphere, we muſt recollect, that though the lines of declination in the northern hemiſphere have conſtantly moved from weſt to eaſt, yet in the ſouthern hemiſphere it is equally certain that they have moved from eaſt to weſt, ever ſince any obſervations have been made on the ſubject. Is it poſſible, then, that the magnetic pole in the ſouthern hemiſphere

ſphere can move from eaſt to weſt, while that in the northern hemiſphere moves from weſt to eaſt?—I think not. But we muſt conſider this matter a little more attentively. In the firſt place, it muſt be obſerved that in ſpeaking of the declination or variation of the magnetic needle, we always refer to the north end of the needle ouly; thus, when the north end of the needle points to the weſt of the meridian, we ſay it has ſo many degrees weſt variation, though the ſouth end thereof points as many degrees to the eaſtward. Again, when the north end of the needle points to the eaſtward of the meridian, we ſay it has eaſt variation, though the ſouth end points to the weſtward thereof. And the ſame language is uſed in the ſouthern as in the northern hemiſphere; ſo that if the ſouth magnetic pole, which governs the needle in that hemiſphere, move to the eaſtward, it occaſions, as we ſay, the needle to have weſt variation; and on the contrary, if it move to the weſtward, it makes what we term eaſt variation. This therefore is the cauſe, on account of which the lines of magnetic declination, or Halleyan curves, as they are now commonly called, appear to have a contrary motion in the ſouthern hemiſphere to what they have in the northern; though both the magnetie poles of the earth move in the ſame direction, that is, from weſt to eaſt." ——————— "It is alſo curious to obſerve, that on account of the ſouthern hemiſphere being colder upon the whole than the northern hemiſphere, the magnetic poles would have moved with unequal pace; that is, the north magnetic pole would have moved farther in any given time to the north-eaſt, than the ſouth magnetic pole could have moved to the ſouth-eaſt. And, according to the opinions of the moſt ingenious authors on this ſubject, it is generally allowed, that at this time the north magnetic pole is conſiderably nearer to the north pole of the earth, than the ſouth magnetic pole is to the ſouth pole of the earth."

DECLINATION *of a vertical plane*, or *wall*, in *Dialling*, is an arc of the horizon, comprehended either between the plane and the prime vertical circle, if you account it from eaſt to weſt; or between the meridian and the plane, if you account it from north to ſouth.

There are many ways given by authors for finding the declination of planes: the moſt practicable way is by a declinator.

DECLINATOR, or DECLINATORY, an inſtrument in dialling, whereby the declination, inclination, and reclination of planes is determined.

Its ſtructure is as follows: on a ſquare wooden board A B C D (*Plate* I. *Dialling*, *fig.* 1.) deſcribe a ſemicircle A E D, and divide the two quadrants thereof A E and E D into 90 degrees each, beginning from E, as in the figure. Then, having fixed a pin in the centre F, fit a wooden ruler H I upon the ſame, moveable thereon, with a box and needle K, as ſhewn under COMPASS.

Now, to apply this, in taking the declination of a plane: apply the ſide A D of the inſtrument to the plane propoſed, as M N (*fig.* 2.); and move the ruler F G, with the compaſs G, this way and that, about the centre F, till the needle reſt upon the line of the magnetical meridian of the place. Now, if the ruler in this ſituation cut the quadrant in E, the plane is either northern or ſouthern; but if it cut between D and E, the plane declines to the weſt, or if between A and E, to the eaſt by the quantity of the angle G F E.

The ſame inſtrument will alſo ſerve to take the inclinations and reclinations of planes. To this end, inſtead of the ruler and needle, a thread with a plumbet is fitted on a pin in the centre F: then the ſide B C of the declinator A B C D, being applied to the propoſed plane, as I L (*fig.* 3.), if the plumb-line F G cut the ſemicircle A E D in the point E, the plane is horizontal: or if it cut the quadrant E D in any point at G, then will E F G be the angle of inclination: laſtly, if applying the ſide A B to the plane, the plumbet cut E, the plane is vertical. Hence, if the quantity of the angle of inclination be compared with the elevation of the pole, and equator, it is eaſily known whether the plane be inclined or reclined. See INCLINATION and RECLINATION.

DECLINATORY PLEA, in *Law*. See *Benefit of* CLERGY.

DECLINATUS, CAULIS, a declining ſtem, in *Botany*, expreſſes a ſtem bowed arch-wiſe towards the earth, as in the bramble, *Rubus fruticoſus*, and ſtill more remarkably in the *Ficus indica*, whoſe *declining* branches, taking root, make a whole grove of a ſingle tree. The term is ſynonymous with *reclinatus*, which laſt is moſt generally, though perhaps leſs properly, uſed by Linnæus.

DECLINE, in *Medicine*, a popular term applied to almoſt all chronic diſeaſes, in which the ſtrength and plumpneſs of the body gradually decline or decreaſe, until the patient dies. The term is ſynonymous with CONSUMPTION, (which ſee,) and is more particularly applied to conſumption of the lungs, and of the meſentery.

DECLINERS, or DECLINING *dials*, are thoſe which cut either the plane of the prime vertical circle, or the plane of the horizon, obliquely.

If we conceive the plane of the prime vertical circle to revolve a little upon a right line drawn from zenith to nadir, the plane will become declining; nor will it be any longer cut at right angles by the meridian, but by ſome vertical circle paſſing through the intermediate points. After the like manner an horizontal plane will be brought to decline, if revolving on the meridian line, one part of it be raiſed a little towards the zenith, and the other depreſſed towards the nadir.

The uſe of declining vertical dials is very frequent, becauſe the walls of houſes whereon dials are commonly drawn, do generally decline from the cardinal points. Incliners and recliners, and eſpecially deincliners, are very rare. See DIAL.

DECLIVITY. See ACCLIVITY.

DECLIVITIES OF MOUNTAINS. On this ſubject a number of writers have remarked, that the weſtern ſides of mountains are leſs ſteep and abrupt than their eaſtern ſides; this will in a great number of inſtances be found to ariſe from the natural riſe of the ſtrata from the S. E. toward the N. W. and the ending of the ſtrata towards the weſt, which compoſe the hill or mountain. In very diſlocated parts of a country, ruptured or broken, and precipitous ſides of hills, or mountains, are to be ſeen on all ſides, almoſt indiſcriminately: but as ſuch eminences, eſpecially if ſmall, are generally occaſioned by tilts of the ruptured pieces of ſtrata, one ſide is generally much leſs ſteep than the oppoſite one. See ENDING *of Strata*.

DECOCTION, in *Pharmacy*, is a very common and highly uſeful way of extracting the ſoluble and efficacious part of many drugs, particularly of barks, woods, and roots, and other ſubſtances which contain alſo much inert and inſoluble portion. The proportion of the ſubſtance boiled to the water ſeldom, if ever, exceeds an ounce of the former to a pint of the latter, and frequently half or a quarter of an ounce is ſufficient.

M. Boulduc aſſures us from his own experience, that the infuſions of vegetable purgatives act better, and produce better effects, than their decoctions, which he attributes to this, that the pureſt and moſt active principles of thoſe bodies are diſſipated and evaporated by a boiling heat. Me-

moires de l'Academie Royale des Sciences, an. 1710. And M. Beaumè, in his Elements of Pharmacy, obſerves, that the infuſion of Peruvian bark, made without heat, contains more of its principles than the decoction; becauſe heat ſeparates and precipitates a conſiderable quantity of reſinous ſubſtance, of which the bark conſiſts: and it is obſerved in general, that decoction ought not to be employed but when abſolutely neceſſary, or when the ſame principles and the ſame quantity of theſe principles cannot be obtained by an infuſion without heat.

Decoction *of Bark.* See Cinchona.

Decoction *of Barley.* See Barley.

Decoction *for a Clyſter*, is prepared by boiling one ounce of the dried leaves of mallow, and half an ounce of dried chamomile, in a pint of water, and ſtraining the liquor.

Decoction *of Elm*, is made by boiling four ounces of freſh elm bark, neareſt the wood, bruiſed, in four pints of diſtilled water, to two pints, and ſtraining the liquor. This decoction, given in doſes of half a pound twice or thrice a-day, is recommended in various chronical cutaneous eruptions; more eſpecially when accompanied with purging medicines.

Decoction *for Fomentation*, is made by boiling for a ſhort ſpace of time ſouthern-wood, ſea-wormwood, and chamomile, of each dried, one ounce by weight, and half an ounce by weight of dried bay-leaves, in ſix pints of diſtilled water, and ſtraining the liquor.

Decoction *of Hartſhorn*, is made by boiling, and conſtantly ſtirring, two ounces by weight, of hartſhorn burnt and prepared, and ſix drams by weight of gum arabic, in three pints of diſtilled water, to two pints, and then ſtraining. This decoction, though a much weaker abſorbent than the *mixtura cretacea*, is much more agreeable to moſt people. It is uſed as common drink in fevers, attended with laxity of bowels.

Decoction *of white Hellebore*, is prepared by boiling one ounce by weight of white hellebore, powdered, in two pints of diſtilled water to a pint, and when the liquor is cold and ſtrained, adding two ounces by weight of rectified ſpirit of wine. This is a very efficacious application in defædations of the ſkin, as in tinea, &c. It may be diluted at diſcretion.

Decoction *of Sarſaparilla.* See Sarsaparilla.

DECOLLATION, Beheading, a term frequently uſed in the phraſe, decollation of St. John Baptiſt, which denotes a painting, wherein is repreſented the Baptiſt's head, ſtruck off from his trunk; or the feaſt held in honour of that martyr.

DECOMPOSITA Folia. See Leaf.

DECOMPOSITION, Chemical, is the reſolution of a compound ſubſtance into its conſtituent parts, which are exhibited either ſeparate, or in ſome new combination. For obſervations on the limits and laws of chemical decompoſition, ſee Affinity.

Decomposition, in *Natural Hiſtory*, is that decay or change, which moſt of the ſtrata of the earth, however hard, are found to undergo when expoſed to the viciſſitudes of the atmoſphere, and often in the parts where different ſubſtances come in contact with each other; which laſt kind of decompoſition has in ſome inſtances of late been ſuppoſed to ariſe from a galvanic influence, excited by the ſuperpoſition of different kinds of ſtrata upon each other. By decompoſition it has been, that a large portion of the mould, or vegetable earth, found ſo uniformly diſtributed on the ſurface of the globe, has been formed; gravel, or heterogeneous mixtures of different ſubſtances are evidently more ſubject to decompoſition than others which are leſs compounded; and hence probably has ariſen the great depth of ſoil, aad fertility of ſome gravelly diſtricts, where quartz, pebbles, and ſand do not too much abound. The nature of ſome rocky ſtrata is ſuch, that they are never found in a hard or ſtony ſtate upon the ſurface, or at their out-crop, but are always here ſeen decompoſed, and in a ſoft or friable ſtate, although the ſame ſtratum, when covered by others, preſents a hard rock. Coal, in like manner, is always imperfect at its out-crop, and often the richeſt ſeams of this valuable ſubſtance preſent but a meer ſmut, or blackening of the earth, at their out-burſt to the day.

Decomposition is uſed by Boyle, Newton, and other Engliſh authors, to ſignify the compoſition or junction of two or more bodies, which were previouſly compounded of other parts.

DECONUS, or Doconus, in *Ancient Geography*, a river of Aſia, which had its ſource in mount Cauçaſus, and diſcharged itſelf into the Phaſis.

DECORATION, in *Architecture*, any thing that adorns and enriches a building, church, triumphal arch, or the like, either without-ſide, or within.

The orders of architecture contribute greatly to the decoration; but then the ſeveral parts of thoſe orders muſt have their juſt proportions, characters, and ornaments; otherwiſe the fineſt order will bring confuſion rather than richneſs.

Decorations in churches are paintings, vaſes, feſtoons, &c. occaſionally applied to the walls; but that with ſo much ſkill, as not to take off any thing from the form of the architecture; as is much practiſed in Italy, at the ſolemn feaſts.

Decoration is more properly applied to the ſcenes of theatres, which muſt be frequently changed, conformably to the ſubject.

The ancients had two kinds of decorations for their theatres: the firſt called verſatiles, having three ſides, or faces, which were turned ſucceſſively to the ſpectators; the other, called ductiles, ſhewing a new decoration by drawing or ſliding another before it.

The latter ſort is ſtill uſed, and apparently with much greater ſucceſs than among the ancients, who were obliged to draw a curtain whenever they made a change in the decoration; whereas in our ſtage the change is made in a moment, and almoſt without being perceived.

DECORIANA, in *Ancient Geography*, an epiſcopal town of Africa, in the Byzacene territory.

DECORTICATION, the act of peeling, or unhuſking roots, ſeeds, fruits, branches, &c. or of freeing them from their barks, rinds, huſks, or ſhells.

DECORUM, or Decor, in *Architecture*. This word is uſed by Vitruvius to expreſs the propriety or congruity of a building with reſpect to its purpoſe, ſituation, &c. which he illuſtrates by various inſtances. Thus the temples erected to Jupiter the Thunderer, to the Heavens, the Sun, or the Moon, are to be built uncovered, becauſe the influences and effects of thoſe deities are perceived in the open air. To Minerva, Mars, and Hercules, temples of the Doric order ſhould be erected; and to Venus, Flora, Proſerpine, and the Nymphs of the Fountains, Corinthian temples, the gay and graceful manner of that order correſponding with the character of the goddeſſes. To Juno, Diana, and Bacchus, the Ionic order is to be appropriated, as poſſeſſing a middle character between the ſeverity of the Doric, and the tenderneſs of the Corinthian. Decor, with regard to cuſtom, is obſerved, when the internal parts of edifices being magnificent, the acceſſes are alſo made ſuitable and

elegant. Again, if dentils are carved in the cornice of the Doric order, or, if triglyphs are repreſented in the frieze of Ionic columns, this confuſion of the characteriſtics of the orders muſt be conſidered as a violation of decorum. Decor, with regard to nature, conſiſts in all temples being placed in a ſalutary ſituation, in the neighbourhood of ſprings of water, but eſpecially the temples of Eſculapius and Health, by whoſe healing influence numbers of ſick appear to be recovered. For the diſeaſed perſons being removed from an unhealthy to a healthy ſituation, and the ſalutiferous waters of the fountains being adminiſtered, they are ſoon recovered. By this means it will happen that the natural effects of the place will increaſe the received opinion of the power of the divinity. This part of decor is alſo obſerved, when chambers and libraries receive their light from the eaſt; baths and winter apartments from the weſt; picture galleries, and ſuch rooms as require a ſteady light, from the north.

DECOUPLE', in *Heraldry*, the ſame as uncoupled, *i. e.* parted, or ſevered.

Thus a chevron decouplé is a chevron wanting ſo much towards the point, that the two ends ſtand at a diſtance from each other.

DECOURS, or Decressant, in *Heraldry*. See Decrement.

DECOY, a place made fit for catching of wild fowl.

Hence alſo a decoy-duck is one that flies abroad, and lights into company of wild ones, and, being become acquainted with them, by her allurement draws them into the decoy place, where they become a prey. See Fowl.

The decoy is uſually made where there is a large pond, ſurrounded with wood, and behind it a marſhy and uncultivated country, where the wild-fowl may ſecurely ſleep during the day-time. The decoy conſiſts of ſeveral pipes, as they are called, which lead up a narrow ditch, that cloſes at laſt with a funnel-net. Over theſe pipes, which become narrower from the firſt entrance, is fixed a continued arch of netting, ſuſpended on hoops. There is uſually a pipe or ditch for almoſt every wind that can blow, as the wild-fowl are determined by this circumſtance which pipe to chooſe; and the decoy-man always keeps on the leeward ſide of the ducks, to prevent his effluvia from reaching their ſagacious noſtrils. Skreens made of reeds are placed at certain diſtances along each pipe, in ſuch a manner, that it is impoſſible for the wild fowl to ſee the decoy-man, before they have paſſed towards the end of the pipe where the net is fixed. In the evening, when the wild-fowl begin to feed, the decoy riſes, and the noiſe of their wings, in their flight, may be heard at a great diſtance. The riſing of the decoy is in Somerſetſhire called rodding. The decoy-ducks are fed with hemp-ſeed, which is thrown in ſmall quantities over the ſkreens, to bring them forwards into the pipes, and to allure the wild-fowl to follow. They are ſo trained as to lead the way, after hearing the whiſtle of the decoy-man, and enticed by the hemp-ſeed, and to dive under water, whilſt the wild-fowl fly on, and are taken in the net. When they are in ſuch a ſleepy ſtate as not to follow the decoy-ducks, a ſmall dog is made to paſs between the ſkreens, approaching gradually nearer and nearer to the purſe-net; which draws the attention of the wild-fowl, and makes them to advance forward; at length the decoy-man appears behind a ſkreen, and drives them into the net.

The general ſeaſon for catching wild-fowl in decoys is from the latter end of October till February. The act of 10 Geo. II. cap. 32. forbids taking them from June 1 to Oct. 1, under a penalty of five ſhillings for every bird deſtroyed within that time. The Lincolnſhire decoys, which principally ſupply the London markets, are rented from 5*l.* to 20*l.* a year. Pennant's Zoology, vol. ii. p. 594. 8vo. 1776.

Decoy, in a *Military Senſe*, refers to the artifice, frequently reſorted to, either of tempting an enemy to deviate from his intended route, under the expectation of cutting off a body of troops; or of preſenting to him the appearance of weakneſs, where a ſtrong body is poſted. This kind of device ſometimes ſucceeds againſt inexperienced or ſanguine commanders; but may generally be diſtinguiſhed by the obvious pains taken to render the decoy conſpicuous. The cautious commander will ever hold in mind that ſuch military operations as are intended to be effectual, are conducted with ſecrecy and concealment; he will therefore ſuſpect every ſtudied diſplay, and, without omitting thoſe due precautions their reality might require, will conſider them as lures held out for the purpoſes of ambuſcade, or to produce a diverſion of his ſtrength towards that quarter. If he ſhould reſolve on aſcertaining the true ſtate of matters, it ought to be done in the day-time, by means of a ſmall advanced party, well ſupported by a ſufficient body. In a cloſe country too much precaution cannot be taken to prevent ſurpriſe from concealed parties: in an open country, cavalry will be the beſt to employ for reconnoitring the ſuſpicious operations; which ordinarily ſeem to peep over the brow of a hill, or from the ſkirts of woods, or along the banks of rivers and hollows.

Decoy, in *Sea Language*, denotes a ſtratagem employed by a ſmall ſhip of war to betray a veſſel of inferior force into a purſuit, till ſhe comes within gun-ſhot. The ſtern and ſides are painted ſo as to diſguiſe the ſhip, and the emblems and ornaments of the nation to which the ſtrangers belong, are aſſumed. When the adverſary is allured to chaſe, the decoy is continued by ſpreading a great ſail, as if ſhe endeavoured to eſcape; but her courſe is retarded by an artful alteration of her trim. The decoy is alſo performed for eluding the chaſe of a ſhip of ſuperior force in a dark night, by throwing out a lighted caſk of pitch, which will burn for a conſiderable time and miſguide the enemy. When the caſk is thrown out, the courſe of the eſcaping ſhip is changed.

DECREE, Decretum, an order or reſolve, made by a ſuperior power for the regulation of an inferior.

The commerce between ſoul and body, F. Malebranche obſerves, has no other vinculum, or connection, but the efficacy of the divine decrees. Second cauſes only execute the decrees of Providence.

The doctrine of the Calviniſts has been charged with implying that God concurs to ſin by a poſitive decree; in that, if crimes were not ordained by an antecedent decree, God could not foreſee the events.

Decrees of councils are the laws made by them to regulate the doctrine and policy of the church.

Decree was originally uſed by the lawyers for any thing ordained by the prince, upon cognizance of a cauſe.

But the canoniſts now reſtrain the word decree to the ordinances of popes, which form the firſt part of the canon-law; as the name canon is to what is ordained by councils.

Decrees in chancery are the determinations or ſentences of the lord chancellor, upon full hearing, and weighing the merits of the cauſe.

A decree in chancery is of the ſame nature with a judgment at common law (Chanc. Rep. 234.) Where there is but one witneſs againſt the defendant's anſwer, the plaintiff can have no decree. (1 Vern. 161.) See Court *of Chancery*.

Several queſtions and diſputes were not many years ago very warmly agitated concerning the authority of the maſter

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of the rolls to hear and determine cauſes, and his general power in the court of chancery; to quiet which it was declared by ſtatute 3 Geo. II. c. 30. that all orders and decrees by him made, except ſuch as by the courſe of the court were appropriated to the great ſeal alone, ſhould be deemed to be valid; ſubject nevertheleſs to be diſcharged or altered by the lord chancellor, and ſo as they ſhall not be inrolled, till the ſame are ſigned by his lordſhip. In caſe of croſs cauſes, when all parties are heard, the court pronounces the decree, adjuſting every point in debate according to equity and good conſcience; which decree being uſually very long, the minutes of it are taken down, and read openly in court by the regiſtrar. The chancellor's decree is either *interlocutory* or *final*. It very ſeldom happens that the firſt decree can be final or conclude the cauſe; for, if any matter of fact is ſtrongly controverted, this court is ſo ſenſible of the deficiency of trial by written depoſitions, that it will not bind the parties thereby, but uſually directs the matter to be tried by jury; eſpecially ſuch important facts as the validity of a will, or whether A is heir at law to B, or the exiſtence of a "modus decimandi," or real and immemorial compoſition for tithes. But as no jury can be ſummoned to attend this court, the fact is uſually directed to be tried at the bar of the court of king's bench, or at the aſſiſes, upon a feigned iſſue. Thus alſo, if a queſtion of mere law ariſes in the courſe of a cauſe, it is the practice of this court to refer it to the opinion of the judges of the court of king's bench or common pleas, upon a caſe ſtated for that purpoſe, wherein all the material facts are admitted, and the point of law is ſubmitted to their deciſion; who thereupon hear it ſolemnly argued by counſel on both ſides, and certify their opinion to the chancellor. Upon ſuch certificate the decree is uſually founded. The completion of decrees is retarded by the following circumſtances. Frequently long accounts are to be ſettled, incumbrances and debts to be inquired into, and an hundred little facts to be cleared up, before a decree can do full and ſufficient juſtice. Theſe matters are always by the decree on the firſt hearing referred to a maſter in chancery to examine, which examination often laſts for years; and then he is to report the fact, as it appears to him, to the court: this report may be excepted to, diſapproved, and overruled; or otherwiſe, is confirmed, and made abſolutely order of the court.

If either party to the ſuit ſhould think himſelf aggrieved by a decree, he may petition the chancellor for a re-hearing, whether it was heard before the chancellor himſelf or any of the judges ſitting for him, or before the maſter of the rolls. For in all caſes it is the chancellor's decree, and muſt be ſigned by him before it is enrolled; which is done of courſe unleſs a re-hearing be deſired. Every petition for a re-hearing muſt be ſigned by two counſel of character, uſually ſuch as have been concerned in the cauſe, certifying that they apprehend the cauſe is proper to be re-heard. And upon the re-hearing all the evidence taken in the cauſe, whether read before or not, is now admitted to be read; becauſe it is the decree of the chancellor himſelf, who now only ſits to hear reaſons why it ſhould not be enrolled and perfected; at which time all omiſſions of either evidence or argument may be ſupplied. (Gilb. Rep. 151, 152.) But, after the decree is once ſigned and enrolled, it cannot be reheard or rectified, but by bill of review, (ſee REVIEW) or by appeal to the houſe of lords. An appeal to parliament, that is, to the houſe of lords, is the dernier reſort of the ſubject who thinks himſelf aggrieved by any interlocutory order or final determination in this court; and it is effected by petition to the houſe of peers, and not by writ of error, as upon judgments at common law. This juriſdiction is ſaid to have begun in 18 Jac. I.; and it is certain, that the firſt petition, which appears in the records of parliament, was preferred in that year; and that the firſt which was heard and determined (though the name of appeal was then a novelty) was preſented in a few months after; both levelled againſt the lord chancellor Bacon for corruption, and other miſbehaviour. It was afterwards warmly controverted in the reign of Charles II. But the diſpute is now at reſt, (Brow. Parl. c. 8.) it being obvious to the reaſon of all mankind, that when the courts of equity became principal tribunals for deciding cauſes of property, a reviſion of their decrees (by way of appeal) became equally neceſſary, as a writ of error from the judgment of a court of law. But no new evidence is admitted in the houſe of lords on any account, this being a diſtinct juriſdiction. (Gilb. Rep. 155. 156.) It is a practice unknown to our law, (though conſtantly followed in the ſpiritual courts,) when a ſuperior court is reviewing the ſentence of an inferior, to examine the juſtice of the former decree by evidence that was never produced below. Blackſt. Comm. book iii.

DECREES *of the Court of Seſſion*, in *Scots Law*, are either *in foro contradictoris*, where both parties have litigated the cauſe, or in abſence of the defender. Decrées of the ſeſſion *in foro* cannot, in the general caſe, be again brought under the review of the court, either on points which the parties neglected to plead before ſentence (which are called *competent* and *omitted*), or upon points pleaded and found inſufficient (proponed and repelled). But decrees, though *in foro*, are reverſible by the court, where either they labour under eſſential nullities, *e. g.* where they are *ultra petita*, or not conformable to their grounds and warrants, or founded on an error *in calcul*, &c. or where the party againſt whom the decree is obtained has thereafter recovered evidence ſufficient to overturn it, of which he knew not before. See SENTENCE.

Decrees in abſence of the defender, have not the force of *res judicatæ*, *i. e.* of ſentences or decrees which exclude all review or rehearing as to him; for where the defender does not appear, he cannot be ſaid to have ſubjected himſelf by the judicial contract which is implied in "conteſtatio litis;" a party therefore may be reſtored againſt theſe, upon paying to the other his coſts in recovering them. The ſentences of inferior courts may be reviewed by the court of ſeſſion; before decree, by advocation; and after decree, by ſuſpenſion or reduction; which two laſt are alſo the methods of calling in queſtion ſuch decrees of the ſeſſion itſelf, as can again be brought under the review of the court.

Decrees are reviewed either by reduction or ſuſpenſion. The former is the proper remedy, either where the decree has already received full execution by payment, or where it decrees nothing to be paid or performed, but ſimply declares a right in favour of the purſuer. For the remedy of ſuſpenſion, ſee SUSPENSION. For the execution of decrees, ſee EXECUTION.

DECREES *arbitral*, are ſentences proceeding on a ſubmiſſion to arbiters, which is a contract entered into by two or more parties who have diſputable rights or claims, by which they refer their differences to the final determination of an arbiter or arbiters, and oblige themſelves to acquieſce in what ſhall be decided. Where the day within which the arbiters are to decide is left blank in the ſubmiſſion, practice has limited the arbiters power of deciding to a year. But where a ſubmiſſion is indefinite, without ſpecifying any time, like all other contracts or obligations, it ſubſiſts for 40 years. As arbiters are not veſted with juriſdiction, they cannot compel witneſſes to make oath before them, or the exhibition of writings; but the court of ſeſſion ſupplies this defect, by granting warrants at the ſuit of the arbiters, or

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of either of the parties, for citing witneſſes or for the exhibition of writings. The arbiters have merely power to decide; but the execution of the decree belongs to the judge. Decrees arbitral are not reducible upon any ground, except corruption, bribery, or falſehood.

DECREMENT, or DECRESSANT, in *Heraldry*, denotes the wane, or decreaſe of the moon, when ſhe is receding from the full towards the new.

In this ſtate ſhe is called, in blazon, a moon-decreſſant, or en decours; ſince to call it a creſcent, would be improper, as that term denotes an increaſe. The moon looking to the left ſide of the eſcutcheon, is always ſuppoſed to be decreſſant: when ſhe faces the right ſhe is creſcent, or in her growth.

DECREMENT, *equal, of life.* See COMPLEMENT *of life.*

DECREPITATION is the violent crackling and motion excited by ſuddenly heating any ſalt or other hard ſubſtance which contains a little water or other evaporable fluid, but much leſs than is ſufficient for liquefaction. Common ſalt affords a perfect inſtance of decrepitation when thrown on a very hot ſhovel, or in the fire.

DECREPITUDE, in *Medicine*, the conſequences of the infirmities of old age: which by degrees leads to death. See DEATH.

DECRETAL, a reſcript, or letter of a pope, whereby ſome point or queſtion in the eccleſiaſtical law is ſolved, or determined: or a digeſt of the canons of all the councils that pertained to one ſubject under one head.

The decretals, *literæ decretales*, compoſe the ſecond part of the *Canon law*, which ſee.

All the decretals attributed to the popes before Siricius, in 318, are evidently ſuppoſititious. They are ſuppoſed by ſome the ſpurious offspring of Iſidore, archbiſhop of Seville, by reaſon the collection thereof bears the name of Iſidore Peccator, or Mercator. They were firſt publiſhed by Riculph, biſhop of Mentz, in the ninth century.

Pope Gregory IX. in the thirteenth century, procured a compilation to be made of all the decretals or pontifical conſtitutions of his predeceſſors, in five books, by friar Raimond, a Dominican, his chaplain; which is the only collection authoriſed by the holy ſee to be read in ſchools.

Theſe decretals, publiſhed by Gregory IX., ſays Mr. Hume, (Hiſt. Eng. vol. ii. p. 229.) are a collection of forgeries favourable to the court of Rome, and conſiſting of the ſuppoſed decrees of popes in the firſt centuries. The forgeries are ſo groſs, and confound ſo palpably all language, hiſtory, chronology, and antiquities; matters more ſtubborn than any ſpeculative truths whatſoever; that even that church, which is not ſtartled at the moſt monſtrous contradictions and abſurdities, has been obliged to abandon them to the critics. But in the dark period of the 13th century, they paſſed for undiſputed and authentic; and even, entangled in the mazes of this falſe literature, joined to the philoſophy, equally falſe, of the times, had nothing with which to defend themſelves, but ſome ſmall remains of common ſenſe, which paſſed for profaneneſs and impiety, and the indelible regard to ſelf-intereſt, which, as it was the ſole motive in the prieſts for framing theſe impoſtures, ſerved alſo, in ſome degree, to protect the laity againſt them.

DECRETUM GRATIANI. See CANON *Law.*

DECTUNINES, in *Ancient Geography*, a people of Italy, in Liguria.

DECTURAPOUR, in *Geography*, one of the Laccadive iſlands, in the Indian ſea. N. lat. 12° 8′. E. long. 72°.

DECUARIA, in *Ancient Geography*, a town of Albion, according to the anonymous writer of Ravenna; ſuppoſed by Camden to be Beverley.

DECUBITUS, in *Medicine*, the manner or poſture in which a ſick perſon lies in bed.

This circumſtance is of conſiderable importance in the obſervation of the phyſician, as it indicates very accurately the degree and extent of ſeveral ſymptoms, by which his judgment of the event of the diſeaſe may be directed. The moſt natural and agreeable poſition of the body in bed, is when we lie on one ſide, with the limbs drawn out of the right line, or half-contracted, ſo that both ſets of muſcles, the flexors and extenſors, ſhall be in a ſtate of relaxation. When we obſerve a patient, therefore, lying in this poſition, eſpecially if ſleeping, we may infer, that he is deſtitute of great pain, that the functions are going on with freedom and eaſe, and that he is poſſeſſed of a certain degree of ſtrength. For, on the contrary, when any important organ is in pain, or diſturbed in its functions, this natural poſition of the limbs is generally altered. Thus, when the bowels and ſtomach are affected with pain, the thighs are commonly contracted inſtinctively towards the abdomen, by which the muſcles of that part are relaxed, and preſſure leſſened on the bowels. Thus alſo, when the lungs or liver are diſeaſed, the patient cannot lie on one or the other ſide. In many diſorders of the former, as in peripneumony, hydrothorax, &c. he ſits upright; not becauſe his diſeaſe is diminiſhed, as a ſuperficial obſerver might ſuppoſe, but becauſe he is threatened with ſuffocation, if he attempt to aſſume the horizontal poſture, in conſequence of the change of poſition of the fluids effuſed within the cheſt. Some degree of muſcular power is requiſite to retain the body on one ſide; ſo that in the latter ſtages of malignant fevers, and other diſeaſes of extreme debility, the failure of the vital powers is indicated by the poſture of the patient; he always is found on his back, with his limbs extended, in conſequence of the general relaxation of all the muſcles both of the trunk and limbs.

DECUMA, in *Ancient Geograghy*, a borough of Spain, dependent on the community of Colonia Patricia, or Cordova, and ſituated near the town of Sacilis (Alcorrucen), and before the confluence of the rivers Bœtis and Singulis.

DECUMÆ. See DECIMÆ.

DECUMANI, in *Ancient Geography*, a people of Gallia Narbonnenſis; ſo called, as it is ſuppoſed, becauſe they were a colony drafted from the 10th legion.

DECUMANNI DENTES, a term uſed by the Latin writers on heraldry to expreſs that ſort of line in arms, which we call danſette or dancetté. See DANCETTE.

It is a kind of indented line, but is very large, and has very few teeth, commonly no more than three. It is ſuppoſed to have been in its origin no other than the letter M, with its two legs extended from one ſide of the field to the other.

DECUMANUS. See DECIMÆ.

DECUMARIA, in *Botany*, (from *decuma* or *decima*, in alluſion to the tenfold ſtructure, not indeed very conſtant, of the flower and fruit.) Linn. Gen. 238. Schreb. 310. Wild. Sp. Pl. v. 2. 850. Juſſ. 324. (Forſythia. Walt. Carol. 154.). Claſs and Order, *Polyandria Monogynia.* Nat. Ord. *Myrti.* Juſſ.

Gen. Ch. *Cal.* Perianth urceolate, with eight, nine, or ten minute, ovate, acute, coloured teeth, at length reflexed. *Cor.* Pet. eight, nine, or ten, lanceolate, obtuſe, equal, inſerted into the rim of the calyx in a ſimple row, ſpreading. *Stam.* Filaments 16 to 27, inſerted into the calyx, thread-ſhaped, equal, as long as the petals. Anthers roundiſh, of two cells, compreſſed. *Piſt.* Germen inferior, turbinate.

Style ſhort, columnar. Stigma capitate, with about ten furrows. *Peric.* Capſule turbinate, furrowed, crowned with the calyx and ſtyle, of from eight to ten cells. *Seeds* numerous, imbricated, chaffy.

Eſſ. Ch. Calyx urceolate, with about ten teeth. Petals eight—ten. Capſule of about ten cells. Seeds numerous, imbricated, chaffy.

D. *barbara*, Linn. Sp. Pl. 1663, the only ſpecies, is a native of Carolina, not, as Schreber and Linnæus ſuppoſed, of Africa. This is a ſhrub, whoſe ſtem clinging by means of fibres to the trunks and branches of trees, climbs to a great height. The leaves are oppoſite, ſtalked, elliptical or obovate, varying iu breadth, of a deep ſhining green, veiny, ſmooth except when very young, ſerrated chiefly towards the point. Stipulas none. Flowers in a terminal corymboſe panicle, cream-coloured, fragrant, ſomewhat reſembling thoſe of the lime-tree, but ſmaller. Capſules of an elegant urn-like form, with longitudinal furrows.

This is the *Forſythia ſcandens* of Walter in his Flora Caroliniana; nor is the *Decumaria ſarmentoſa* of Boſc, Act. Soc. Hiſt. Nat. Paris, 76, t. 13, as far as we can diſcern, at all different from the above. S.

DECUPLE, in *Arithmetic*, a term of relation, or proportion, implying a thing to be ten times as much as another.

DECURIO, the chief, or commander of a decury, both in the Roman army, and in the college or aſſembly of the people. See Decury.

Decurio *municipalis*, was a name given to the ſenators of the Roman colonies.

They were called decuriones, becauſe their court or company always conſiſted of ten perſons, or becauſe, as ſome ſay, when the colony was firſt planted, every tenth man was made a ſenator. The fortune requiſite for being elected a decurio, under the emperors, was 100,000 ſeſtertii. Plin. Epiſt. i. 19. See Decury.

By means of this appointment, the cities of Italy, at leaſt, ſuch as had colonies, had a ſhare under Auguſtus, in the election of the Roman magiſtrates; the decurions, or ſenators of thoſe cities, having ſuffrages therein, which they ſent, ſealed up, to Rome, a little before the election.

Whilſt, under the emperors, every thing that was honourable or important in the adminiſtration of the revenue, was committed to the wiſdom of the præfects, and their provincial repreſentatives; the laborious offices, which could be productive only of envy and reproach, of expence and danger, were impoſed on the decuriones, who formed the corporations of the cities; and whom the ſeverity of the imperial laws had condemned to ſuſtain the burthens of civil ſociety. The title concerning the decurions (l. xii. tit. 1.) is the moſt ample in the whole Theodoſian code; ſince it contains not leſs than 192 diſtinct laws, to aſcertain the duties and privileges of that uſeful order of citizens.

Decurio was alſo a name given to certain prieſts intended, as it ſhould ſeem, for ſome particular ſacrifices, or other religious ceremonies; or for the ſacrifices of private families and houſes, as Struvius conjectures, who thence derives their name.

Be the origin of the name what it will, we have an inſcription in Gruter, which confirms what we have ſaid of their function: ANCHIALVS. CVB. AED Q TER. IN. AEDE. DECVRIO. ADLECTVS. EX. CONSENSV. DECVRIONVM. FAMILIAE. VOLVNTATA. This inſcription proves that there was a decurio in the houſe of a private perſon, Q. Terentius.

DECURION, in the armies of the ancient Roman empire, was an officer who held command over ten men, as the centurion did over an hundred. The ſyſtem of dividing their forces into very ſmall parties, each under the particular charge of an expert and approved individual, was a chief ſupport of the great power the Romans acquired over their neighbours. Military men of eminence, in our own country, have ever conſidered the diviſion of a company into very ſmall parties, each commanded by a non-commiſſioned officer, to be highly conducive to effect in the moment of conteſt; eſpecially among new levies, which are apt to be too impetuous. Hence it has been remarked that old regiments ſtand a charge with moſt coolneſs and obſtinacy; while the aſſault made by a new regiment, generally compoſed of young, ardent, and vigorous individuals, is moſt impreſſive. The plains of Maida give us a recent inſtance of a new corps making its *debut* with the defeat of nearly treble its numbers of French veterans, who could not ſtand the bayonets of the gallant ſecond battalion of the 78th, juſt raiſed in the Highlands.

It would be difficult to ſtate which of the modern ranks of ſerjeants or corporals, tallies with moſt general conformity to the ancient rank of decurion; the number of men they command being unſettled, as they uſually act according to the occaſion of the moment; and perform the general duty of the company in turn, without having charge of any particular individuals, abſtracted from the reſidue. It appears obvious, that, in this reſpect, our ſyſtem is rather deficient, and admits of a very eaſy remedy.

DECURRENTIA Folia, in *Botany*. See Leaf.

DECURSIO, in *Roman Antiquity*. See Campicursio.

DECURY, ten perſons ranged under one chief, or leader, called the decurio.

The Roman cavalry was divided into decuries.

Romulus divided the whole Roman people into three tribes over each of which he appointed a tribune: each tribe he ſubdivided into ten centuries, with centurions at their heads; and each century he ſubdivided farther into ten decuries, over each of which a decurio commanded. See Curia.

DECUSSATA Folia, in *Botany*. See Leaf.

DECUSSATION, in *Geometry* and *Optics*, the points wherein two lines or rays croſs or interſect each other: or the action itſelf of croſſing.

The rays of light decuſſate in the cryſtalline, before they reach the retina.

Decussation *of the Nerves*, in *Anatomy*. The optic nerves, ariſing ſeparately from the right and left ſides of the brain, approach each other, and unite together before leaving the ſkull. Their united portion lies juſt in front of the ſella turcica, and the right and left nerves paſſing from this, go through their reſpective foramina optica into the orbits. Anatomiſts have doubted whether or not the nerves decuſſate at this united part; ſo that the nerve ariſing from the right optic thalamus ſhould belong to the left eye, and *vice verſâ?* A direct examination of the part in queſtion is not ſufficient to determine this point: the ſubſtance of the right and left nerves is completely blended at the point of junction, but whether they croſs cannot be aſcertained. In ſeveral inſtances of diſeaſe and injury affecting one eye of an animal, the optic nerve of the diſeaſed ſide has been found diminiſhed in ſize, and altered in appearance, as far as the united portion; and theſe changes have there been continued towards the oppoſite thalamus: in ſome fiſhes they obviouſly croſs each other: in the ſkate, the right nerve goes through a fiſſure of the left; and in bony fiſhes the nerve lies on the other without any intermixture. Theſe facts are ſtrongly in favour of the ſuppoſed decuſſation in the human ſubject. An explanation of the circumſtance of our ſeeing objects ſingle with two eyes, has been ſought in this decuſſation; but, if it be admitted, we do not ſee that the phenomenon becomes more intelligible.

From

From the circumſtance of injury of one ſide of the brain generally producing paralyſis of the oppoſite ſide of the body, ſome have inferred that all the nerves decuſſate; ſo that the right ſide of the body, according to this opinion, has its nerves from the left ſide of the brain, and *vice verſâ*. The arguments from direct anatomical inveſtigation would certainly be completely againſt ſuch an opinion, as we diſcover nothing like a decuſſation of that ſort. We are ſo totally ignorant of the *manner*, in which the mind is affected, and of every thing that relates to the chain of connexion uniting external objects and the ſenſitive faculty, that we need not be ſurpriſed at not being able to explain any particular phenomena in this department of phyſiology. We have no more reaſon to infer that preſſure on one ſide of the brain ſhould affect the ſame ſide of the body, than that it ſhould paralyſe the oppoſite parts; and any inveſtigation of the reaſon why the latter event ſhould take place, will probably avail us no more than our attempts to explain how it is that we ſee objects upright, when they are painted on the retina in an inverted ſtate, in conſequence of the decuſſation of the rays of light in their paſſage through the cryſtalline lens. See S. T. Soemmerring and Noethig Diſſert. de Decuſſatione Nervorum Opticorum. Mogunt. 1796.

DECUSSIS, a Roman coin, which had different values. At firſt it was worth ten as, under Fabius ſixteen, and under Auguſtus twelve.

DECUSSORIUM, a ſurgeon's inſtrument, wherewith the dura mater is preſſed down in trepanning, to ſecure it from damage in the operation.

DECZ, or DEEZ, in *Geography*, a town of Tranſylvania, on the river Samos; 7 miles N.W. of Samoſvivar.

DEDARD, a town of Tranſylvania; 8 miles W. of Kereſztier.

DEDDINGTON, a market town in the hundred of Wootton, Oxfordſhire, England. is ſeventeen miles diſtant from Oxford, and ſixty-nine N.W. from London. It is an ancient town, was incorporated, and ſent members to parliament in the reigns of Edward I. and Edward III. It has long loſt that privilege, and is at preſent governed by a bailiff. Dr. Plot, in his Hiſtory of the County, informs us, that Deddington had once a caſtle, in which the earl of Pembroke left the famous and unfortunate favourite of Edward II., Piers Gaveſtan, under a ſtrong guard; where he was ſurpriſed by the earl of Warwick, and hurried away to Black-low hill for execution. The town is tolerably well built; and the church is a good ſtructure, having a very neat tower. Sir Thomas Pope, who was born here, A. D. 1507, and died in 1558, founded a free-ſchool, called Jeſus ſchool; before he gave the manor to Chriſt church college, Oxford. The canal from Birmingham to Oxford paſſes near the town, on which is a wharf for landing of coals to ſupply the inhabitants: an article which, previous to that communication being made to the Staffordſhire collieries, was often ſcarce and extremely dear. The place is famous for brewing excellent malt-liquor: hence it has obtained the appellation of Drunken Deddington. It has a market weekly on Saturdays, and three annual fairs. According to the returns under the late act, the number of houſes was 232, and of inhabitants 1172.

In the neighbourhood of Deddington are two mineral ſprings, celebrated for their medicinal virtues. One of them has a ſtrong ſulphureous ſcent, and contains a conſiderable portion of hepar ſulphuris, mixed with other ſulphuric neutral ſalts; and its waters produce ſimilar good effects in ſcrophulous caſes, to thoſe of Harrowgate Spaw in Yorkſhire.

DEDELER, a town of Aſiatic Turkey, in the province of Caramania; 21 miles N.W. of Conia.

DEDHAM, a large village of Eſſex, in England, was formerly a market town of ſome note, and famous for its clothing trade, as early as the reign of Richard II. Here is a free grammar ſchool, which was endowed by William Littlebury, gent. in the year 1570, for the education, &c. of twenty ſcholars. The donation was confirmed, and the governors incorporated by a charter of queen Elizabeth, dated May 14, 1574. According to the late population act of parliament, Dedham contained, in 1800, 303 houſes, and 1537 inhabitants. This town is 20 miles N.E. by E. from Colcheſter, and 58 miles N.E. by N. from London.

DEDHAM, a poſt-town of America, and the capital of Norfolk county, in the ſtate of Maſſachuſetts, called by the Aborigines Tiot, and by the firſt ſettlers Clap-board Trees. This townſhip was incorporated in 1637; it is ſeven miles long, and ſix broad, and contains 1973 inhabitants. Its public buildings are, three congregational churches, an epiſcopal church, a court-houſe, and a gaol. Its ſituation is pleaſant, 11 miles S.W. of Boſton, on Charles river. A ſmall ſtream, which joins Neponſit river, on the borders of Milton, furniſhes water for two griſt-mills, two ſaw-mills, two fulling-mills, and a leather-mill; and in this place is a wire-manufactory, which ſupplies the fiſh-hook and card-manufacturers of Boſton.

DEDI, in *Conveyances*, imports a warranty given to the feoffee and his heirs. See WARRANTY.

DEDICATION, the act of conſecrating a temple, altar, ſtatue, place, &c. to the honour of ſome deity. See TEMPLE, ALTAR, CHURCH, &c.

The uſe of dedications is very ancient, both among the worſhippers of the true God, and among the heathens: the Hebrews call it חֲנֻכָּה, *hhenuchah, initiation*; which the Greek tranſlators render εγκαινια, and εγκαινισμος, *renewing*.

In the Scripture we meet with dedications of the tabernacle, of altars, of the firſt and ſecond temple, and even of the houſes of private perſons. (Numb. vii. 10, 11. 84. 88. Deut. xx. 5. 1 Kings, viii. 63. 2 Chron. vii. 5. 9. Ezra, vi. 16, 17. 1 Eſd. vii. 7. Pſalm, xxx. 1. Heb. ix. 18.) There are alſo dedications of veſſels and garments of the prieſts and Levites, and even of the men themſelves.

Under the Chriſtian diſpenſation, we call the like ceremonies conſecrations, benedictions, ordinations, &c. and not dedications, which term is only applied to places, as to a church; and is properly the conſecration thereof performed by a biſhop, and a number of ceremonies preſcribed by the church. See CONSECRATION.

The Chriſtians, finding themſelves at liberty under Conſtantine, in lieu of their ruinous churches, built new ones in every place; and dedicated them with a great deal of ſolemnity. The dedication was uſually performed in a ſynod; at leaſt they aſſembled a number of biſhops, to aſſiſt at the ſervice. We have the deſcription of thoſe of the churches at Jeruſalem and Tyre, in Euſebius, and many others in later writers.

In the Sacramentary of Gelaſius, the dedication of the baptiſtery is delivered ſeparately from that of the church, which was performed with leſs ceremony than at preſent. The Feaſt of the Dedication, or rather the feaſt day of the ſaint or patron of a church, called, in our law-books, *dedicatio*, was celebrated not only by the inhabitants of the place, but by thoſe of all the neighbouring villages, who uſually reſorted thither; and ſuch aſſemblies were authoriſed by the

king.—" Ad dedicationes, ad ſynodos, &c. *venientes* ſit ſumma pax."

The cuſtom is ſtill retained, in diverſe places, under the name of feaſts, wakes, or vigils.

Popes Felix and Gregory are the firſt that decreed the annual obſervation of the dedication of churches, ſince our Saviour's time, which have been obſerved in England under the name of wakes or revels; but they were the occaſion of much idleneſs and debauchery, ſo that king Henry VIII. A. D. 1536, reſtrained them all to the firſt Sunday in October, prohibiting their being kept on any other day; and afterwards, by the ſtatute 5 and 6 Edward VI. c. 3. of holy-days, they were totally aboliſhed. But theſe feaſts being again revived by degrees, in ſundry places of this realm, and particularly in Somerſetſhire, judge Richardſon, when he was on the circuit, at the requeſt of the juſtices of peace for the county, publiſhed an order for ſuppreſſing them; but he was obliged the next year as publicly to revoke it, and to declare ſuch recreations to be lawful; and as a farther puniſhment on the judge, archbiſhop Laud obtained his removal from that circuit. In anſwer to a letter written by Laud to Pierce, biſhop of Bath and Wells, in which he requires fuller information on this ſubject, the biſhop acquaints him, that the late ſuppreſſion of the revels was very unacceptable, and that the reſtitution of them would be very grateful to the gentry, clergy, and common people; in proof of which he had procured the hands of 72 of his clergy, in whoſe pariſhes theſe feaſts were kept; and he believes that if he had ſent for 100 more he ſhould have had the ſame anſwer from them all; but theſe 72 (ſays his lordſhip) are like the 72 interpreters, that agreed ſo ſoon in the tranſlation of the Old Teſtament into Greek. He then proceeds to explain the nature of theſe feaſts. The feaſts of dedication, ſays he, are in memory of the dedication of their ſeveral churches; thoſe churches which are dedicated to the Holy Trinity, have their feaſts on Trinity Sunday; and ſo all the feaſts are kept upon the Sunday before or after the ſaint's day to whom the churches are dedicated, becauſe the people have not leiſure to obſerve them in the week-days:—this, ſays his lordſhip, is acceptable to the people, who otherwiſe go into tipling-houſes, or elſe to conventicles. (See *Church*-Ales.) It was one of the charges againſt Laud at his trial, that he encouraged theſe revels; and it was alleged, that they were the occaſion of many diſorders, as drunkenneſs, quarrelling, fornication, and murder; and that, therefore, it was very unlikely they ſhould anſwer any good purpoſe, and that they were unfit to ſucceed the public devotions of the Lord's day.

The Jews celebrated the anniverſary of the dedication of their temple every year, for eight days; this was firſt enjoined by Judas Maccabæus, and the whole ſynagogue, in the year of the Syro-Macedonian æra 148, *i. e.* 165 years before Chriſt, on occcaſion of the victory obtained by the Maccabees over the Greeks. (1 Maccab. iv. 59.) It begun every year on the 25th day of Ciſſeu, and was continued to the 8th day, during all which time they illuminated their houſes, by ſetting up candles at every man's door, whence it was called the feaſt of lights. This feſtival Chriſt honoured with his preſence at Jeruſalem. (John, x. 22.) Leo of Modena ſays, that they begun with one lamp, and added to the number, according to the day of the feaſt; ſo that on the laſt day they had eight lamps in their houſes. Perſius ſeems to refer to this feſtival in his 5th ſatire, v. 179—184; and it is poſſible, that the Maccabee feſtival, of the dedication of the altar, and the commemoration of the inauguration of Herod the Great, might be blended together at the time to which Perſius refers. This coincidence, which is not improbable, accounts for the ſplendour of the illuminations, which he deſcribes.

The heathens had alſo dedications of temples, altars, and images of their gods, &c. Nebuchadnezzar had a ſolemn dedication of his ſtatue. (Dan. iii. 2.) Pilate dedicated gilt bucklers at Jeruſalem, to Tiberius. (Philo de Legat.) Petronius would have dedicated a ſtatue to the emperor in the ſame city. (Ibid. p. 791.) Tacitus (Hiſt. lib. iv. cap. 53.) mentions the dedication of the Capitol, upon rebuilding it by Veſpaſian, &c.

Theſe dedications were performed with ſacrifices proper to the deity they were offered to; but they were never practiſed without public permiſſion. Among the Greeks, it does not appear who gave that permiſſion; but among the Romans, it was always the magiſtrate.

The heathens had ſimilar anniverſaries with the Jews, as that of the dedication of the temple of Parthenope, mentioned by Lycophron. The heathen temples were dedicated with many ceremonies, the principal of which were the following. The pontiffs and people encompaſſed the temple with garlands and feſtoons of flowers; the veſtal virgins, holding branches of olive trees in their hands, ſprinkled the outſide of the temple with the luſtral water; then the perſon who conſecrated, being the prætor, cenſor, &c. drew near the gate with a pontiff at his ſide, who directed him in pronouncing the words of conſecration: after which they ſacrificed a beaſt in the court of the temple, and anointed a ſtatue of the deity to whom it was dedicated with oil, and laid it on a pillar rubbed with oil. An inſcription was afterward made on ſome part of the temple, according to the name of the perſon who performed the office, and the year of dedication, which they annually obſerved by a ſacrifice, or ſome other ſolemnity.

Dedication, in *Literature*, is an addreſs prefixed to a book, ſoliciting patronage, or teſtifying reſpect for the perſon to whom it was made. The dedication of the fourth part of Mr. Edwards's Hiſtory of Birds, is curious: "To God! the one eternal! the incomprehenſible! the omnipreſent! omniſcient and Almighty Creator of all things that exiſt! from orbs immeaſurably great, to the minuteſt points of matter, this atom is dedicated and devoted, with all poſſible gratitude, humiliation, and worſhip, and the higheſt adoration both of body and mind, by his moſt reſigned, low, and humble creature, G. E."

DEDIMUS Potestatem, in *Law*, a writ whereby commiſſion is given to one or more private perſons, to aſſiſt for the expedition of ſome act belonging to a judge.

The civilians call it delegatio: it is granted moſt commonly upon ſuggeſtion, that the party who is to do ſomething before a judge, or in a court, is ſo weak that he cannot travel.

Its uſe is various: as, to take a perſonal anſwer to a bill in chancery; to examine witneſſes, or to levy a fine, &c.

DEDUCTION, in *Commerce*, a ſubtracting, or retrenching a little ſum paid, from a greater remaining to be paid.

Deduction, in *Logic* and *Science*, denotes a proceſs or chain of reaſoning, whereby, from principles ſuppoſed and allowed, we arrive at the truth of any propoſition. See Reasoning.

DEDUCTOR, in *Antiquity*, a client, who, beſides the ordinary ceremony of ſaluting his patron every morning, was likewiſe obliged to attend him on public occaſions. Pitiſc. Lex. Antiq. in voc.

DEDUCTIONE, or Deduttione, in the *Italian Muſic*, the name which Guido Aretine gave to the riſe of the voice, in pronouncing the ſyllables *ut, re, mi, fa, ſol, la: quia per has deducitur vox.* On the contrary, when the voice deſcended by *la, ſol fa, mi, re, ut,* he called it Reduttione, quia per has reducitur vox.

DEDUCTIVE Evidence, in *Ethics*, is derived either from the invariable properties or relations of general ideas, or from the actual, though perhaps variable, connections ſubſiſting among things. The former is called demonſtrative, and the latter moral. Theſe differ from one another with reſpect to their ſubject; with reſpect to their nature, as the one admits of degrees and contrariety of proofs, which the other does not, and as the former is ſimple, ariſing from a coherent ſeries of proofs mutually and eſſentially connected, and the latter is generally complicated, being compoſed of a number of isdependent proofs. Campbell's Hiſt. Rhet. vol. i. book i. chap. 5.

DEE, John, in *Biography*, an Engliſh divine and mathematician, was born in London in 1527. He received the early part of his education at different ſchools in and near the metropolis; from thence he went to St. John's college, Cambridge, where he applied himſelf to the uſual ſtudies with much diligence. In 1547 he viſited Flanders; and, on his return, was choſen fellow of Trinity college, and was admitted to the degree of M. A. His knowledge of mathematics, and his perpetual obſervations on the face of the heavens, drew upon him the imputation of a conjurer, which was never afterwards obliterated. To avoid the notice which evil-minded perſons excited by reports equally malicious and unfounded, he withdrew to Louvain, where he obtained a doctor of laws' degree. From Louvain he went to Paris, and read lectures on Euclid's Elements with much applauſe. In 1551 he returned to England, and was introduced to the king, who gave him a penſion of 100 crowns, which in a ſhort time was commuted for a royal preſentation to the rectory of Upton-upon-Severn. In the reign of Mary, he was charged with practiſing enchantments againſt the queen's life, and it was not till after much expence, trouble, and an impriſonment, that he was ſet free. In the ſucceeding reign he received better treatment. He was conſulted as to the moſt propitious day for celebrating the coronation, and his ſuppoſed ſkill in this inſtance obtained for him a high degree of credit from the principal characters at court, and even from the queen herſelf, who at length took him into her ſervice, and did him the honour of becoming his ſcholar. In 1564 he went on the continent to preſent a work, entitled, "Monas Hieroglyphica," to the emperor Maximilian. His next work, "Propedumata Aphoriſtica," he preſented to his own ſovereign in 1568, and in two years after he publiſhed a preface to ſir Henry Billinſley's tranſlation of Euclid, to which edition he added many notes of his own. In 1571 he went again to Louvain, where he was attacked by a ſerious and alarming illneſs, which afforded the queen an opportunity of ſhewing her regard and reſpect for him who had formerly been her inſtructor in aſtrology. She ſent out two phyſicians to attend him, and exhibited other marks of her beneficence. On his return he ſettled at Mortlake, in Surry. Here he collected a valuable library, and an aſtronomical and chemical apparatus, the greater part of which was deſtroyed by an ignorant mob, who conceived that the owner had ſecret dealings with the devil. In the year 1572, on the ſudden appearance of a new ſtar in Caſſiopeia's chair, and again in 1577, on the appearance of a comet, which was looked on as foreboding ſome terrible calamity, Mr. Dee obtained the higheſt reputation for the diſcourſes which he delivered explanatory of the celeſtial phenomena. The queen's ill-health in the following year afforded her a pretext for ſending Dee to Germany, to conſult ſome eminent phyſicians on her caſe; though he probably was deputed on a political errand. He was next employed to draw a geographical deſcription of the countries diſcovered by Engliſhmen in different parts of the globe: this is ſtill preſerved in the Cottonian library, on two large rolls. He now compoſed a treatiſe on the reformation of the calendar, which was highly eſteemed by the beſt mathematicians of the age, and ſtill exiſts in MS. at the Aſhmolean muſæum, Oxford. Hitherto, notwithſtanding the popular clamour excited againſt Mr. Dee, his conduct was reſpectable, and his character eſtimable. But now he ſeems to have perſuaded himſelf that an intercourſe might, by the occult ſciences, be maintained with the inhabitants of another world. He connected himſelf with a man of the name of Kelley, and they united in performing their incantations, and maintaining an imaginary intercourſe with ſpirits, until, from their neglect of every duty attached to life, they were reduced to circumſtances of want and great diſtreſs. In the year 1583, they admitted a Poliſh nobleman into their ſociety; and after they had nearly exhauſted all his reſources, they went, to avoid his creditors, to Poland, and from thence to Bohemia. Dee contrived to obtain an audience with the Poliſh ſovereign, and the emperor Rodolph, both of whom he diſguſted by his own ſelf-importance, and by a parade of projects which he was incapable of realizing. Dee and Kelley ſeparated, and the latter made himſelf maſter of the moſt valuable part of their ſtock, by which he was enabled to eſtabliſh his future fortune. Dee returned to England in the year 1589, and, through the intereſt of the queen, obtained ſome preferment in the church, with promiſe of higher honours, and more lucrative poſts, which he never obtained. His manners were haughty, his temper unconciliating, and, on account of his ſuppoſed commerce with infernal ſpirits, he became the object of hatred to thoſe with whom he was obliged to aſſociate. He petitioned for trial, in hopes of being able to free himſelf from the ſuſpicions attached to his character as a necromancer; but his prayer was not regarded, and he felt himſelf in old age without friends, and overwhelmed in poverty. He died in 1608, while he was preparing for another journey to the continent. The works of Mr. Dee were numerous; but they are now well nigh forgotten. Some unpubliſhed MSS. are ſtill preſerved in the Aſhmolean and Cottonian collections, which are ſaid to exhibit evident proofs of the author's erudition and diligence, as well as diſplay abundance of vanity and fanaticiſm. Biog. Brit.

Dee, Arthur, ſon of John, born at Mortlake, in Surry, July 14th, 1579, accompanied his father in his travels over France, Germany, and Poland, and was early initiated by him in the ſame myſteries which he himſelf had ſo unfruitfully followed. Returning to England, he ſettled in Weſtminſter, intending to practiſe medicine there; but, being rejected by the college of phyſicians, to whom he applied for a licence, he went to Ruſſia, and, on the recommendation of king James, was appointed phyſician to the czar, an office he continued to hold for fourteen years. He now returned to England, where he ſoon loſt the money he had acquired in Ruſſia, in ſearch of the grand elixir, the reality of the exiſtence of which he never doubted. He is ſaid to have died at Norwich in extreme poverty, in September, 1651. He ſuffered the cenſures of the college of phyſicians, Goodall ſays, for hanging out a table at his door, expoſing to ſale ſeveral medicines, by which he profeſſed to cure ſundry diſeaſes. While at Paris, he publiſhed, in 1631, "Faſciculus chymicus, abſtruſæ ſcien-

tiæ Hermeticæ, ingreſſum, progreſſum, coronidem explicans," 12mo. Eloy Dict. Hiſt.

DEE, in *Geography*, a river that riſes in the mountains of Merionethſhire, in North Wales, runs through Pimblemere, near Bala, and after an extenſive circuit through the county of Denbigh, which it ſeparates from Cheſhire, paſſes by Cheſter, almoſt encircling it, and after flowing to the weſt, through an artificial canal formed by the river Dee company, diſcharges itſelf into the Iriſh ſea, about 15 miles N.W. from that city. It is navigable for ſhips of 200 tons burthen up to the city of Cheſter. See CANAL. Near to Parkgate, on the northern ſhore of the eſtuary of this river, coals are dug. The freight of goods by means of this river and the ocean, would, it is ſaid, be much cheaper between Cheſter and Liverpool, than by the nearer route of the Wirral branch of the Elleſmere canal and the river Merſey, were it not for the coaſt-wiſe duties which all goods are obliged to pay in paſſing between the mouths of the Dee and Merſey rivers. The waters of this river were regarded as ſacred and purifying by our Britiſh anceſtors.

DEE, a river of Scotland, which riſes in the N.W. part of Kircudbrightſhire, from Loch Dee, and runs into Solway Frith, about five miles below Kircudbright. It is rather an eſtuary in the part which is navigable for about ſix miles from its opening into the ſea.—Alſo, a river of Scotland, which riſes in the borders of the county of Inverneſs, and runs into the German ocean at Aberdeen. It ſeparates Aberdeenſhire from the county of Mearns, and is navigable from its mouth at the harbour of New Aberdeen, to the new ſtone bridge about ſix miles above this, which was erected in the year 1801 over this river, with a principal arch of 100 feet ſpan: about the ſame time the earl Fife propoſed to clear the bed of this river upwards to the foreſt of Mar, ſo as to float the timber thereof down to new Aberdeen harbour. See CANAL. On this river is the moſt extenſive ſalmon-fiſhery in Scotland.

DEE, a ſmall river of Ireland, which, riſing in the county of Meath, enters Louth, croſſes it from weſt to eaſt, and falls into the bay of Dundalk. The town of Atherdee or Ardee is ſituated on it, and hence derives its name, which ſignifies *a ford over the Dee*.

DEE, or *Dee-obba*, a ſmall but clear river of Abyſſinia, which runs into the Nile between Abbo and Eion Mariam, about 25 geographical miles above the ſource aſſigned to it by Mr. Bruce. N. lat. 11° 25′. E. long. 36° 51′.

DEEAZED, in *Agriculture*, a provincial term which is applied to any ſort of plant or animal which is much injured or deſtroyed by the operation of cold, ſuch as vegetables which are nipped by froſt, or chicks which die in the ſhell of the egg, in conſequence of the abſence of the hen.

DEED, FACTUM, in *Law*, ſo called, κατ' εξοχην, by way of eminence, becauſe it is the moſt ſolemn and authentic act which a man can poſſibly perform, with reſpect to his property, is an inſtrument written on paper, or parchment, the validity of which conſiſts in the following particulars; proper parties to contract with one another, and a proper ſubject matter to be contracted for; a good and ſufficient conſideration; writing on paper or parchment duly ſtamped; ſufficient and legal words properly diſpoſed, comprehending the premiſes, the *habendum* and *tenendum*, the terms of ſtipulation, a condition, a clauſe of warranty, and the concluſion, mentioning the execution and date of the deed; reading, if deſired, before the execution; ſealing; and by ſtat. 29 Car. II. cap. 3. in many caſes ſigning alſo; and delivery; and which comprehends a contract, or bargain, between party and party.

If a deed wants any of the forementioned requiſites, it is void *ab initio*; and it may be alſo avoided by matter *ex poſt facto*; as by raſure, interlining, or alteration in any material part, without a memorandum made at the time of execution and atteſtation; by breaking off or defacing the ſeal; by delivering it up to be cancelled; by the diſagreement of ſuch whoſe concurrence is neceſſary; and by the judgment and decree of a court of judicature.

Of theſe there are two ſorts; deeds indented, and deeds poll; which denominations ariſe from the form and faſhion thereof; the one being cut in and out in the top, or ſide, called indented; inſtar dentium, in acute angles, but at preſent in a waving line; and the other plain, or polled.

A deed indented, or an indenture, conſiſts of two parts, or more (for there are tripartite, quadripartite, ſeptempartite, &c. deeds); wherein it is expreſſed that the parties thereto have to every part thereof interchangeably ſet their ſeveral ſeals. The cauſe of their indenting is, that whereas the ſeveral parties have each of them one, the indenture may make it appear, that they belong to one and the ſame contract by their tallying. See INDENTURE.

A deed poll, or polled, anciently called charta decima parte, or charta ſimplex, is a plain deed, without indenting; uſed when the vendor, for example, only ſeals, and there is no need for the vendee's ſealing a counter-part, becauſe the nature of the contract is ſuch, that it requires no covenant from the vendee.

DEED, *date of a*. See DATE.

DEEDS, *ſtealing of*. See LARCINY.

DEEL, in *Geography*, a ſmall river of Ireland, in the county of Mayo, which flows into the northern part of lough Conn.

DEEL-*Caſtle*, a ſmall poſt-town of Ireland, in the county of Mayo, 134 miles N. W. from Dublin, on the road from Caſtlebar to Killalla, and about five miles from the latter place.

DEEMSTERS, or DEMSTERS. All controverſies in the Iſle of Man are decided, without proceſs, writings, or any charges, by certain judges, choſen yearly from among themſelves, called deemſters. This inſtitution they are ſuppoſed to owe to the ancient Druids.

The word is formed from the Saxon *dema*, *judge*, or *umpire*.

There are two deemſters for each diviſion of the iſland: in ancient court-rolls, they are called juſticiarii domini regis. They ſit as judges in all courts, either for life or property; and with the advice of the twenty-four keys, declare what is law in uncommon emergencies.

DEENKOTE, in *Geography*, a town of Hindooſtan, in the country of Lahore, ſeated on the eaſt ſide of the Indus, or Sinde, at its junction with the Cow river, from 30 to 35 geographical miles below Attock, where is a paſs acroſs that river.

DEEP, is a term frequently applied in the ſacred writings to the ocean; the Great Deep, mentioned by Moſes in his account of the Noetic Deluge, (Gen. vii. 11.) has been ſuppoſed by Dr. Woodward (Nat. Hiſt. of Earth, p. 117.) to mean "a mighty collection of water incloſed in the bowels of the earth, conſtituting an huge orb in the interior or central parts of it; upon the ſurface of which orb of water, the terreſtrial ſtrata are expanded." Under the article CONTINENT, we have endeavoured to ſhew, that the central parts of the earth are not only ſolid, but of much greater ſpecific gravity than the ſuperficial ſtrata of the earth; and, indeed, if we conſult the Moſaic account of the decreaſe of the waters of the ſame deluge, (Gen. viii. 2.) we ſhall find the word deep only uſed, as in numerous other places, where the ſea upon the ſurface of the earth is intended to be underſtood. See ABYSS.

DEEP,

ſpace which the lines, notes, &c. are to take up. See *Plate Miſcellany, Fig.* 5.

The compoſing-ſtick ordinarily contains ſeven or eight lines of a middle-ſized letter; theſe, when ſet, are taken out, by help of a thin ſlip of braſs, termed a rule, and diſpoſed in the galley; and others compoſed, till a page be formed. The page being compoſed, is tied up, and ſet by; and the reſt of the pages of the ſheet prepared in the ſame manner: when done, they are carried to the impoſing or correcting-ſtone; there ranged in order, and diſpoſed in a chaſe, or iron-frame, fitted with wooden furniture; then, the quoins being ſtruck in, it is carried to the preſs to be printed.

Composition, in *Sculpture*, from *Compozitione*, Italian, the art of placing figures or other objects together, whether by entwining them in groups, or forming them into maſſes more nearly or diſtantly appoſed. The word bears the ſame meaning in the arts of deſign as in literature, from which it was moſt probably received, with many other terms, by the Italian artiſts at the revival of learning. Although in its moſt ſimple ſenſe it is only ſyntheſis, or joining together; yet, in its extended acceptation, it comprehends the production, order, and fitneſs of all the parts contained in the whole. The firſt elements, therefore, are invention and ſentiment; the invention ſhould be new and copious, affording an abundant choice of beautiful parts according to the ſubject, whether there be many figures or one only; the ſentiment muſt be juſt and ſtriking; according to the rule "feel yourſelf if you would make others feel;" this muſt pervade every part of the character of the figures; their action or paſſion expreſſed to the points of their fingers and toes as well as in the very folds of their drapery.

The order of compoſition contains the divine, heroic, and hiſtoric. The divine contains all ſublime and terrific ſubjects of divinities, angels, departed ſouls, and infernal miniſters. The heroic, according to the ancients, conſiſts of thoſe mortals, ſaid to have one mortal and one immortal parent. The hiſtoric claſs contains the whole ſeries of human life, in which however the moſt exalted perſons and circumſtances are always to be preferred.

The arrangement muſt be dramatic, repreſenting an action; becauſe ſentiment only affects the countenance of the figure prior to action, and words cannot be expreſſed by mute figures; therefore the ſentiments and paſſions muſt be demonſtrated by the action, in which the figures partake. The principal perſon muſt have the moſt diſtinguiſhed place, whilſt the inferiors occupy ſubordinate gradations; thus in "Prometheus chained;" Prometheus occupies the firſt intereſt and place, whilſt Force, Strength, and Vulcan are gradually inferior, although linked in the ſame group. If the hero or heroine of the ſubject be not entwined in the ſame group with other figures, he or ſhe will ſtill be diſtinguiſhed by a preferable ſituation to thoſe in which the inferior perſons are placed; this rule is obſerved in all the beſt pictures of the Herculaneum collection. In the antique baſſo-relievos and painted vaſes, and in the beſt works of antiquity, we ſcarcely ever ſee more figures introduced than ſuch as are ſufficient to tell the ſtory, and for this reaſon that the expreſſion may be the ſtronger, being leſs divided.

Outline. The general outlines of a compoſition, whether it conſiſt of one or more groups, ſhould be agreeable to the eye, which is produced by a ſucceſſion of curves of different ſegments alternately reverſed; or, in other words, a ſucceſſion of S. lines of different curvatures and dimenſions. Theſe will be more gentle in tender and graceful ſubjects, ſuch as the Triumphs of Nymphs, Naiads, and Sea Divinities, the Judgment of Paris, &c. In the antique baſſo-relievos, theſe curves become more violent with a mixture of angles in ſubjects of great exertion, ſuch as the War of the Giants, the Battles of the Lapithæ and Centaurs, the Athenians and Perſians. See Stuart's Athens, vol. iii. Muſeum Pium Clementinum. Baſſo-relievos. In the fine antique groups, as the Laocoon, Niobe and her Daughter, Cupid and Pſyche, and the Fauns and Nymphs, the lines are incatenated (chained) as it were linked into each other in whatever view they are ſeen.

Light and Shadow. Sculpture is not like painting, ſeen and forced on our perception, by the variety and brilliance of its colours. On the contrary, it has properly no colour at all; and its forms are underſtood by the effect of light and its privation, with the degrees of their medium called middle tint; theſe, in fact, produce the all of ſculptural forms to the eye, becauſe no ſuch thing as outline really exiſts, and when we ſpeak of it or uſe it, it is only to demonſtrate form geometrically. Light and ſhadow will be continually varied in the varied forms of the human figure. If ſeen abroad in the open air, or illumined from a ſky-light within doors, the light will ſtrike moſt powerfully on the head and breaſt, and gradually with leſs force on the lower part of the body and inferior limbs as they approach nearer to the earth. If the figure be recumbent, or in an horizontal poſition, thoſe parts will have moſt light which are neareſt to the luminary. If the figure be inverted, the bottoms of the feet will have the ſtrongeſt lights, which will gradually diminiſh as they approach the head; and conſequently all thoſe parts which are ſhadowed, when the figure is upright, will be lightened in this poſition, and *vice verſâ*. It muſt be remembered that, as the human figure partakes of globular forms, ſome one part will be lighter than the reſt, and that light will be brighteſt in one point. It will be found that figures in ſculpture are almoſt covered with middle tint, having a ſmall portion of bright light neareſt the luminary, with a very few dark and ſtrong ſhadows which relieve particular projections. Baſſo-relievos preſent the general effect of darkiſh figures on light back-grounds; in diſtribution of quantity, of both lines and form, that will be moſt agreeable which is inherent in the nature of things, which pervades all creation, and is more particularly evident in muſical proportion of 3ds, 5ths, and 8ths, with their ſubdiviſions and relative quantities.

We muſt however obſerve, that the rules for compoſition, like all other rules laid down for liberal art, will only aſſiſt genius; they will never produce any thing without the vigorous exertion of mental powers and manual induſtry in the ſubtle inveſtigation and diligent imitation of nature; all muſt be done by ſympathy and beautiful repreſentation; rules may be compared to the ſcaffold for raiſing a building. We muſt therefore remember that the beauties of nature are alſo various as they are endleſs, and from them only we can furniſh ourſelves with original materials for compoſition, by continually obſerving the expreſſion of ſentiment and paſſion in men, women, and children; the characters of their faces, the forms and action of their limbs, their draperies, and the manner in which the direction of the folds obſcures or indicates the bodies or limbs, in the grouping of figures; the entwining of the limbs ſhould be carefully obſerved, and the planes in which the different parts of the bodies and limbs are directed.

In the liberal arts, the ſentiment of a compoſition applies to our ſympathetic feelings, as the invention ſurprizes and delights by its novelty, and both together animate the maſs as a body is animated by the ſoul; and as no compoſition would be complete or intereſting without them, ſo when theſe vital principles are obtained, great care ſhould

men; but always in the neighbourhood of extenſive and ſolitary woods, to which they may flee in the hour of danger."

It is ſtated by the ſame writer that. "the deer, like other cattle, riſe in the bone by good keeping; and the breed degenerates when the paſture is poor. When the deer enjoyed the extenſive range of the moſt fertile valies, and were fed undiſturbed, by the moſt luxuriant graſs, he ſuppoſes they muſt have been larger in both horn and hoof, than at preſent, while baniſhed to the receſſes of the higheſt mountains, and compelled to live on ſuch coarſe fare as they can find on the mountain's brow."

Theſe animals are well ſuited as ſtock for large parks and other ſimilar grounds; and it is ſuggeſted, in the report noticed above, that there are no "ſpecies of tame animals that are more elegant in their appearance, if they be well ſelected, than the fallow deer, or better ſuited for occupying an extenſive lawn, which ſtretches round the caſtle of a great man."

It is remarked in the Report on Agriculture for the County of Hertford, that "the earl of Clarendon, juſtly conſidering that there is no more impropriety in converting one animal to profit than another, makes deer an object of huſbandry. As ſoon as the rutting ſeaſon is over, or uſually about the tenth of November, his Lordſhip ſelects from the herd, the weak ones, ſome of which would probably die in the winter, and keeps them in a ſmall yard that has a ſhed on one ſide, and a net over the whole, againſt pigeons, &c.; the ſpot very warm and well ſheltered. Their horns are immediately ſawn off, the place is well littered, and they are fed at a very ſmall expence, on pea ſtraw, hay, &c. warmth making up for the want of better food. At times during the winter, they have clover hay cut into chaff, and if they do not eat it well, a little ſalt is added. They have always plenty of water, and are kept perfectly clean: much attention ſhould be paid by the keeper, to make himſelf familiar with them, that he may enter the place without diſturbing them. The firſt week in March he gives them oil cake; about half a cake each a day, with chaff, which fattens them ſo quickly, that all are gone in May. Before killing, they have ſome green meat given, to take away any ill flavour from the cake, ſuppoſing ſuch to be the effect of the food. for it is certain that the veniſon is exceedingly good. As to weight, a haunch uſually weighs about twenty-four pounds; a brace are ſold for fifteen guineas: the ſkin worth 2*l.* 2*s.* is the keeper's perquiſite; ſo that the value of a brace amounts to 17*l.* 17*s.* excluſive of ſome trifling articles. The purchaſer ſends for them. His lordſhip uſually fattens nine brace: his whole winter ſtock riſes to three hundred and fifty head, in a park of two hundred and fifty acres, but much of it is thickly covered with timber; thirty ſheep, and ten cows alſo feed in it. The park conſumption of hay amounts to thirty-two loads, being reduced to that quantity by the uſe of much browſe; all aſh, elm, and Scotch fir, being brought for that purpoſe before faggoting, which not only ſaves hay, but improves the flavour of the veniſon."

The writer of the work mentioned above ſtates in addition that he had, "from various information, conceived that breeding deer for ſale was a very unprofitable buſineſs; but the circumſtance ſtated in this account, of ſelecting ſuch as would probably die, or be unprofitable to keep, places the eſtimate of advantage in quite a new light: thus conſidered he thinks, the ſpeculation ſeems a profitable one. It is not uncommon to hear of great winter loſſes of deer in parks, for want of a ſyſtem in which ſuch can be applied to advantage: nothing of this ſort can be well done, that is not in a regular courſe; but, by this practice, every deer which, from ſeverity of ſeaſon, or from accident, would be loſt, is converted to a great profit; as in ſuch caſes the expence of fattening is a trifle, the greater burthen of bringing them to an age for ſale, not belonging to the account of this ſyſtem. Some, it is obſerved, have fattened well, that have had their legs broken by accident."

Mr. Young remarks that, on the manure being mentioned, he made the common objection, that deer's dung is good for nothing; but this lord Clarendon conceives to be a great error: his lordſhip had an experiment made to aſcertain it; he manured for turnips, two lands; one with ſtable dung, one with deer's dung, and he left a third without manure; the two manured were nearly equal, if any difference, it was in favour of the deer; the other of courſe was much inferior. There are loop-holes in the fence through which they are ſhot. This is conſidered as a ſimple ſyſtem of management, in this branch of farming, by which much profit is capable of being derived from an animal which has hitherto been ſcarcely regarded by the farmer.

DEER-*field*, a park or place where deer are kept.

DEER-*hays*, engines, or great nets, made of cords, to catch deer. Anno 19 Hen. VII. cap. 11.

DEER's-*horns*, in *Natural Hiſtory*, are foſſile remains, bearing a conſiderable reſemblance to the horns of ſtags; ſome of theſe, found imbedded in tufa, or modern concretions of calcareous matter, as at Matlock-Bath, and at Alport in Derbyſhire, are of immenſe ſize, although pretty cloſely reſembling recent deer's horns in other reſpects. Many extraneous foſſils have been denominated deer's-horns, which are in reality the caſts of branched coraloid ſubſtances. See STAG's *Horns*.

DEER-*neck*, in *Rural Economy*, a term in the language of the breeder, which denotes a thin ill-formed neck, as applicable to horſes, neat-cattle, ſheep, &c.

DEER-*ſtealers*, in *Law*. There are ſeveral ſtatutes for the puniſhment of deer-ſtealers; as 1 Jac. I. cap. 27. againſt ſellers and buyers of deer, who are to forfeit 40*s.*—13 Car. II. cap. 10.—3 and 4 W. and M. cap. 10.—5 Geo. I. cap. 15 and 28.—9 Geo. I. cap. 22. See BLACK *Act*. 10 Geo. II. cap. 32.—28 Geo. II. c. 19. 16 Geo. III. c. 30.

By ſtat. 5 Geo. I. c. 28. wounding or killing deer in a park is puniſhable with tranſportation. By 9 Geo. I. c. 22, to hunt, wound, kill, or ſteal any deer, in the king's foreſts or chaſes incloſed, or in any other incloſed place where deer have been uſually kept; or by gift or promiſe of reward to procure any perſon to join in ſuch unlawful act: all theſe are felonies without benefit of clergy. But the principal ſtatute for the puniſhment of deer-ſtealers, is the 16 Geo. III. c. 30., which enacts, that if any perſon ſhall hunt or take in a ſnare, or kill or wound, any red or fallow deer in any foreſt, chaſe, &c. whether incloſed or not; or in any incloſed park, a paddock, &c. or be aiding in ſuch offence, they ſhall forfeit 20*l.* for the firſt offence, and alſo 30*l.* for each deer wounded, killed, or taken. A game-keeper offending, incurs the penalty of double forfeiture. For a ſecond offence thoſe who are guilty ſhall be tranſported for 7 years. Juſtices may grant warrants to ſearch for heads, ſkins, &c. of ſtolen deer, and for toils, ſnares, &c.; and perſons having ſuch in their poſſeſſion, forfeit from 30*l.* to 10*l.*, at the diſcretion of the juſtices. Perſons unlawfully ſetting nets or ſnares, forfeit for the firſt offence from 10*l.* to 5*l.*; and for every other offence from 20*l.* to 10*l.* Perſons pulling down pales, or fences of any foreſt, chaſe, park, paddock, wood, &c., are ſubject to the penalties annexed to the firſt offence for killing deer. Dogs, guns, and engines may be ſeized by park-keepers; and perſons reſiſting ſhall be tranſported

tranſported for 7 years. Penalties may be levied by diſtreſs, in default of which offenders are to be committed for 12 months. No *certiorari* to be allowed, unleſs the party convicted become bound to the proſecutor in 100*l.* to pay him all coſts and damages, and to the juſtice in 60*l.* to proſecute the *certiorari* with effect, &c. &c. Proſecutions are limited to 12 months from the time of the offence committed. By ſtat. 28 Geo. II. c. 19, deſtroying gorze, furze, and fern in foreſts and chaces, being the covert for deer, ſubjects the offenders to a penalty from 5*l.* to 40*s.* or to three months' impriſonment. For further particulars, ſee GAME and LARCINY.

DEERFIELD, in *Geography*, a poſt-town of America, in Cumberland county, and ſtate of New Jerſey; 178 miles from Waſhington.—Alſo, a very pleaſant poſt-town in Hampſhire-county, and ſtate of Maſſachuſetts, ſeated on the weſt bank of Connecticut river, from which the compact part of the town is ſeparated by a chain of high hills. It lies in the midſt of a fertile country, and has a ſmall inland trade. The compact part of the town includes from 60 to 100 houſes, and a handſome congregational church, and the number of inhabitants is 1531. An academy, incorporated in 1797, under the name of "the Deerfield academy," is eſtabliſhed in this town, diſtant from Waſhington 430 miles N.E. —Alſo, a well-ſettled agricultural town in the county of Rockingham, and ſtate of New Hampſhire, formerly a part of the townſhip of Nottingham; 19 miles S. E. of Concord, and 35 N.W. of Portſmouth; containing 1878 inhabitants, and incorporated in 1766.—Alſo, a river called *Pocomtic*, which riſes in Bennington county, Vermont, and unites a number of ſtreams from the adjoining towns on entering Maſſachuſetts; thence winding in an eaſterly direction, it receives North-river, and diſcharges itſelf into Connecticut river between the townſhips of Greenfield and Deerfield. On its banks are tracts of excellent meadow ground.

DEERING, a townſhip of America, in Hillſborough county, and ſtate of New Hampſhire, incorporated in 1774; containing 1244 inhabitants, and diſtant 15 miles S.W. of Concord, and 54 miles W. of Portſmouth.

DE ESSENDO *quietum de tolonio*, in *Law*, a writ that lies for thoſe who are by privilege freed from the payment of toll, on their being moleſted. Nat. Br. fol. 226.

DE EXPENSIS MILITUM, a writ commanding the ſheriff to levy four ſhillings *per* day, to defray the expences of a knight of the ſhire attending in parliament. See KNIGHT.

There is a like writ *de expenſis civium & burgenſium*, to levy two ſhillings per day for every citizen and burgeſs in parliament. 23 Henry VI. cap. 14. See BURGESS.

DE FACTO, ſomething actually in fact, or exiſting; in contradiſtinction to *de jure*, where a thing is only ſo in juſtice, or equity, but not in fact.

After the revolution, the retainers of the abdicated king inſiſted much on the difference between a king *de jure* and *de facto*, or a prince in actual but not legal poſſeſſion of the crown, and another who had the right but not the poſſeſſion. The non-jurors held the pretender for king *de jure*; and only allowed king George for king *de facto*.

DEFAIT, or DECAPITE', a term uſed by the French *Heralds* to denote a beaſt whoſe head is cut off ſmooth; in which it differs from eraſed, where the head is, as it were, torn off, and the neck left ragged.

DEFALCATION, from the French *defalquer*, to *diminiſh*, denotes the deduction or ſubtraction of a ſmall ſum, in matters of account, from a large one.

DEFAMATION, in *Law*, is when a perſon ſpeaks ſcandalous words of another, or of a magiſtrate, &c. whereby they are injured in their reputation; for which the party offending ſhall be puniſhed, according to the nature and quality of the offence; ſometimes by action on the caſe at common law, ſometimes by ſtatute, and ſometimes by eccleſiaſtical law. But defamation is alſo puniſhable by the ſpiritual courts; in which courts it ought to have three incidents; firſt, it is to concern matters ſpiritual, and determinable in the eccleſiaſtical courts; as for calling a man heretic, ſchiſmatic, adulterer, fornicator, &c. Secondly, that it be a matter ſpiritual only; for if the defamation concern any thing determinable at the common law, the eccleſiaſtical judges ſhall not have conuſance thereof. And thirdly, though ſuch defamation be merely ſpiritual, yet he that is defamed cannot ſue for damages in the eccleſiaſtical courts, but the ſuit ought to be only for puniſhment of the fault by way of penance. Terms de Ley, 224, 225.

DEFAMATORY, a term chiefly uſed in the phraſe defamatory libel, ſignifying a writing intended to ſcandalize or diſcredit a perſon, &c.

By the Roman law, and the ancient ordonnances of France, the authors of defamatory libels were puniſhed with death. See Balduin. Comment. ad Leges de Libellis famoſis.

But the hiſtorian tells us, that cardinal Ximenes was inſenſible to all defamatory libels; he found it but reaſonable to leave inferiors the liberty of venting their grief by writings, which only live while the perſon is offended at them, and loſe all their ſpirit and malignity when deſpiſed or diſregarded.

DEFAN, CAPE, in *Geography*, the laſt cape of the ſhore of Abyſſinia, before you run into the ſtraits of Babelmandeb; it is called by the Portugueſe *Cape Daſui*. This, ſays Mr. Bruce, has no meaning in any language; the Abyſſinians, on whoſe ſide it is, call it *Cape Defan*, or the cape of Burial, probably becauſe the eaſt wind drove aſhore thoſe who had been ſhipwrecked in the voyage. See GARDEFAN.

DEFAULT, in *Law*, non-appearance, before a court of juſtice, at a day aſſigned, or an omiſſion of what a perſon ought to do. (Bract. lib. v. tract. 3. Co. Litt. 259.) If a plaintiff makes default in appearance in a trial at law, he will be non-ſuited; and where a defendant makes default, judgment ſhall be had againſt him by default. See JUDGMENT, and NONSUIT. By default of a defendant, he is ſaid to be generally out of court to all purpoſes, but only that judgment may be given againſt him; and no judgment can be afterwards given for the defendant. (1 Nelſ. Abr. 628.) Suffering judgment to go by default is an admiſſion of the contract declared on. (Stra. 612.) After the inqueſt is taken by default, the defendant can make no ſuggeſtion on the roll. (Str. 46.)

Jurors making default in their appearance for trying of cauſes ſhall loſe and forfeit iſſues, unleſs they have a reaſonable excuſe proved by witneſſes, in which caſe the juſtices may diſcharge the iſſue for default. Stat. 35 Hen. VIII. c. 6. See JURY.

DEFEASANCE, or DEFEAZANCE, (from the French *defaire*, to *defeat*,) is of two ſorts; 1. A collateral deed, made at the ſame time with a feoffment or other conveyance, containing certain conditions, upon the performance of which the eſtate then created may be *defeated*, or totally undone. In this manner mortgages were in former times uſually made; the mortgager infeoffing the mortgagee, and he at the ſame time executing a deed of defeazance, whereby the feoffment was rendered void on repayment of the money borrowed at a certain day. And this, when executed at the ſame time with the original feoffment, was conſidered as part of it by the ancient law (Co. Litt. 236); and, therefore, only indulged; no ſubſequent ſecret accommodation of a ſolemn conveyance,

veyance, executed by livery or ſeiſin, being allowed in thoſe days of ſimplicity and truth; though, when uſes were afterwards introduced, a revocation of ſuch uſes was permitted by the courts of equity. But things that were merely executory, or to be completed by matter ſubſequent, (as rents, of which no ſeiſin could be had till the time of payment; and ſo alſo annuities, conditions, warrranties, and the like) were always liable to be recalled by defeazances made ſubſequent to the time of their creation. (Co. Litt. 237.) 2. A defeazance, on a bond, or recognizance, or judgment recovered, is a condition, which, when performed, defeats or undoes it, in the ſame manner as a defeazance of an eſtate beforementioned. It differs only from the common condition of a bond, in that the one is always inſerted in the deed or bond itſelf; the other is made between the ſame parties by a ſeparate, and frequently a ſubſequent deed. (Co. Litt. 237. 2 Sand. 47.) This, like the condition of a bond, when performed, diſcharges and diſencumbers the eſtate of the obligee. To make a good defeazance it muſt be, 1. By deed; for there cannot be a defeazance of a deed without a deed; and a writing under hand doth not imply it to be a deed. 2. It muſt recite the deed it relates to, or at leaſt the moſt material part thereof. 3. It is to be made between the ſame perſons who were parties to the firſt deed. 4. It muſt be made at the time of, or after, the firſt deed, and not before. 5. It ought to be made of a thing defeaſible. 1 Inſt. 236. 3 Lev. 234.

DEFEAT, in a *Military Acceptation*, relates to the inability of an army to reſiſt the attack of another, and its yielding the field to the ſuperior power of its adverſary. Such we may, for the moſt part, conſider to be the juſt definition of this term; and we may, generally ſpeaking, view a defeat as being attended with certain loſſes and diſadvantages. But we have numerous inſtances on record, wherein it appears that armies driven from the field, have retired under ſuch reſpectable circumſtances, and with their power ſo perfectly compacted, as to render it imprudent, nay impracticable, to purſue, or to follow up the victory. It is, in fact, under the circumſtance of inability to maintain his ground, that a general's abilities will become moſt conſpicuous. If the arrangement has been made merely upon a curſory view of the field, and without due conſideration in regard to a poſſibility of being compelled to give way, the defeat will probably be general, and fatal. If the plan has been well digeſted, and the different commanders have received inſtructions regarding their conduct in caſe of diſaſter, either to their own diviſions, or among thoſe in other parts of the army, the defeat will, in all probability, be merely a retreat; a ceſſation from attack; the abandonment of ſome particular poſt, no longer tenable; or ſome ſuch partial diſadvantage; and the whole will take a new poſition, according to previous arrangement, ſo as to make up for the failure in ſome degree, by checking purſuit, and avoiding the neceſſity of totally relinquiſhing the field. Sham defeats have occaſionally been uſed as devices for alluring troops from ſtrong holds, or for cauſing a part of the enemy's line to puſh forward in purſuit of the ſuppoſed fugitive corps; ſo that the imprudent followers might be ſuddenly flanked by parties, concealed for the purpoſe, or detached from other parts of the line; and advantage be taken of the break or vacancy, thus occaſioned in the enemy's line. Sham defeats are, however, very hazardous; it being difficult to inſpire retiring troops with confidence, or to make them rally, and return to the charge, at the preciſe moment when their doing ſo would render them certain of victory. If it were poſſible, or prudent, always to caution the body, which ſhould appear to be defeated, of the intention, ſucceſs would probably be ſecured; but amidſt the innumerable occurrences of the day, and when ſmoke and noiſe debar the poſſibility of general communication, much more of individual inſtruction, it becomes impoſſible to diſpenſe the neceſſary precautions. A commander, doubtful of the ſucceſs of an attack, ſhould defer it to a late hour; ſo that he may, if defeated, afford leſs time for the enemy to take advantage of his misfortune.

DEFECTION, the act of abandoning, or relinquiſhing, of a party, or an intereſt, a perſon had been engaged in.

The word is formed of the Latin *deficio*, *to fail of*.

DEFECTIVE, or DEFICIENT *Nouns*, in *Grammar*, are ſuch as want either a whole number or a particular caſe, or are totally indeclinable.

The term defective is alſo applied to a verb that has not all its moods and tenſes.

DEFECTIVE *Third*, in *Muſic*. See DIMINISHED *Third*, and DEFICIENT.

DEFECTIVE *Fifth*. When upon the firſt inverſion of the mixed cadence, the fifth of the ſubmediant (or fourth of the ſcale) is accidentally ſharpened, the chord of the extreme ſharp fixth is formed, the radical baſe of which is the ſupertonic of the key, and its fifth is allowed to be flat or defective, that the original minor mode may not be totally deſtroyed. See Callcott's Muſ. Gram. 219.

DEFECTIVE *Scale*. Dr Smith has applied this name to a ſyſtem of temperament deſcribed by him, wherein the major thirds and fifths beat equally quick, the former ſharp, and the latter flat; in which eight fifths in aſcending from C, and three fifths deſcending from the ſame note, are each flattened about $\frac{5}{23}$ parts of a comma, leaving a wolf between $\flat$ A and $\flat$ E, wherein the fifth is ſharpened $14\frac{7}{23}s + 1\frac{2}{23}m$. See TEMPERAMENT.

The term defective ſcales is ſometimes applied generally to all the douzeanes, or ſyſtem wherein only 12 notes are uſed within the octave.

DEFECTUM, *Challenge Propter*. See CHALLENGE.

DEFENCE, in a *Military Acceptation*, means the reſiſtance made by an inferior force, or by troops that have taken poſt within a fortified place, or that have thrown up temporary works to protect them from aſſault. The immenſe variety of circumſtances attendant on the defences of various poſts would lead us into volumes of digreſſion on hiſtorical ſubjects; we ſhall, however, ſtate, that in the event of proviſions, and warlike ſtores in general being at hand, there are few ſituations which do not admit of conſiderable protraction in regard to the term, or period, of reſiſtance. Without looking back to ancient data, when the famous ſiege of Troy attracted the attention of all the then civilized ſtates, we may refer our readers to modern events ſufficiently eminent, and exemplary, to claim the notice of thoſe who may be intereſted in this branch of honourable emulation. Perhaps we may be correct in ſtating the defence of Turin, when beſieged by the French, and defended by marſhal count Daun, to be one of the moſt brilliant exploits recorded in the annals of military hiſtory. With a very few battalions, but firmly ſupported by the public ſpirit and private eſteem of the inhabitants, he held out for near ſeven months, againſt a force of full ſeventy thouſand men, although the defences of the town were in many parts completely demoliſhed, and the greater part of the interior deſtroyed by the enemies' mortar batteries. Under ſuch circumſtances, with a perſon leſs endued with courage and reſolution, and a mind leſs capable of finding reſources in ſituations promiſing no ſupply or means of repulſion, Turin would infallibly have ſurrendered; but the count's ingenuity was equal to the diffi-

culty

culty of his ſituation, and enabled him to deviſe means for upholding the honour of his ſovereign's arms, in ſpite of the formidable attack which inceſſantly poured deſtruction around the brave handful of defenders. The count had, in the firſt inſtance, cauſed an exact inventory to be taken of all the ſtores, proviſions, merchandiſe, &c. in the town, when the enemy firſt ſat down before it. His active mind was buſied in contriving the means of appropriating every thing within the walls to their defence. Among other articles of merchandiſe were ſome thouſand bales of cotton, and a large quantity of oils. When the breach became practicable, and the enemy came to the aſſault, a quantity of the cotton, previouſly ſteeped in oil, was ſet fire to, and thrown in ſmall parcels among the ſtorming party, whoſe ammunition took fire in their pouches, and exploded, while their perſons were miſerably ſcorched by the unprecedented miſſiles; this being often repeated, the aſſailants were abſolutely diſheartened, and diſcontinued their aſſaults; converting the ſiege into a blockade. From this ſtate the brave defenders were relieved by the approach of prince Eugene, who raiſed the ſiege.

It is worthy of remark, that, by this determined defence, an army of ſeventy thouſand men was, in fact, loſt to its ſovereign for a whole campaign; while a very heavy expence, and loſs in various reſpects, neceſſarily reſulted. Hence we ſee the importance of a garriſon holding out to the laſt, and cauſing a diverſion in favour of troops acting in another quarter. With what feeling muſt the ſenſible mind contemplate the conſequences of an oppoſite conduct on the part of our allies within the laſt two years; when fortreſſes, hitherto judged impregnable, ſurrendered in many inſtances without even the ſhew of reſiſtance.

Need we uphold for an example the wonderful manner in which the brave Elliot defeated the efforts of the combined armies and navies of France and Spain, to force the ſurrender of Gibraltar! Hiſtory may record, but cannot do juſtice to, the defence made by our countrymen, not exceeding 5400 in the total, againſt upwards of 100,000 choſen men, ſupported by a numerous fleet, and in poſſeſſion of a thouſand comforts and neceſſaries, of which the garriſon were wholly deprived! We will not in this place anticipate the proceedings on that occaſion, which will be found under the head GIBRALTAR, but ſtate a recent inſtance of energy and contrivance on the part of one of Holkar's generals; a man ſuppoſed to be little acquainted with the ſcience of defence; and whoſe practice among the native powers of India, could ſcarcely claim the deſignation of experience.

When Bhurtpoor was inveſted by the army under the late lieutenant-general lord Lake, a breach had been made, which was judged practicable; *i. e.* large enough to admit the ſtorming party. The Indian general had, however, availed himſelf of the preſence of a large ſtore of raw hides, which he placed in the breach, their ends pointing inwards and outwards, in ſo artful a manner, that our grape ſhot were buried among them, and cauſed one of our parties, that proceeded to the ſtorm, to paſs the breach, miſtaking it (in the night time) for an unbattered part of the wall. It is remarkable that Bhurtpoor never ſurrendered; and, that, although a treaty was concluded under its walls, the implied ſubmiſſion of its garriſon was not underſtood.

But, as above remarked, it would not be prudent for us to enter on ſo wide a field of exemplification as the ſubject may admit; we ſhall therefore conclude with obſerving, that genius, bravery, foreſight, and fortitude, will often oppoſe ſuch formidable barriers, even where the means, ſuperficially conſidered, appear very inadequate, or indeed inſignificant, as may at leaſt retard, if not totally fruſtrate, the operations of great and well ſupplied armies. The veteran cannot but acknowledge this truth as reſulting from his own obſervation, while the tyro in the military art may, in the annals of his profeſſion, find multitudes of inſtances yielding him a rich harveſt of information, and warming his ſoul with admirable emulation.

DEFENCE, *Line of*, is that which flanks a baſtion, being drawn from the flank oppoſite to it.

The line of defence ſhould not exceed a muſket-ſhot.

The *greater*, or *fichant*, line of defence, is a right line, drawn from the point, or vertex, of the baſtion, to the concourſe of the oppoſite flank with the curtin.

The *leſſer* line of defence, called alſo *raſant*, and *flanquant*, is the face of the baſtion continued to the curtin.

DEFENCE, in *Old Law-Books*, is ſometimes uſed for prohibition.

Thus in Rot. Parl. 21 Edw. III. cries and defence were made throughout England, *i. e.* proclamation and prohibition. *Salmones ponantur in* defenſo. Stat. Weſt. 2. cap. 47. Salmons are by that act prohibited to be taken at certain times. *Uſurarios* defendit *rex Eduardus, ne remanerent in regno.* LL. Edu. Confeſſ. cap. 37. In the ſtatutes of Edward I. we have one, entitled, *Statutum de* defenſione *portandi arma*, &c. and it is defended by law, to diſtrain on the high-way.

This ſenſe of the word was probably borrowed from the French, in which language it is ſo applied.

DEFENCE, in its true legal ſenſe, denotes an oppoſing or denial of the truth or validity of the complaint, anſwering to the *conteſtatio litis* of the civilians. It is a general aſſertion which the defendant makes immediately after the count or declaration, that the plaintiff hath no ground of action; which aſſertion is afterwards extended and maintained in his plea.

The courts were formerly very nice and curious with reſpect to the nature of the defence, ſo that if no defence was made, though a ſufficient plea was pleaded, the plaintiff ſhould recover judgment (Co. Litt. 127.); and therefore the book entitled "Novæ Narrationes," or the "New Talys," (ed. 1534.) at the end of almoſt every count, *narratio*, or tale, ſubjoins ſuch defence as is proper for the defendant to make. For a general defence or denial was not prudent in every ſituation, ſince thereby the propriety of the writ, the competency of the plaintiff, and the cognizance of the court were allowed. By defending the force and injury the defendant waved all pleas of miſnomer; by defending the damages, all exceptions to the perſon of the plaintiff: and by defending either one or the other *when and where* it ſhould behove him, he acknowledged the juriſdiction of the court. (Co. Litt. 127.) But of late years theſe niceties have been very deſervedly diſcountenanced (Salk. 217. Ld. Raym. 282.); though they ſtill ſeem to be law, if inſiſted on. (Caith. 230.) A defendant cannot plead any plea before he hath made a defence; though this muſt not be intended abſolutely, for in a *ſcire facias*, a defence is never made. (3 Lev. 182.)

DEFENCE-*month* is more uſually called Fence-month. See FENCE-*month*.

DEFENCES, in *Heraldry*, are the weapons of any beaſt; as, the horns of a ſtag, the tuſks of a wild boar, &c.

DEFENCES *of a fortified Place*, include the various works intended either to cover the garriſon, or to annoy an enemy. This term comprehends a great variety of buildings, excavations, &c. for the explanation of which we muſt generally refer our readers to the heads of *Military* CONSTRUCTION and FORTIFICATION; wherein all the parts, with their ſeveral

intentions, appropriations, and proportions, will be fully exhibited. In this place we ſhall ſtate, that the defences of regular fortifications are claſſed under two diſtinct heads; *viz.* the body of the place, as delineated by an out-line called the *principal*; and the exterior defences called the *out-works*.

It is a rule held ſacred, in the theory of the art, that the defences ſhould ever be exactly proportioned to the object in view, and to the number of men that can be allotted as a garriſon. We are to take into conſideration the number of yards the defences preſent as a front, the quantity of ordnance they mount, the means of ſafely lodging the troops, and ſheltering the proviſions and ſtores requiſite for a long ſiege; the ſupply of water is alſo a primary object towards the ſecurity of which the defences muſt to a certain degree conform.

Thus we ſhould underſtand, that the defences ought never to exceed that extent which could be well manned by ſuch a garriſon as could be lodged and proviſioned; and that the garriſon ought not to exceed the reaſonable value of the occupancy. For want of due attention to theſe truly important points, it has, more than once, happened that the beſt conſtructed works have proved inefficient. The diſtribution of the various defences, ſo as to form a mutual ſupport, without ſubjecting the principal, or body of the place, to annoyance from ſuch parts as might be cut off, and poſſeſſed by the enemy, is called the *defilement*, (which ſee,) and is an indiſpenſible conſideration while planning the out-works. Whatever may be their extent, it is neceſſary, that, though temporary, ſafe lodgment ſhould be furniſhed in all out-works for the defenders, and their ſupplies; while the more retired, and concentrating parts of the fortreſs, ſhould become gradually more ſubſtantial, more elevated, and more conveniently arranged for the reception of ſuch of the defenders as may be driven in from the out-works: it being obvious, that were this precaution neglected, each diviſion of troops muſt ſurrender with the part allotted to its defence, or retire within the principal, where its preſence would create confuſion, diſeaſe, and ſcarcity.

DEFEND, Defendere, in our *Ancient Laws* and *Statutes*, ſignifies to prohibit or forbid. See Defence. 5 Rich. II. cap. 7. In which ſenſe alſo Chaucer uſes it, in the following paſſage:

> "Where can you ſay, in any manner, age,
> That ever God *defended* marriage."

See alſo Milton's Parad. Loſt, book ii. line 86.

DEFENDANT, a term in *Law*, ſignifying him who is ſued in an action perſonal; a tenant is he who is ſued in an action real.

DEFENDEMUS, a term uſed in grants and donations, having this force, that it binds the donor and his heirs to defend the donee, if any man go about to lay any incumbrance on the thing given, other than is contained in the deed of donation. Bract. lib. ii. c. 16. See Warranty.

DEFENDER of the Faith, (*Fidei Defenſor,*) is a peculiar title belonging to the king of England; as *Catholic* to the king of Spain; and *Moſt Chriſtian* formerly to the king of France, &c. Theſe titles were given by the popes of Rome; and that of *fidei defenſor* was firſt conferred by Leo X. on king Henry VIII. for writing againſt Martin Luther; and the bull for it bears date quinto idus Octob. 1521. It was afterwards confirmed by Clement VII. (Lord Herbert's Hiſt. of Henry VIII. 105.) But the pope, on Henry's ſuppreſſing the houſes of religion at the time of the Reformation, not only deprived him of his title, but depoſed him from his crown alſo: though, in the thirty-fifth year of his reign, this title, &c. was confirmed by parliament; and hath continued to be uſed by all ſucceeding kings to this day. (Lex Conſtitutionis, 47, 48.) Chamberlayne ſays, the title belonged to the kings of England before that time; and for proof hereof appeals to ſeveral charters granted to the univerſity of Oxford! So that pope Leo's bull was only a renovation of an ancient right. Preſ. ſtat. lib. i. cap. 2.

DEFENDERE Unica manu, to wage law, by denying the accuſation upon oath. "Et ſi forte forisfactor ille factum negaverit & foreſtarius ſolus ſit ſine teſte, ille debet ſe defendere unica manu ad unicam vocem rationabili die data in curia abbatis, & ſi unicum teſtem vel plures habuerit, debet ſe defendere ſexta manu, &c." Charta facta inter W. de Bray, mil & Abb. & Convent, de Oſeney, ſine dat. See Manus.

DEFENDERS were anciently notable dignitaries, both in church and ſtate; whoſe buſineſs was to look to the preſervation of the public weal, and to protect the poor and helpleſs, and to maintain the intereſts and cauſes of churches and religious houſes.

The council of Chalcedon, can. 2. calls the defender of a church, εκδικος. Codin. De Officiis Aulæ Conſt. makes mention of defenders of the palace; ſo does Bollandus, Act. S. Januar. tom. i. p. 501. There were alſo a defender of the kingdom, *defenſor regni*; defenders of cities, *defenſores civitatum*; defenders of the people, *defenſores plebis*; of the poor, fatherleſs, widows, &c.

About the year 420, each patriarchal church began to have its defender; which cuſtom was afterwards introduced into other churches, and continued to later days under other names; as thoſe of advocate and advouee. See Advocate, and Advouee.

In the year 407, we find the council of Carthage aſking the emperor for defenders, of the number of ſcholaſtici, *i. e.* advocates who were in office; and that it might be allowed them to enter, and to ſearch the cabinets and papers of the judges, and other civil magiſtrates, whenever it ſhould be found neceſſary for the intereſt of the church.

DEFENDING, in *Fortification*, is ordinarily ſynonymous with flanking. Thus we ſay the flank defends the curtin, and the oppoſite face of the baſtion; this demilune flanks, or defends the horn, or crown-work.

When they ſay the flank defends the curtin, they mean not only that it is aſide of the curtin, but, alſo, that it prevents the approaches: that is, ſuch as are poſted on the flank of a baſtion, can ſee any that come to attack the curtin; and can ſhoot them, or prevent their approaching it.

Defending-*Angle, Inner*, is the angle made by the leſſer line of defence with the curtin.

Defending-*Angle, Outer*, is the angle formed by the two leſſer lines of defence.

The lines, or ſides, of the rampart or wall, defended by muſkets or carbines, are more eaſy, cheap, and commodious, than cannons.

DEFENSITIVE, in *Surgical Pharmacy*, is a term applied to ointments, plaſters, and other applications, the uſe of which is merely to defend the ſurface, to which they are applied, from receiving injury by any accident, or from being irritated by cauſtic or by acrid diſcharges and the like.

DEFENSIVE-Allegation, in *Law*. See Allegation.

DEFENSO, that part of any open field or place, that was allotted for corn and hay, and upon which there was no common or feeding, was anciently ſaid to be *in defenſo*: ſo of any meadow ground that was laid in for hay only. It

was likewiſe the ſame of a wood, where part was encloſed and fenced up to ſecure the growth of the underwood from the injury of cattle.

DEFENSOR. See ADVOCATE.

DEFERENS VAS, in *Anatomy*, the tube which conveys the ſemen from the epididymis to the urethra. It aſcends along the back of the ſpermatic chord, enters the abdomen at the abdominal ring, takes its courſe ſubſequently over the ſide and under part of the bladder, and then penetrates the proſtate gland and urethra. For a further account of it, ſee GENERATION, *Organs of*.

DEFERENT, or DEFERENS, in the *Ancient Aſtronomy*, a circle invented to account for the eccentricity, perigee, and apogee of the planets.

As the planets are found differently diſtant from the earth, at different times, it was ſuppoſed, that their proper motion was performed in a circle, or ellipſis, which is not concentric with the earth; and this eccentric circle, or ellipſis, they call the deferent; becauſe, paſſing through the centre of the planet, it ſeemed to ſupport or ſuſtain it in its orbit.

The deferents are ſuppoſed differently inclined to the ecliptic, but none more than eight degrees, excepting that of the ſun, which is in the plane of the ecliptic itſelf, and is cut differently by the deferents of the other planets in two places called nodes.

In the Ptolemaic ſyſtem, the ſame deferent is alſo called the deferent of the epicycle; becauſe it traverſes the centre of the epicycle, and ſeems to ſuſtain it.

DEFERTINES, in *Geography*, a ſmall town of France, in the department of the Allier, three miles N. E. of Montluçon.

DEFESCH, in *Biography*, a German muſical compoſer and performer on the violin, who came to England about 1739, and frequently led the band at Marybone. He was a good contrapuntiſt, and a voluminous writer, but his productions were in general dry and unintereſting.

Mrs. Clive, after a quarrel and battle with Dr. Arne, behind the ſcenes of Drury-lane theatre, would perform none of the doctor's muſic; and when he had new ſet the Tempeſt, and prepared for her his charming air in the part of Ariel, "Where the bee ſucks," ſhe refuſed to ſing it, and employed Defeſch to ſet the ſame words, and whatever elſe ſhe had to perform in all her parts, which was a greater loſs to the public, than diſgrace to Dr. Arne, who was as ſuperior to Defeſch in genius, as Mingotti was to Clive in the art of ſinging. Yet ſo little do we know our own powers, that though ſhe was a moſt admirable and original actreſs in ſuch comic parts as Nell in "The Devil to Pay," and Mrs. Heidelberg, in the "Clandeſtine Marriage," ſhe never was ſo happy as when ſhe played lady Townley, and was attempting to ſing fine ſerious Italian ſongs: though ſhe had neither ear, voice, nor knowledge of muſic, ſo that had Defeſch's ſongs been leſs dull than they uſually were, they would never have been ſung into public favour by Mrs. Clive.

DEFIANCE. See CHALLENGE.

DEFIANCE, in *Geography*, a fort in the ſtate of Ohio, ſituated on the point of land formed by the confluence of the rivers of Au Glaize, and the Miami of the lake, nearly in the midway between fort Wayne on the Miami, and lake Erie. N. lat. 41° 41'. W. long. 84° 43'.

DEFICIENT INTERVAL, in *Muſic*, is uſed for an interval leſs than the true by a comma. See INTERVAL.

DEFICIENT *Numbers*, are ſuch whoſe parts added together make leſs than the integer, whoſe parts they are. See NUMBER.

Such *e. gr.* is 8; whoſe quota parts are 1, 2, and 4; which, together, only make 7. See ABUNDANT *Number*.

DEFICIENT *Hyperbola* is a curve of that denomination, having only one aſymptote, and two hyperbolic legs running out infinitely towards the ſide of the aſymptote, but contrary ways. (See CURVE.) This name was given to the curve by Newton in his "Enumeratio Linearum tertii ordinis." Of theſe there are 6 different ſpecies, which have no diameters, expreſſed by the equation $xyy + ey = -ax^3 + bx^2 + cx + d$, the term ax^3 being negative. When the equation $ax^4 = bx^3 + cx^2 + dx + \frac{1}{4}ee$ has all its roots real and unequal, the curve has an oval joined to it. When the two middle roots are equal, the oval joins to the legs, which then cut one another in the ſhape of a nooſe. When three roots are equal, the nodus is changed into a very acute cuſp or point. When, of three roots with the ſame ſign, the two greateſt are equal, the oval vaniſhes into a point. When any two roots are imaginary, there is only a pure ſerpentine hyperbola, without any oval, decuſſation, cuſp, or conjugate point; and when the terms b and d are wanting, it is of the 6th ſpecies. There are alſo 7 different ſpecies of theſe curves, having each one diameter, expreſſed by the above equation, when the term ey is wanting, according to the various conditions of the roots of the equation $ax^3 = bx^2 + cx + d$, as to their reality, equality, their having the ſame ſigns, or two of them being imaginary.

DEFILE, in the *Military Acceptation*, is a narrow way or path, admitting only of a few perſons (ſometimes indeed only one) proceeding a-breaſt; and uſually ſerving as the road through wilderneſſes, mountainous countries, &c. The term is derived from the thread given by Ariadne to Theſeus when he entered the celebrated labyrinth of Dædalus, king of Crete, for the purpoſe of, according to the modern term, "unthreading" the paſſage by which he had entered. Hence, when an army proceeds through cloſe countries, wherein they cannot perform evolutions, and are compelled to march by files, *i. e.* with a very narrow front, not exceeding three or four abreaſt, it is ſaid to "file off," or to "defile." Defiles are very often confounded with paſſes, though there is a very obvious diſtinction; for a defile may be of any extent, even to the length of thirty or forty miles, whereas a paſs more properly ſpeaking relates to ſome particular ſpot; like the Thermopylæ, where three hundred Greeks ſufficed to arreſt the progreſs of the hoſt, hiſtory ſays near a million, with which Xerxes threatened to over-run their country. We may form a more correct idea of the nature of defiles, if we recollect, that in the early part of the French revolution, when general Moreau was hemmed in by the Auſtrians on the borders of the Black Foreſt, he retreated through that immenſe wilderneſs towards Conſtance, cutting roads and opening paſſages by manual labour for his cannon and baggage waggons; thus his army *defiled* through the Black Foreſt, to the admiration of all Europe. From this explanation it will be ſeen that *paſſes* are defences, chiefly natural, which offer more or leſs difficulty at particular localities, while ſuch mazes as render the paſſage of troops confined and difficult, by their ruggedneſs, cloſe arborage, and meandering courſe amidſt a variety of impediments, are to be conſidered as *defiles*.

DEFILEMENT, in *Fortification*, ſignifies the branching forth of various outworks in their proper directions, ſo that the one may ſerve to ſupport the other, while, at the ſame time, all the defences depending exteriorly on any face or front, of the principal, or body of the place, may be under the command and fire of the more centrical batteries, &c., in order that the more detached parts, when carried by the enemy, may not afford a ſafe lodgment, but be open to the enfilade, or to the direct fire, of the principal.

Our readers muſt be ſenſible, that in proportion as con-

centric circles become more remote from their common centre, they neceſſarily acquire a greater perimeter, or circumference; conſequently, the outworks cover a far greater meaſurement of area, than the body of the place. This extenſion admits of, and demands a greater variety of flanks, &c, than could be deſcribed, on a proper ſcale, within a more circumſcribed ſpace. But, in the formation of ſuch exterior defences, it requires no ſmall art (we ſpeak of level ground) to arrange the whole in ſuch manner as may form a perfect ſyſtem of mutual defence, without giving the enemy a ſhelter, or eventually even a battery, from which he may be enabled to annoy the garriſon. Want of care in this particular has been fatal to many fortified places.

Fortreſſes ſituated on ground interſected by heights, or commanded by elevated batteries, are leſs in danger from the want of that defilement which is indiſpenſable in ordinary inſtances; but there muſt, in every caſe, be due regard paid to the mutual ſupport of out-works, and particular care muſt be taken to conſtruct batteries in thoſe parts which may be leaſt acceſſible, and have the greateſt range; in ſuch parts the defences ought to be adapted, not only to the general defence, but to the expulſion of the enemy from ſuch works as they may chance to carry. This, in fact, is a ſpecies of defilement, though not on that ſyſtematic plan which is prevalent in all the modern ſyſtems of regular fortification.

To DEFILE, to go off file by file. See FILE.

The army began to defile on the left, and was forced to defile at each end of the field, on account of the moraſſes and the woods.

DEFINITE, in *Grammar*, is applied to an article that has a preciſe determinate ſignification.

Such are the articles *the* in Engliſh, *le* and *la* in French, &c. which fix and aſcertain the noun they belong to, to ſome particular; as *the* king, *le* roy; whereas, in the quality *of* king, *de* roy, the articles *of* and *de*, mark nothing preciſe; and are therefore called indefinite. See ARTICLE.

DEFINITION, in *Logic*, an enumeration of the chief ſimple ideas whereof a compound idea conſiſts; in order to aſcertain or explain its nature and character.

The ſchoolmen give very imperfect notions of definition. Some define it the firſt notion, or conception, that ariſes of a thing, whereby it is diſtinguiſhed from every other, and from which all the other things, that we conceive of it, are deduced; but the uſual definition of it is, *oratio explicans quid res eſt*, a diſcourſe explaining what a thing is: that is, as ſome farther explain it, a diſcourſe ſetting forth thoſe attributes which circumſcribe and determine the nature of a thing. For, to explain is only to propoſe the parts ſeparately and expreſsly, which were before propoſed conjunctly and implicitly; ſo that every explication has regard to ſome whole. Hence, according to the diverſe kinds of parts in any thing, *viz.* phyſical parts, metaphyſical parts, &c. ariſe ſo many different kinds of definitions of the ſame thing; thus, man is either defined an animal, conſiſting of ſoul and body; or, a reaſonable animal, &c.

Definitions are of two kinds; the one *nominal*, or, *of the name*: the other *real*, or, *of the thing*.

DEFINITION *of the name*, or *nominal* DEFINITION, is that which explains the ſenſe or ſignification appropriated to a word: or, as Wolfius more accurately conſiders it, it is an enumeration of certain marks, or characters ſufficient to diſtinguiſh the thing defined from any other thing; ſo as to leave it out of doubt, what the ſubject is that is intended, or denoted by the name. This is what is meant by definition in mathematics.

Such is the definition of a ſquare, when it is ſaid to be a quadrilateral, equilateral, rectangular figure.

By definition of the name, is either meant a declaration of the ideas and characters appropriated to the word in the common uſage of the language; or the peculiar ideas, &c. which the ſpeaker thinks fit to denote by that word, *i. e.* the ſpecial ſenſe wherein he propoſes to uſe it, in his future diſcourſe. For it may be obſerved that the ſignificancy of any word depends entirely on our will; and we may affix what idea we pleaſe to a ſound, which itſelf ſignifies nothing at all.

The definition of the name, therefore, in the ſecond ſenſe, is merely arbitrary, and ought never to be called in queſtion; only it is to be minded, that we keep inviolably to the ſame ſignification. Hence, a definition comes to ſtand, or to be made uſe of as an undoubted, or ſelf-evident maxim; as it frequently does, and particularly among geometricians, who, above all other people, make uſe of ſuch definitions.

Not that we mean, that after having defined a thing ſo and ſo, there is nothing in our idea affixed to the defined term, but muſt be granted to the thing itſelf; thus, if any one ſhould define heat to be a quality in certain bodies, like that which we feel upon the application of fire, or hot bodies; no man could find fault with the definition, as far as it expreſſes what he means by the word heat; but this does not hinder us from denying that there is any thing in the body that warms us, like what we feel in ourſelves.

DEFINITION *of the thing*, or *real* DEFINITION, is properly an enumeration of the principal attributes of a thing, in order to convey or explain its nature.

Thus, a circle is defined a figure, whoſe circumference is every where equidiſtant from its centre.

Wolfius defines a real definition to be a diſtinct notion, explaining the geneſis of a thing, that is, the manner wherein the thing is made or done; ſuch is that of a circle, whereby it is ſaid to be formed by the motion of a right line round a fixed point. On which footing, what was before inſtanced as a real definition of a circle, amounts to no more than a nominal one.

This notion of a real definition is very ſtrict and juſt; and affords a ſufficient diſtinction between a real and a nominal one. But though it has the advantages of analogy, diſtinctneſs, and conveniency on its ſide; yet, being only itſelf a nominal definition, *i. e.* a definition of the term real definition, we muſt conſider it in that light, that is, an idea fixed arbitrarily to that word, and which the author always denotes by that word in the courſe of his book. But, in effect, it is not the uſual ſenſe, or acceptation of the term; which is much leſs convenient and diſtinct. And it is to that uſual acceptation we are here chiefly to have regard.

Definitions are alſo divided into *accurate* and *inaccurate*; the firſt make what we ſtrictly call a definition; the ſecond, we diſtinguiſh under the name of *deſcription*.

Of the parts enumerated in a definition, ſome are common to other things beſide the thing defined; others are peculiar thereto: the firſt are called the *genus* or *kind*; and the ſecond the *difference*. Thus, in the former definition of a circle, by a figure, whoſe circumference is every where equidiſtant from its centre; the word *figure* is the *kind*, as being a name common to all other figures, as well as the circle; the reſt are the difference which ſpecify, or diſtinguiſh this figure from every other figure. And hence ariſes that rule of F. de Colonia, for the making of a definition. "Take," ſays he, "ſomething that is common to the thing *defined* with other things, and add to it ſomething that is proper, or peculiar to the thing; *i. e.* join the genus and ſpecific difference, and you will have a definition." Thus, *e. gr.* rhetoric is defined the art of ſpeaking well; for that it is an art, is common to it with ſeveral other things; but that it is the art of ſpeaking well, is peculiar to it alone.

There

There are five common rules of a good definition. 1. That it be clear, and more eaſy and obvious than the thing defined. 2. That it be univerſal, or adequate to the thing defined; that is, it muſt agree to all the ſpecies or individuals included under the ſame idea. 3. That it be proper or peculiar to the thing defined. The two ordinary defects of definitions are, not to agree either to the whole thing, or the ſole thing defined: neque omni, neque ſoli: than which nothing is more common, even among the beſt and juſteſt authors. 4. That it be ſhort. And 5. That neither the thing defined, nor a mere ſynonymous name, make any part of the definition.

Lord Bacon obſerves of Ariſtotle's definitions in the general, that they are very much like that, whereby man ſhould be defined an animal that tills the ground. Nor was his maſter Plato leſs exceptionable. The joke put upon him on that account is famous: Plato, it ſeems, had defined man, *animal bipes & implume*, a two-footed animal without feathers. Upon which, Diogenes the cynic, a great derider of the academics, threw a cock ſtripped of his feathers, and quite naked, into the middle of Plato's ſchool; crying, "Here is Plato's man."

Our definition of ſubſtances, it muſt be added, are very defective: and as for individuals, we have no definitions at all. The ideas of ſubſtances are compounded of the various ſimple ideas, jointly impreſſed when they preſent themſelves; and all we can do to define them, is only to enumerate thoſe ſeveral ſenſible ideas, as colour, denſity, malleability, weight, &c. Thus gold is defined by ſuch a peculiar colour, gravity, &c. Yet ſuch definitions may raiſe an idea clear enough of that ſubſtance in the mind of one who has ſeparately received, by his ſenſes, all the ſimple ideas that are in the compoſition of the complex idea defined; though the intimate nature and eſſence of ſubſtance are unknown, and conſequently cannot be defined.

It follows, that they are only the modes, or attributes, that can be explained by what we properly call a definition.

DEFINITION, in *Rhetoric*, is one of the common places, and is defined by Tully, a ſhort comprehenſive explanation of a thing.

The definitions of the orator, it muſt be obſerved, differ much from thoſe of the logician and philoſopher: theſe latter define a thing cloſely and drily by genus and difference, *e. g.* man is a reaſonable animal, &c.

The orators take a larger compaſs, and define things more ornamentally from the places of rhetoric, thus: man is a curious work of an Almighty Creator, framed after his own image, and endued with reaſon, and born for immortality. But this rhetorical definition, in ſtrictneſs, comes nearer to the nature of a deſcription than an accurate definition.

DEFINITIVE is applied to ſomewhat that terminates or decides a queſtion, or proceſs. Thus we ſay:

The houſe of lords have paſſed a definitive ſentence in ſuch a cauſe: the church has given a definitive judgment on ſuch an article of faith.

The word ſtands in oppoſition to proviſional, and interlocutory.

DEFINITIVE *Pronoun*, in *Grammar*. See DEMONSTRATIVE.

DEFINITIVES, denote, according to the arrangement of Mr. Harris, one of the four ſpecies of words; or ſuch as are ſignificant by relation, called by others articles. See ARTICLE.

DEFINITOR, a term uſed in ſeveral religious orders, for an aſſeſſor, or counſellor of a general, or ſuperior in certain monaſteries.

In moſt orders of religious, the definitor takes place after the ſuperior of the convent he lives in, when in the convent itſelf; but out of the convent, the definitor's place is before his own ſuperior.

Definitors are alſo ſubject in the convent where they reſide, to the immediate ſuperior of the convent, as to things relating to the monaſtic diſcipline, but in nothing elſe.

DEFLAGRATION, in *Chemiſtry*, is uſually applied to any rapid combuſtion ſpreading through any mixture accompanied with much evolution of flame and vapour. Thus nitre deflagrates when thrown on hot coals, or mixed with charcoal and fired. When accompanied with a loud noiſe it is termed *detonation*.

DEFLECTION, the turning any thing aſide from its former courſe, by ſome adventitious or external cauſe.

The word is often applied to the tendency of a ſhip from her true courſe, by reaſon of currents, &c. which divert her, and turn her out of her right way.

DEFLECTION *of light*. See INFLECTION *of light*.

DEFLECTIVE FORCES, (from *deflecto*, Latin, to bend, to turn aſide,) are thoſe forces which act upon a moving body in a direction different from that of its actual courſe, in conſequence of which the moving body is deflected from its original courſe, *viz.* is obliged to deviate from that direction in which it would move if not acted upon by any of thoſe forces. Thus a ball projecting horizontally from a cannon, would move in a ſtraight line if the force of gravity did not deflect it from that direction. See CENTRAL, or CENTRIPETAL, and CENTRIFUGAL *forces*.

DEFLORATION, or DEFLOWERING, the act of violating or taking away a woman's virginity.

Death, or marriage, are decreed by the civil law in caſe of defloration. Many anatomiſts make the hymen a real proof of virginity, perſuaded that where it is not found, the girl muſt have been deflowered. See HYMEN.

The ancients had ſo much reſpect for virgins, that they would not put them to death, till they had firſt procured them to be deflowered. On the contrary the natives of the coaſt of Malabar hold virginity in ſo little eſtimation, that they pay ſtrangers to come and deflower their brides. Among the Scots, it was a privilege of the lords of the manor, that they ſhould have the firſt night's lodging with their tenant's wives. King Malcolm III. allowed the tenants to redeem this ſervice at a certain rate, called marcheta, conſiſting of a certain number of cows. Buchanan ſays, it was redeemed with half a mark of ſilver. The ſame cuſtom had place alſo in Wales, Flanders, Frieſland, and ſome parts of Germany. See BOROUGH-ENGLISH.

By the cuſtom of Anjou and Maine, a maid, after twenty-five years of age, may ſuffer herſelf to be deflowered, without being diſinherited for it by her father.

Du-Cange quotes an arret of the nineteenth of March, 1409, obtained by the inhabitants of Abbeville, againſt the biſhop of Amiens, for taking money to diſpenſe with an injunction he had made, not to ſuffer them to conſummate their marriage the three firſt nights; the injunction being founded on a canon of the fourth council of Carthage, which decrees the ſame, out of reverence of the matrimonial benediction.

DEFLUVIUM, is uſed to expreſs a diſtemper in trees, whereby they loſe their bark; it is thought to be cauſed by a ſharp humour, that diſſolves the glue whereby the bark is faſtened to the wood, and ſometimes by too much drought.

DEFLUXION, in *Medicine*, from *defluo*, *I flow down*, a term uſed by the older writers to denote an increaſed diſcharge of fluids from any particular part, as from the noſtrils, in *coryza*, and from the trachea and bronchial paſſages in-

in *catarrh*, with which the word is ſynonymous. It was originally uſed, it would ſeem, to expreſs the collection of humours in the part, which were ſuppoſed to *flow down* to it from ſome other part. Thus Celſus conſiders the diſorders, juſt named, as occaſioned by a *defluxion* of humours from the head to the noſe, throat, and lungs reſpectively, lib. iv. cap. 4. de Medicina. Almoſt every inflamed part was conſidered as the ſeat of a defluxion of this kind; the morbid ſecretions, which were the conſequence and production of the inflammatory action of the veſſels of the part, being ſuppoſed to be the cauſe of the diſorder. See CONCOCTION and CATARRH. Hence the truth of ſome of the ancient prognoſtic aphoriſms; as when it is affirmed, that defluxions on the lungs are dangerous, theſe defluxions including peripneumony and pulmonary conſumption; and that defluxions on the eyes, that is, ophthalmia in its various forms, occaſion weakneſs of ſight and often blindneſs.

DE-FOE, DANIEL, in *Biography*, the ſon of James Foe, a butcher by trade, was born about the year 1663, and it is by no means fairly aſcertained why Daniel aſſumed the prefix De to his family name. He was educated at Newington Green, and exhibited an early taſte for literature. As an author, he publiſhed, before he had attained the age of manhood, a political pamphlet; and diſplayed his regard to the cauſe of liberty and the Proteſtant religion by joining the inſurrection of the duke of Monmouth, but by a happy addreſs he eſcaped to the metropolis unnoticed. In the way of trade, he was unſucceſsful, and became inſolvent, but to his honour, it muſt be recorded, that after he had been legally freed from his debts, by a compoſition, he paid moſt of them upon a fortunate change of circumſtances. He had the ambition of being an inventor, and publiſhed an octavo volume, entitled, "An Eſſay on Projects." In the year 1701, he publiſhed "The true-born Engliſhman," a ſatire which excited a conſiderable ſhare of attention. The object of this work was to reply to thoſe who were perpetually abuſing king William and his friends as foreigners, by ſhewing that the then exiſting race of Engliſhmen was ſo mixed and heterogeneous, as to be able to lay claim to no native purity of blood. One of his next pieces was a ſatire, entitled "Reformation of Manners," which contains, among other things, an invective againſt the ſlave trade. He is ſuppoſed to have been the writer of "A Memorial to the Houſe of Commons," uſually denominated the "Legion Letter," which is a manly and ſpirited cenſure of the conduct of that aſſembly in reference to the Kentiſh petition. In the year 1702, when the high church party was inclined to perſecute the diſſenters, De-Foe publiſhed "The ſhorteſt Way with the Diſſenters, or Propoſals for the Eſtabliſhment of the Church." For this he was tried and convicted, and was ſentenced to fine, impriſonment, and the pillory. No part of the judgment was mitigated, and ſo far from being aſhamed of his fate, he wrote "A Hymn to the Pillory." During his impriſonment he publiſhed a periodical work, entitled "The Review," which contained the news of the day, and is ſaid to have given the hint of the Tatler, and the other celebrated papers of Steele and Addiſon. He did not finiſh the period of his impriſonment in Newgate, but was liberated at the interceſſion of Harley, afterwards earl of Oxford, and the queen herſelf afforded aſſiſtance to him and his family. Soon after his liberation he publiſhed, by ſubſcription, his "Jure divino" in 12 books, the object of which was to expoſe the doctrine of the divine right of kings, and to decry tyranny. By the government he was employed in aiding the union with Scotland, and after the important meaſure was completed, he drew up and publiſhed a hiſtory of it in folio. De-Foe thought his great fort was irony, and in many inſtances it muſt be acknowledged that he was ſucceſsful; but on the acceſſion of the houſe of Hanover, he made uſe of the ſame weapon ſo very awkwardly that his publications were taken for libels in favour of the pretender, and he was tried and impriſoned on their account. About the year 1715, he commenced a new ſtyle of writing, and publiſhed "The Family Inſtructor," which has been highly regarded for its excellent moral tendency. But the moſt diſtinguiſhed of the works of Daniel De-Foe is, "The Life and Adventures of Robinſon Cruſoe," which was firſt publiſhed in 1719. This work is too well known to every Engliſh reader to ſtand in need of being characteriſed here. It has paſſed through as many editions as almoſt any book in our language of the ſame ſtanding, and muſt long continue to be the favourite book in the juvenile library. "Religious Courtſhip" is another of Mr. De-Foe's works, which is of a tendency very ſimilar to that of his "Family Inſtructor." He could unite the ſerious and the gay with admirable effect; "A Journal of the plague Year," though a fiction, was written in ſo very natural and intereſting a manner, that it was taken by Dr. Mead for real hiſtory. Beſides the works already mentioned, De-Foe was the author of many others, of which an account is given in the Biographia Britannica. He died on the 26th of April, 1731, in the pariſh of St. Giles's, Cripplegate, leaving behind him a widow and ſeveral children. De-Foe poſſeſſed much merit as a citizen, and as a writer. His proſe works are much more valuable than his poetical performances. As a political writer, he had great merit; his ſentiments appear to have been generally juſt, and he expreſſed himſelf with force and perſpicuity. His pieces on the ſubject of trade and commerce, place him in the foremoſt rank among his contemporaries. "Were we," ſays his biographer, "to compare De-Foe with Davenant, it would be found that Davenant has more detail from official documents; that De-Foe has more facts from wider inquiry. Davenant is more apt to conſider laws in their particular application; De-Foe more frequently inveſtigates commercial legiſlation in its general effects. From the publications of Davenant it is ſufficiently clear, that he was not very regardful of the means, nor very attentive to the conſequences; De-Foe is more correct in his motives, and more ſalutary in his ends." Biog. Brit.

DEFOLIATA. See DECIDUOUS and LEAF.

DEFORCEMENT, in *Law*, a withholding lands or tenements, by force, from the right owner. (Co. Litt. 277) In this extenſive ſenſe it includes an abatement, an intruſion, a diſſeiſin, or a diſcontinuance, as well as any other ſpecies of wrong, whereby he that hath a right to the freehold is kept out of poſſeſſion. But as contradiſtinguiſhed from theſe, it is only ſuch a detainer of the freehold, from him that hath the right of property, but never had any poſſeſſion under that right, as falls not under any of thoſe terms. As in caſe where a lord has ſeignory, and lands eſcheat to him *propter defectum ſanguinis*, but the ſeiſin of the lands is withheld from him; here the injury is not *abatement*, for the right veſts not in the lord as heir or deviſee; nor is it *intruſion*, for it veſts not in him who hath the remainder or reverſion; nor is it *diſſeiſin*, for the lord was never ſeized; nor does it at all bear the nature of any ſpecies of *diſcontinuance*; and it muſt, therefore, be a *deforcement*. (F. N. B. 143.) If a man marries a woman, and, during the coverture, is ſeized of lands, and alienes, and dies; is diſſeiſed and dies; or dies in poſſeſſion; and the alienee, diſſeiſor, or heir, enters on the tenements, and doth not aſſign the widow her dower; this is alſo a deforcement to the widow, by withholding lands to which ſhe hath a right. (F. N. B. 147.) In like manner, if a man

leaſe

leaſe lands to another for a term of years, or for the life of a third perſon, and the term expires by ſurrender, efflux of time, or death of the *ceſtuy que vie;* and the leſſee, or any ſtranger, who was, at the expiration of the term, in poſſeſſion, holds over, and refuſes to deliver the poſſeſſion to him in remainder or reverſion, this is likewiſe a deforcement. (Finch. L. 263. F. N. B. 201—5, 6, 7.) Deforcements may alſo ariſe upon the breach of a condition in law; as if a woman gives lands to a man by deed, to the intent that he marry her, and he will not when thereunto required, but continues to hold the lands; this is ſuch a fraud on the man's part, that the law will not allow it to diveſt the woman's right of poſſeſſion; though, his entry being lawful, it does diveſt the actual poſſeſſion, and thereby becomes a deforcement. (F. N. B. 205.) Deforcements may be alſo grounded on the diſability of the party deforced; as if an infant makes an alienation of his lands, and the alienee enters, and keeps poſſeſſion; now, as the alienation is voidable, this poſſeſſion as againſt the infant (or, in caſe of his deceaſe, as againſt his heir) is, after avoidance, wrongful, and, therefore, a deforcement. (Finch. L. 264. F. N. B. 192.) The ſame happens, when one of non-ſane memory alienes his lands or tenements, and the alienee enters and holds poſſeſſion, this may alſo be a deforcement. (Finch. L. 264. F. N. B. 202.) Another ſpecies of deforcement is, where two perſons have the ſame title to land, and one of them enters and keeps poſſeſſion againſt the other; as where the anceſtor dies poſſeſſed of an eſtate in fee-ſimple, which deſcends to two ſiſters as coparceners, and one of them enters before the other, and will not ſuffer her ſiſter to enter and enjoy her moiety; this is alſo a deforcement. (Finch. L. 293, 294. F. N. B. 197.) Deforcement may be alſo grounded on the non-performance of a covenant-real; as if a man ſeiſed of lands, covenants to convey them to another, and neglects or refuſes ſo to do, but continues poſſeſſion againſt him; this poſſeſſion, being wrongful, is a deforcement (F. N. B. 146.); whence, in levying a fine of lands, the perſon, againſt whom the fictitious action is brought upon a ſuppoſed breach of covenant, is called the deforciant. And, laſtly, by way of analogy, keeping a man by any means out of a freehold office is conſtrued to be a deforcement; though, being an incorporeal hereditament, the deforciant has no corporeal poſſeſſion. So that whatever injurious withholding the poſſeſſion of a freehold is not included under *abatement, intruſion, diſſeiſin,* or *diſcontinuance,* is compriſed under *deforcement.* Blackſt. Com. vol. iii. p. 174.

DEFORCEMENT, in the law of Scotland, is uſed for the reſiſting, or offering violence to the officers of the law, while they are actually employed in the exerciſe of their functions, by putting its order and ſentences in execution; whether they be officers of the ſupreme courts of juſtice, as heralds, purſuivants, meſſengers, macers; or of inferior courts, as mayors.

The puniſhment of this crime is confiſcation of moveables, joined with ſome arbitrary puniſhment; as fine, impriſonment, baniſhment, or corporal pains, according to the degree of violence, and other circumſtances which aggravate the crime; beſides, the party aggrieved may have an action of damages, to be highly taxed out of the firſt and readieſt of the offender's eſcheat, or other eſtate. See Bayne's Criminal Law.

Deforcing of officers of the cuſtom-houſe, is provided againſt by the ſame ſtatutes as in England.

DEFORCER, or DEFORCIANT, one that caſts out another from his lands, or tenements, by mere force. See DEFORCEMENT.

DEFORMITY is immediately oppoſed to beauty, and denotes the want of that uniformity, ſymmetry, and variety neceſſary to conſtitute beauty. Accordingly, Dr. Hutcheſon defines it by the abſence of beauty, or a deficiency in the beauty expected in any ſpecies. Deformity and beauty may be conſidered either as natural or moral. Theſe are both referred by the above-mentioned ingenious writer to an internal ſenſe, and our perceptions of them, as he ſuppoſes, ariſe from an original arbitrary ſtructure of our own minds, by which certain objects, when obſerved, are rendered the occaſions of certain ſenſations and affections.

That many objects give no pleaſure to our ſenſe, is obvious. Many are certainly void of beauty; but then, ſays this author, there is no form which ſeems neceſſarily diſagreeable of itſelf, when we dread no other evil from it, and compare it with nothing better of the kind. Many objects are naturally diſpleaſing, and diſtaſteful to our external ſenſes, as well as others pleaſing and agreeable; as ſmells, taſtes, and ſome ſeparate ſounds: but with regard to our ſenſe of beauty, no compoſition of objects which give not unpleaſant ſimple ideas, ſeems poſitively unpleaſant, or painful of itſelf, had we never obſerved any thing better of the ſame kind.

Had there been a ſpecies of the form which we now denominate ugly, or deformed, and had we never ſeen or expected greater beauty, we ſhould have received no diſguſt from it; though the pleaſure would not have been ſo great in this form as in thoſe we now admire. Our ſenſe of beauty ſeems deſigned to give us poſitive pleaſure; but not poſitive pain or diſguſt, any farther than what ariſes from diſappointment.

There are, indeed, many faces which, at firſt view, are apt to raiſe diſlike. But this is generally not from any poſitive deformity, but either from want of expected beauty, or from the carrying ſome natural indications of morally bad diſpoſitions, which we all acquire a faculty of diſcerning in countenances, airs, and geſtures. That this is not occaſioned by any form poſitively diſguſting, appears hence, that if, upon long acquaintance, we are ſure of finding ſweetneſs of temper, humanity, and cheerfulneſs, though the bodily form continues, it ſhall give us no diſguſt. There are horrors raiſed by ſome objects, which are only the effect of fear for ourſelves, or compaſſion towards others, when either reaſon, or ſome fooliſh aſſociation of ideas, makes us apprehend danger, and not the effect of any thing in the form itſelf. For we find that moſt of thoſe objects, which excite horror at firſt, when experience or reaſon has removed the fear, may become the occaſion of pleaſure.

The caſual conjunction of ideas gives us diſguſt, where there is nothing diſagreeable in the form itſelf. And this, in effect, is the cauſe of moſt of our fantaſtic averſions to the figures of diverſe animals, &c. Thus, ſerpents of all kinds, and many inſects, really beautiful enough, are beheld with averſion by many people, who have got ſome accidental ideas of miſchief aſſociated to them. A ſimilar reaſoning is applied to our perception of moral beauty and deformity. Inquiry into the Original of our Ideas of Beauty and Virtue, paſſim.

But it is more juſt to diſtinguiſh between the ſentiments of delight or diſguſt, excited in us by beautiful or deformed objects, which are effects of ſome cauſes, and the natural and real qualities of the perceived objects by which they are produced. There are objects, ſays an excellent writer, which have a natural aptitude to pleaſe or offend, or between which and the contemplating mind there is a neceſſary congruity or incongruity; and though the actual perception of the underſtanding, and conſequent feeling of the heart, in contemplating

contemplating the actions and affections of moral agents may exiſt in very different degrees, on account of the incidental obſtructions, ariſing from bodily indiſpoſition, mental prejudices and biaſſes, and the aſſociation of ideas; yet, to every rational mind properly diſpoſed, morally good actions muſt for ever be acceptable, and can never, of themſelves offend; and morally evil actions muſt for ever be diſagreeable, and can never of themſelves pleaſe. What is right in actions and characters is beautiful and amiable, and gives pleaſure; what is wrong is deformed and odious, and excites diſguſt: right and pleaſure, wrong and pain, are as diſtinct as cauſe and effect. It is no leſs abſurd to maintain, that the perception of virtue is nothing diſtinct from the reception of the pleaſure reſulting from it, than to infer, with ſome metaphyſicians, that ſolidity, extenſion, and figure, are only particular modes of ſenſation, becauſe attended whenever they are perceived with ſome ſenſations of ſight or touch. Thus does this author ſhew, that moral beauty and deformity are real qualites of certain actions; in which conſiſts their aptitude to pleaſe or diſguſt. With reſpect to natural beauty, he obſerves, that uniformity amidſt variety pleaſes, becauſe of the natures of variety and uniformity, which are ſuch, that, whenever united, they are adapted to pleaſe every free unbiaſſed mind that diſcerns them. He accounts for the pleaſure they afford, without referring them to an arbitrary, internal ſenſe, by the following circumſtances that attend them. They are more eaſily comprehended by the mind: order and ſymmetry give things their ſtability and ſtrength, and ſubſerviency to any valuable purpoſe; regularity and order evidence art and deſign. Diſorder and confuſion, whence deformity ariſes, denote only the negation of regularity and order; or any arrangement and diſpoſition of things, which are not according to a law, rule, or plan, and prove not deſign. Theſe are not poſitively diſpleaſing; except where we previouſly expected order, or where impotence or want of ſkill appear, and the contriver has either failed of his deſign, or executed it ill. See on this ſubject Dr. Price's Review of the principal Queſtions and Difficulties in Morals, ch. ii. paſſim. See an admirable Eſſay on Bodily Deformity, by Mr. Hay, in the Fugitive Pieces, vol. i. p. 93, &c. See BEAUTY.

DEFOSSION, *Defoſſio*, the puniſhment of burying alive, inflicted, among the Romans, on Veſtal virgins guilty of incontinency. It is alſo a cuſtom among the Hungarians to inflict this puniſhment on women convicted of adultery. Heretics alſo were puniſhed in this manner. See BURIAL.

DEFTARDAR, or DEFTERDAR, or *Teſterdar-eſſendi*, the treaſurer of the revenues of the Turkiſh empire, or the miniſter of the finances.

The word is compounded, firſt, of *defter*, a Turkiſh name for a book, regiſter, memoir, &c. which Meninſki derives from the Greek διφθερα, the ſkin or parchment anciently wrote on. The ſecond word, whereof deftardar is compounded, is *dar*, a Turkiſh and Perſian word, ſignifying *keeping* or *holding*, *q. d.* book-keeper of the monies received and expended.

Meninſki calls him *ſupremus theſaurarius*, high treaſurer; and *præſes cameræ*, preſident of the exchequer. Caſtellus makes him the keeper and comptroller of the books of receipts and payments.

The deftardar, or, as Vigenere calls him, dephterderi, has in his charge the rolls and accounts of the militia, and the treaſury: he receives all the grand ſignior's revenues, pays his forces, and furniſhes the expences of all public affairs: in which his office differs from that of khaſné-veliki, a black eunuch, who is charged with the general adminiſtration of the interior imperial treaſure, into which is poured the produce of the confiſcations and inheritances that ſerve for the ſupport of the ſeraglio. The preſents, the effects, the jewels which are ſent by foreign powers, thoſe acquired by conqueſt, the colonies, &c. conſtitute a part of this treaſure. This treaſurer or miniſter of the finances is alſo different from the chaznadar or khaſnadar-aga, who is one of the pages of confidence, and adminiſters the private treaſure of the ſultan, as the others do thoſe of the ſtate and of the ſeraglio. The ſultan's private treaſure, increaſed by the ſavings of the greater number of the ſultans, is ſupported by the profits of the mint, and by ſome confiſcations. The treaſure under the management of the teſterdar-eſſendi conſiſts of the produce of the ſale of the great employments, of that which ariſes from the annual renewal of the barats or firmans, obtained by the zaïms, timariots, and others, the produce of the karatch or capitation-tax on the Jews and Chriſtians, the produce of the farmed domains, that of the cuſtoms, &c. &c.

Ricaut makes a deſtardar, whom he calls teſtardar, in each beglerbeglic, or government. Vigenere aſſures us, there are but two, the one for Europe, and the other for Aſia; the firſt reſides at Conſtantinople, and has under him two general commiſſioners, or deputies, one for Hungary, Tranſylvania, Walachia, Croatia, Servia, Bulgaria, Boſnia, &c. the other for Greece and the Morea, with the iſlands of the Archipelago.

Each of theſe has under him as many ſub-commiſſioners, or agents, as there are ſangiackats in his province; which ſub-commiſſioners have as many clerks as there are aſbaſſis in their ſangiackat, to keep the account of the timariots in their diſtricts. The deſtarder of Aſia has two general deputies, the one for Anatolia; the other for Syria, Arabia, and Egypt: theſe have likewiſe their ſub-agents, clerks, &c. as thoſe of Europe.

DEGAGNAC, in *Geography*, a town of France, in the department of the Lot; $4\frac{1}{2}$ leagues N. of Cahors.

DEGENERATION, the act of failing, or declining from a more perfect, or valuable kind, ſtate, or condition, to an inferior or worſe.

M. Buffon is a ſtrenuous advocate for the degeneration of animals, and he aſcribes it to three cauſes, *viz.* the temperature of the climate, the quality of the food, and the evils produced by ſlavery. Whenever man, he ſays, began to change his climate, and to migrate from one country to another, his nature became ſubject to various alterations, which were greater or leſs in proportion to the diſtance of his removal from the ſituation which he originally occupied. During the lapſe of ages, and after he had traverſed whole continents, intermixing with thoſe who had already degenerated under the influence of different climates; after he was habituated to the ſcorching heats of the ſouth, and the frozen regions of the north; he underwent changes ſo conſiderable and ſo conſpicuous as to furniſh occaſion for ſuſpecting, that the Negro, the Laplander, and the White, were really different ſpecies, if we were not previouſly aſſured, on the one hand, that one man only was originally created, and, on the other, that the White, the Laplander, and the Negro, are capable of uniting and of propagating the great and undivided family of the human kind. Hence he concludes, that thoſe marks which diſtinguiſh men who inhabit different regions of the earth are not original, but purely ſuperficial. It is the ſame identical being, who is varniſhed with black under the torrid zone, and tawned and contracted by extreme cold under the polar circle. Man, he ſays, is the ſame in both the two great continents into which the earth is divided. The Aſiatic, the European,

and the Negro, produce equally with the American; nor can any thing, as this ingenious writer maintains, be a ſtronger proof that they belong to the ſame family than the facility with which they unite to the common ſtock. The blood is different, but the germ is the ſame. The ſkin, the hair, the features, and the ſtature, have varied, without any change in the internal ſtructure. The type is general and common; and if, by any great revolution, man was forced to abandon thoſe climates which he had invaded, and to return to his native country, he would, in the progreſs of time, reſume his original features, his primitive ſtature, and his natural colour. But this effect would be produced much ſooner by the mixture of races. A white male with a black female, or a black male with a white female, equally produce a mulatto, whoſe colour is brown, or a mixture of black and white. This mulatto, intermixing with a white, produces a ſecond mulatto leſs brown than the former; and if the ſecond mulatto unites with a white, the third will only have a ſlight ſhade of brown, which will entirely vaniſh in future generations. Hence, by this mixture, 150 or 200 years are ſufficient to bleach the ſkin of a Negro. The influence of climate produces this change by ſlow degrees, and in a ſeries of ſeveral centuries; but great as this alteration is, it is only ſuperficial. The colour of the ſkin, hair, and eyes, varies by the influence of climate alone. The other changes, ſuch as thoſe of ſtature, figure, features, and quality of the hair, ſeem to require the joint operations of climate and other cauſes. The moſt direct and general of theſe concurring cauſes is the quality of the food. It is chiefly by aliment that man receives the influence of the ſoil which he inhabits; whilſt that of the air and climate acts more ſuperficially. While the climate changes the colour of the ſkin, food acts upon the internal form by its qualities, which are always related to thoſe of the earth by which it is produced. In the ſame country we perceive ſtriking differences between thoſe who occupy the heights and thoſe who inhabit the low grounds. The inhabitants of the mountains are always better made, more lively, and more beautiful, than thoſe of the valley. Hence, in countries remote from the original climate, where the herbs, fruits, grains, and the fleſh of animals, differ both in quality and ſubſtance, the men who feed upon theſe articles muſt, in a courſe of years, undergo ſtill greater changes. But it requires ages, in the conſtant uſe of the ſame food, to change the features, the ſize of the body, and the ſubſtance of the hair, and to produce thoſe internal alterations, which, when perpetuated by generation, become general and permanent characteriſtics which diſtinguiſh the different races and nations that compoſe the aggregate of the human ſpecies.

With regard to brute animals, theſe effects are greater and more ſuddenly accompliſhed; becauſe they are more nearly allied to the earth than man; becauſe their food, more uniformly the ſame, and ſubject to no preparation, has qualities more determinate and of more powerful influence; and becauſe the animals, being unable to clothe themſelves, or to uſe the element of fire, operations which require the ſkill of man, remain perpetually expoſed to the action of the air, and all the inclemencies of the climate. Animals are more fixed in their habitation than man, and continue for a longer interval of time in ſituations that are beſt adapted to their conſtitution. But when they are forced by men, or by any revolution on the globe, to abandon their native ſoil, their nature undergoes changes ſo great, that, in order to recognize them, recourſe muſt be had to accurate examination, and even to experiment and analogy. If to theſe natural cauſes of alteration in free animals, we add that of the empire of man over thoſe which he has reduced to ſlavery, we ſhall be aſtoniſhed at the degree to which tyranny can degrade and diſfigure nature; we ſhall perceive the marks of ſlavery, and the prints of her chains; and we ſhall find, that theſe wounds are deeper and more incurable in proportion to their antiquity; and that, in the preſent condition of domeſtic animals, it is perhaps impoſſible to reſtore their primitive form, and thoſe attributes of nature of which we have deprived them.

M. Buffon examines, in detail, the operation and effect of the cauſes above-ſpecified, and, by ſo doing, exhibits a picture of nature in her preſent condition contraſted againſt what he conceives it to have been before her degradation. The firſt animal, which he contemplates in its original ſtate and in that of its degeneration, is the ſheep, compared with the mouflon, from which the modern animal derives its origin. The mouflon, ſays this author, is a large, ſwift, ſtrong animal, armed with horns and thick hoofs, covered with coarſe hair, and dreading neither the inclemency of the ſky nor the voracity of the wolf. How different from our ſheep, who ſubſiſt with difficulty in flocks, who are unable to defend themſelves by their number, who cannot endure the cold of our winters without ſhelter, and who would all periſh, if man withdrew his protection! Timidity, weakneſs, reſignation, and ſtupidity, are the only melancholy remains of their degraded nature. To obtain fine wool, ſays this ingenious writer, our rams ſhould have Barbary ewes; and to augment the ſize, our ewes ſhould be ſerved with the male mouflon. Our goats might be managed in the ſame manner. By intermixing them with the goat of Angora, their hair might be changed, and rendered equally uſeful as the fineſt wool. In our climate the ſpecies of the goat is not ſo much degenerated as that of the ſheep. It appears to be ſtill more degenerated in the warm countries of Africa and India. The ſpecies of the ox is more influenced by nouriſhment than that of any other domeſtic animal. The influence of food is in general greater, and produces more ſenſible effects upon ſuch animals as feed on herbs or fruits. Carnivorous animals, on the contrary, are leſs affected by this cauſe than by the influence of climate; becauſe fleſh is an aliment already aſſimilated to the nature of the animal by which it is devoured; but graſs is the firſt product of the ſoil, and has all the properties of it; and theſe terreſtrial qualities are immediately communicated to the animal. Accordingly the dog ſpecies, upon which food ſeems to have a very ſlight influence, is more varied than that of any other carnivorous animal. In his degradations, he ſeems to follow exactly the differences of climate. In the warmeſt climates he is naked, covered with a coarſe thick hair in the northern regions, and adorned with a fine ſilky robe in Spain and in Syria, where the mild temperature of the air converts the hair of moſt animals into a kind of ſilk. But independently of the external varieties produced by the influence of climate, the dog is ſubject to other changes, which proceed from his ſituation, his captivity, or the nature of the intercourſe he holds with man. Of all the varieties of dogs, the ſhepherd's dog ſeems to be the leaſt degenerated; and he is likewiſe the moſt uſeful for guarding our flocks, and for the preſervation of good order. His race ought, therefore, to be more multiplied than thoſe of other dogs, who miniſter only to our amuſements, and whoſe number is ſo great that, in every town and village, the proviſions conſumed by them would nouriſh many families. The domeſtic ſtate has greatly contributed to vary the colour of animals, which, in general, was originally brown or black. The dog, the ox, the goat, the ſheep, the horſe, have aſſumed all kinds of colours. The dog has changed from black to white; and pure white, without any ſpots, ſeems to mark the laſt de-

gree of degeneration, and is generally accompanied with eſſential imperfections. All quadrupeds which are abſolutely white have thoſe faults of dullneſs of hearing and red eyes, which are obſervable in the race of white men. This kind of degeneration, though more frequent among domeſtic animals, ſometimes appears among the wild ſpecies, as in thoſe of the elephant, ſtags, fallow-deer, monkeys, moles, and mice; in all which this colour is uniformly accompanied with ſmaller or greater degrees of bodily weakneſs, and bluntneſs of the ſenſes. But ſlavery ſeems to have made the deepeſt and moſt conſpicuous impreſſions on the camel. He is brought forth with bunches on his back, and calloſities on his breaſt and knees. The wild animals, not being under the immediate dominion of man, are not ſubject to ſuch great changes as the domeſtic kinds. Their nature ſeems to vary with different climates; but it is no where degraded. If they were capable of chuſing their climate and their food, the changes they undergo would be ſtill leſs: but as they have at all times been hunted and baniſhed by man, and even by the ſtrongeſt and moſt ferocious quadrupeds, moſt of them have been obliged to abandon their native country, and to occupy lands leſs friendly to their conſtitution. The aſs, though ſubjected to the preſſure of the moſt wretched ſervitude, has undergone few changes; for his nature is ſo obdurate, that it equally reſiſts bad treatment and the inconveniences of a foreign climate and of coarſe food. The elephant is the only quadruped upon which the domeſtic ſtate has had no influence; becauſe, in this ſtate, he refuſes to propagate, and, of courſe, does not tranſmit to his ſpecies the blemiſhes or defects occaſioned by his unnatural condition.

Having ſurveyed the variations peculiar to each ſpecies, M. Buffon directs his attention to the moſt important change of the ſpecies themſelves. This, he ſays, is the moſt ancient degeneration; and it ſeems to have taken place in each family, or in each genus, under which the contiguous ſpecies may be comprehended. By comparing all the quadrupeds, and ranking each under its own genus, this author concludes, that the 200 ſpecies, whoſe hiſtory he has given, may be reduced to a ſmall number of families or principal ſtems, from which all the others have probably derived their origin. All the animals common to both continents, and all thoſe which are peculiar to the Old World, are reduced, by this author, to fifteen genera, and nine ſolitary or detached ſpecies; which he enumerates. Of theſe, ſeven genera and two ſpecies, *viz.* the bear and mole, are common to both continents; and hence he infers, that there remain only eight genera and fifty detached ſpecies, which are peculiar to the Old World. By purſuing the inveſtigation, and enumerating the animals peculiar to the New World, he finds, that there are about fifteen different ſpecies, which may be reduced to ten genera, and four detached ſpecies. Theſe, though they differ from the animals of the Old Continent, have remote relations which ſeem to indicate ſomething common in their formation, and lead us to cauſes of degeneration more ancient, perhaps, than all the others. Accordingly he ſuppoſes, that all the animals of the New World are much ſmaller than thoſe of the Old. This great diminution in magnitude, whatever be the cauſe of it, is a primary kind of degeneration, which could not happen without having a conſiderable influence on the figure of all theſe animals; and in comparing them, we muſt not loſe ſight of this firſt effect. For further particulars we muſt refer to the author himſelf, and to the article CLIMATE in this dictionary.

DEGENERATION *of Plants*, in *Botany*. See PLANTS.

DEGLIGI, in *Geography*, a town of the iſland of Ceylon; 16 miles N.E. of Candy.

DEGLUTITION, in *Phyſiology*, is the act of ſwallowing; or the paſſage of the food, after its maſtication has been performed in the mouth, into the ſtomach.

Moſt animals take their food into the mouth by means of the jaws themſelves; for very few poſſeſs hands. Hence the jaws are much longer in almoſt every quadruped than in man, and are continued, in an elongated and ſlender form, beyond the reſt of the head, to admit of the mouth being opened more widely, and of the food being ſeized more conveniently. They draw in fluids by the action of the tongue, previouſly rendered concave for that purpoſe.

The hands are uſed, in the human ſubject, for introducing both ſolids and fluids into the mouth; although the latter can be taken in by means of ſuction. The harder ſubſtances, being introduced into the mouth in maſſes, which are either too large for ſwallowing, or which would be unfit for the action of the ſtomach in a ſtate of aggregation, are reduced into ſmaller portions, and into a ſofter conſiſtence, by the proceſs of chewing or maſtication. Even the fluid aliments, which do not require this reduction, have to paſs from the mouth to the throat, and require, therefore, the action of particular organs deſtined for their propulſion.

The proceſs of chewing, being a neceſſary preliminary to the act of ſwallowing, will be conſidered in the firſt place. The immediate agents in this function are the two rows of teeth, implanted in the alveolar portions of the upper and lower jaw-bones, acting on the food by means of the motions of the lower jaw; and aſſiſted in their office by the lips, cheeks, and tongue. For the deſcription of the teeth, and of the bones which form the joint of the lower jaw, the reader is referred to the article CRANIUM. Our obſervations on the remainder of the ſubject will include, 1ſt, A deſcription of the joint of the lower jaw; 2dly, An explanation of its motions; and, 3dly, A deſcription of the muſcles which move it. The *mouth*, or cavity in which the act of chewing is performed, will form the next diviſion of the article: and here we ſhall give a deſcription, 1ſt, of the mouth in general; 2dly, of the lips and cheeks, with their muſcles; 3dly, of the palate, ſoft palate, and its muſcles; 4thly, of the tongue and its muſcles, including the os hyoides and the hyoidal muſcles; 5thly, of the ſalivary glands, and other glandular apparatus of the mouth, furniſhing the fluids that ſoften and dilute the food during its maſtication; 6thly, of the paſſage from the mouth into the pharynx, and the propulſion of the food through that opening. The laſt named membranous bag, which receives the food, and drives it downwards to the ſtomach, will form the third part of the article; which will be concluded with an account of the œſophagus, that conveys the food from the pharynx into the ſtomach.

Joint of the lower Jaw.—This articulation is formed between the glenoid cavity and eminentia articularis of the temporal bone on one ſide, and the condyle of the lower jaw on the other. The oppoſed ſurfaces are furniſhed with two thin cartilaginous coverings, of which one is common to the articular eminence of the temporal bone, with that portion of the glenoid cavity which is in front of the fiſſura Glaſeri; and the other belongs to the condyle. The bones are held together by three ligaments; and the joint poſſeſſes alſo a ſynovial membrane, and an interarticular cartilage. The external ligament ariſes from the root of the zygomatic proceſs of the temporal bone, deſcends obliquely backwards, and is attached to the outer part of the neck of the condyle. It conſiſts of cloſely united parallel ſhining fibres, and adheres firmly to the capſule and interarticular cartilage. The internal ligament, which is not ſo ſtrong and diſtinct as the former, is continued obliquely downwards and forwards, from the ſpinous proceſs of the ſphenoid bone to the orifice of

of the canal of the lower jaw. The ſtylo-maxillary ligament can ſcarcely be conſidered as having any concern with the articulation. It is a thin and ſmall aponeurotic chord, extended from the ſtyloid proceſs to the angle of the lower jaw, where it is fixed between the inſertions of the maſſeter and pterygoideus internus. The ſtyloglofſus muſcle is attached to a conſiderable length of this ligament. The ſynovial membrane, or capſule of the joint, conſiſts of two parts, which cannot indeed be very clearly diſtinguiſhed from each other. The ſuperior diviſion covers the articular eminence, and the upper ſurface of the articular cartilage; and is continued from one of theſe parts to the other, at the circumference of each. The lower diviſion covers the inferior ſurface of the cartilage, and is reflected from its margin to the condyle, being continued lower down on the poſterior than on the anterior ſurface of the laſt-mentioned eminence. Thus the joint of the lower jaw conſiſts of two cloſed cavities, having no communication with each other. The ſynovial membranes, which form theſe bags, are looſe where they are reflected from the articular cartilage to the bones, particularly on the anterior and poſterior aſpects of the joints, and are covered by cellular ſubſtance. There is a ſmall ſynovial gland near the glenoid cavity. The cartilage of the lower jaw is of an oval figure, interpoſed between the maxillary condyle and the baſe of the ſkull; its two ſurfaces are adapted to thoſe parts of the bones which come in contact with it. It is concave on the front, and convex on the back part of its upper ſurface, to correſpond to the articular eminence and glenoid cavity. Below it is concave, as it is applied only to the convexity of the condyle. Its two ſurfaces are cloſely covered by the correſponding portions of ſynovial membrane; the circumference is free between the reflexions of theſe membranes, except externally, where the outer ligament has a connection, and towards the front, where a few fibres of the external pterygoid muſcle are attached. It is thicker in the circumference than towards the centre, and may nearly equal the thickneſs of half a crown in the former ſituation; it is alſo thicker behind at the glenoid cavity than towards the front, where it is interpoſed between the convexities of the articular eminence and condyle. It is ſometimes penetrated by a hole in the middle, and then the two ſynovial membranes communicate with each other. It poſſeſſes the ſame fibrous ſtructure as the other articular cartilages; the fibres, which are concentric, are moſt evident towards the circumference.

Motions of the Jaws.—The mechaniſm of the face may be conſidered under two points of view; 1ſt, as affecting the bones, which conſtitute the upper jaw; 2dly, that of the lower jaw. Reſiſtance and ſolidity ſeem to have been the objects attended to in framing the former; and facility of motion in the latter.

Mechaniſm of the upper Jaw.—Force is applied to the upper jaw in three directions; 1ſt, from below upwards, which is the moſt ordinary caſe, as it takes place in maſtication; 2dly, from before backwards; 3dly, from ſide to ſide. It is very ſeldom that any impulſe or ſhock is received from above downwards. By the elevation of the lower jaw-bone, motion is chiefly tranſmitted, and the ſtrongeſt impulſe communicated to the dental margin or the upper. Hence the points of reſiſtance, or the ſupports of the latter, correſpond to this ſituation. The palatine arch, ſeparating the mouth and noſe, and placed behind and within the above-named margin, receiving little or no impulſe towards its middle, is furniſhed with a very ſlender ſupport in that ſituation. The naſal ſeptum indeed ſeems rather deſigned to divide the cavities, from which its name is derived, than to concur in the latter object, to which its ſtrength is manifeſtly inadequate. Moreover, as it is connected above to the thin cribriform plate, any ſtrong impulſe communicated in that direction might produce an injurious effect on the brain. We muſt turn our attention, therefore, chiefly to the dental margin of the upper jaw, in examining the reſiſtance which is experienced by the lower maxillary bone. And in this ſituation its ſupports are derived; in front, from the naſal proceſſes of the upper jaw-bones; and behind, from the malar bones, which, as well as the proceſſes juſt mentioned, are again ſuſtained by the os frontis. Hence the upper jaw will reſiſt the moſt powerfully in theſe two directions; and two intervals may be noticed between theſe points, in which no ſupport is afforded; *viz.* the opening of the noſe, and the orbits. The ſituation of the teeth is accommodated to this circumſtance. The inciſors, which are formed for the purpoſe of cutting ſoft kinds of food, are placed under the ſpace left at the entrance of the noſe. The cuſpidati, adapted by their ſize and ſtrength for tearing tough and hard ſubſtances, are ſupported by the naſal apophyſes; while the molar teeth, which bruiſe and finally comminute the food, are placed in the moſt reſiſting portion of the alveoli, *viz.* that which is ſupported by the cheek-bone. The bicuſpides, although found under the orbits, are ſufficiently ſupported by the union of the naſal apophyſes with the cheek-bones. The motion then communicated to the dental margin of the upper jaw is tranſmitted to the frontal bone, at its internal and external orbitar proceſſes. The ethmoid may likewiſe tranſmit a ſmall part of the impulſe, ſince it alſo is placed between the frontal and upper jaw-bones. The os malæ, which is impelled in this way upwards, is furniſhed with a point of reſiſtance behind, in the zygomatic portion of the temporal bone; and in that circumſtance conſiſts the advantage of the mode in which the latter overlaps the former. The preceding conſiderations render it very evident that all the impulſe, tranſmitted from the lower to the upper jaw, is ultimately communicated to the cranium, and there loſt. Hence it has been inferred, that if, in caſes of fracture, a reſiſting body be held between the teeth, and thrown into vibration; or if a hard body, as a nut, be cracked between the teeth; that the impulſe thus produced would occaſion motion, and conſequently pain in the place of the injury: and the older writers have even inſiſted on theſe ſigns as affording indications under doubtful circumſtances. They appear to us more like the offſpring of the imagination, than the reſult of obſervation and experience; yet we may often feel a kind of ſhock in the ſkull, when we exert the powers of maſtication very ſtrongly. Let us make one more remark on the latter ſubject; that the upper inciſor teeth ſlip over the lower ones, like the blades of ſciſſars; and that their flattened form and their edges favour this kind of motion, by which the interpoſed ſubſtances are cut in pieces. The cuſpidati overlap a little; but the grinders, which bruiſe the ſolid parts of the food, meet together in the ſame vertical line.

Impulſe can be produced in the ſecond direction, only by external objects; as in the caſe of a blow or fall on the face. The pterygoid proceſſes and the zygomatic arches are the reſiſting points, which ſuſtain the effort in thoſe caſes; and it is tranſmitted from theſe to the cranium. Perſons have ſuppoſed that a ſhock, affecting the front of the noſe, might be tranſmitted to the brain through the ſeptum narium. But that part is too weak for ſuch an effort, which, in point of fact, does not ſeem ever to occur.

The propagation of a lateral ſhock cannot be eaſily eſtimated, ſince there is no ſupport oppoſite to the part ſtricken. But it muſt no doubt be loſt in the ſide of the head.

The upper jaw will be found to move a little when the

mouth is opened; but the motion is common to the whole of the cranium with the jaw. The back of the head deſcends, while the front is ſlightly elevated; and the motion takes place between the occipital condyles and the atlas. The quantity of this movement is very ſmall, ſo that phyſiologiſts in general have overlooked it altogether, and have agreed almoſt univerſally in ſtating that the mouth is opened by the depreſſion of the lower jaw only. Haller and others have indeed been aware that the upper jaw could be moved in the manner juſt mentioned (Elementa Phyſiol. tom. vi. p. 10.); but they do not ſeem to know that ſuch a motion takes place in ordinary caſes. For the author laſt quoted expreſſes himſelf thus: "motum, quo os aperitur, *maxillâ inferiori non motâ*, ſed capite retrorſum ducto, per biventrem." Any individual may ſatisfy himſelf, that his upper jaw does aſcend, when the mouth is opened, if he will ſtand oppoſite to a looking-glaſs, holding the point of a knife juſt againſt the lower edge of the upper teeth, and then open his mouth.

Mechaniſm of the lower Jaw.—This may be depreſſed, elevated, moved backwards, forwards, and to either ſide. In the depreſſion, which is the principal means of opening the mouth, the condyle firſt turns a little on its own axis in the glenoid cavity, ſo that the upper part becomes rather anterior; the angles of the bone move backwards, and the coronoid proceſſes deſcend. When the depreſſion is ſlight, no further effect is produced; but if a more conſiderable opening of the mouth be needed, the condyle is carried ſuddenly forwards under the articular eminence of the temporal bone. This motion can be felt by placing the finger on the outer end of the condyle in the living ſubject; and it can be demonſtrated by moving the jaw, with the articulation diſſected, in the dead body. The cartilage is carried forwards with the condyle; the rotation of which going on at the ſame time, its poſterior portion is brought into contact with the articular eminence. The angle is carried farther and farther backwards, ſo that it moves juſt in an oppoſite direction to the condyle; the external ligament is rather tenſe, as well as the poſterior part of the upper ſynovial membrane; and the ſtylo-maxillary ligament is relaxed. If the depreſſion be carried to a very great extent, and be combined at the ſame time with a motion forwards, the condyle may become diſplaced, by ſlipping in front of the articular eminence.

The elevation of the jaw is effected by a motion of the bone in an inverſe direction to that which has been juſt deſcribed. The condyle placed under the articular eminence performs a rotatory movement, by which that part, which was before turned forwards, is directed upwards; and then the whole eminence returns into the glenoid cavity. When arrived in that part, it ſtill continues to turn upon itſelf, until the motion is arreſted by the lower teeth meeting the upper ones. If the depreſſion has been inconſiderable, the elevation is effected by that part only of the motion, which takes place in the glenoid cavity. The meeting of the teeth prevents the lower jaw from being ever elevated ſufficiently to produce a luxation backwards; which indeed is ſtill further prevented by the meatus auditorius and proceſſus vaginalis. In this motion the external ligament is relaxed; the ſtylo-maxillary becomes rather tenſe; and the poſterior part of the upper ſynovial membrane, which is naturally very looſe, becomes folded on itſelf in the cellular ſpace behind the fiſſura Glaſeri.

The jaw is moved forwards without any thing like that revolution, which we have deſcribed in the depreſſion. The whole bone is moved horizontally; and all the ligaments become equally tenſe. The ſuperior ſynovial membrane is ſtretched at its back part; while the inferior remains in its natural ſtate, ſince it accompanies the condyle in its motion forwards. For the pterygoideus externus, by which that motion is performed, attaching itſelf to both parts, carries them forwards together. This common inſertion is eſſential for the purpoſe of preſerving the condyle and cartilage in their proper relative poſitions. If the motion forwards were continued to a great extent, the coronoid proceſs would ſtrike againſt the anterior part of the temporal foſſa, and prevent any luxation; for which it is neceſſary that that apophyſis ſhould be depreſſed below the zygoma. The motion of the jaw forwards requires a ſlight previous depreſſion of the condyle, in order to bring its convexity to a level with the articular eminence, under which it is to be carried. But as the cartilage fills up much of the glenoid cavity, this depreſſion is very ſlight.

In the motion backwards, the whole jaw moves horizontally through the ſame ſpace in which it had paſſed forwards; and by a movement preciſely the inverſe of that which we have juſt deſcribed.

The lateral motion of the jaw is not of an horizontal nature. Indeed, if one condyle could be moved horizontally outwards, the other muſt be carried proportionally inwards; but the ſpine of the ſphenoid bone and the proceſſus vaginalis are the obſtacles to ſuch a motion; ſo that a luxation inwards or outwards is manifeſtly impoſſible. If the chin move towards the right, the following is the condition in which the lower jaw-bone is placed. The left condyle remains in the glenoid cavity, and is even more deeply fixed in that depreſſion, ſo as to form a pivot, on which the reſt of the bone turns. The other condyle, which is the part moſt remote from the centre of motion, exhibits that motion the moſt clearly. It quits the glenoid cavity, moves forwards under the articular eminence, and may even be luxated ſeparately, if the effort be very conſiderable. The ſtate of the left joint is then nearly the ſame as in the depreſſed condition of the jaw. The reader will of courſe underſtand that the chin is carried towards the left by a ſpecies of movement the inverſe of that now deſcribed.

Muſcles moving the lower Jaw.—The temporal muſcle, (temporalis, crotaphites, temporo-maxillien,) which is ſmaller in ſize in the human ſubject than in any of the mammalia, ariſes from an extenſive ſurface at the ſide of the cranium. Its origin commences by thin fleſhy fibres from the ſemicircular bony ridge, which, beginning juſt behind the orbit, paſſes backwards in an arched courſe over the middle of the parietal bone, and then turns forwards and downwards, ſo as to become continuous with the bony ridge which ſeparates the ſquamous and maſtoid portions of the temporal bone. (For a particular deſcription of this ridge, and of the ſpace included within it, ſee CRANIUM.) A ſtrong and denſe aponeuroſis ariſes from the whole extent of the temporal ridge, and, covering the muſcle, is implanted firmly in the ſuperior edge of the zygoma, and in the outer edge of the orbit. By means of this, a complete cavity is prepared for holding the muſcle; having its inner ſurface formed of the cranium, and the outer ſurface of this temporal faſcia; and opening below by the ſpace left between the zygoma and the ſurface of the ſkull. The muſcle ariſes then in a fleſhy form; 1ſt, from the whole bony ſurface included within the temporal ridge, and conſtituting the temporal foſſa (conſiſting of a greater or ſmaller portion of the four following bones, *viz.* os frontis, temporis, ſphenoides, and malæ); 2dly, from the inner ſurface of the zygoma; and 3dly, from the whole inner ſurface of the temporal faſcia. From theſe parts two layers of fleſhy fibres are produced, an internal and external; and theſe are implanted in a middle

radiated tendon, which is lodged for the greateſt part in the body of the muſcle, but comes out below to be attached to the coronoid proceſs of the lower jaw-bone. It deſcends between the zygoma and the ſide of the ſkull, and is implanted into the apex, the outer and inner margin, and the anterior edge of the coronoid proceſs.

The muſcle is thin above, and grows gradually thicker downwards; it is nearly flat on its two ſurfaces. The fibres have a radiated arrangement, as they paſs from an extenſive ſurface of origin to a ſingle point of inſertion. The anterior fibres paſs rather backwards; the next to theſe deſcend in a ſtraight courſe; and a very conſiderable portion comes obliquely forwards, filling up the ſpace left between the zygoma and the ſquamous portion of the temporal bone, and playing over the root of the zygomatic proceſs.

The temporal muſcle and its faſcia are covered by the aponeuroſis of the fronto-occipitalis; by the anterior and ſuperior muſcles of the ear; by the ſuperficial temporal veſſels and nerves; the zygomatic arch and the maſſeter muſcle.

It elevates the lower jaw, particularly when acting in conjunction with the maſſeter. If the bone has been carried forwards, it is again reſtored to its place, chiefly by means of the poſterior fibres. The anterior portion, which goes obliquely backwards, may concur with the pterygoideus externus in carrying the jaw forwards.

The *maſſeter* (jugo-maxillien) is a ſtrong and thick muſcle, compoſed of an intermixture of tendinous and muſcular fibres, quadrilateral but rather elongated in its figure, and covering the ramus of the lower jaw. It ariſes, 1ſt, from two thirds of the anterior and outer part of the lower edge of the zygoma, by a very ſtrong ſheet of tendon, which, covering a conſiderable part of the muſcle, detaches ſeveral plates from its inner ſurface into the ſubſtance of the part; 2dly, from the poſterior part of the ſame edge by a mixture of tendon and muſcle; 3dly, from the inner ſurface of the zygoma by ſhort tendinous fibres. The firſt portion conſtitutes the chief bulk of the muſcle, and, paſſing obliquely downwards and backwards, is implanted into the angle and neighbouring portion of the ramus of the lower jaw. The fibres of the ſecond claſs, deſcending vertically, are mixed with the former at their inſertion. The laſt diviſion paſſes obliquely forwards, and are inſerted high up in the ramus of the jaw, and near the coronoid proceſs.

This muſcle is covered externally by the platyſma myoides, the parotid gland and its excretory duct, the facial nerve, tranſverſalis faciei artery, zygomaticus and orbicularis palpebrarum muſcles. It covers the ramus of the lower jaw, which is rendered irregular on its ſurface by the attachment of the fibres, and a part of the tendon of the temporal muſcle. Its front edge is ſeparated from the buccinator by adipous ſubſtance.

It elevates the lower jaw, and is particularly employed on thoſe occaſions in which a conſiderable force is exerted; as in maſticating hard ſubſtances, whence its name ſeems to have been derived. In thoſe elevations of the part, which do not require ſo great an exertion, as in ſpeaking, the temporal muſcle is made uſe of. The outer and larger part may contribute ſlightly to move the jaw forwards, while the fibres which ſlope forwards may aſſiſt in reſtoring it. Is this muſcle, or the temporal, or the pterygoideus internus, exerted in depreſſing the head, ſuppoſing the lower jaw to be carried downwards, and to be held in that ſituation? This and the other elevators of the lower jaw are particularly affected by the ſpaſmodic trembling, produced by the action of cold on the ſkin; and are peculiarly ſubject to the attacks of tetanus. Paralyſis, on the contrary, is ſlow in affecting them; and they will be found often to act equally well on both ſides, when the whole face is diſtorted from hemiplegia.

Pterygoideus internus (ſpheno-maxillien) is placed on the inſide of the ramus of the jaw, oppoſite to the maſſeter, to which in figure and ſtructure it has a conſiderable analogy, although it is rather ſmaller in ſize. The aſcending part of the lower jaw-bone is indeed included between the fibres of this muſcle and the maſſeter; although the latter embraces it more cloſely on the outſide, than the pterygoid does internally. Its diſtinguiſhing epithet of *internus* denotes merely that it ariſes from a more internal part of the pterygoid proceſs than the *externus*, and not that it is ſituated more deeply. It ariſes from the whole of the pterygoid foſſa; conſequently from the inner ſurface of the external, and from the outer ſurface of the internal plate, and from the pterygoid proceſs of the os palati. Its fibres, conſiſting, like thoſe of the maſſeter, of an intimate mixture of tendon and muſcle, deſcend and paſs at the ſame time outwards, and ſlightly backwards, to be attached to the angle, and to the inner ſurface of the ramus of the inferior maxillary bone; and are ſometimes mixed, under the edge of the bone, with thoſe of the maſſeter.

The inner ſurface of this muſcle correſponds to the circumflexus palati, to the ſpace ſeparating that muſcle from the conſtrictor pharyngis ſuperior, and lodging ſeveral nerves, veſſels, &c., and to the ſub-maxillary gland. Externally it is ſeparated from the jaw above by the dental and lingual nerves, and by the dental veſſels.

It concurs with the two former muſcles in elevating the lower jaw; and it aſſiſts in moving the bone towards the right or left, when it acts ſeparately.

The three pairs of muſcles now deſcribed unite in producing the elevation of the lower jaw; which is termed biting, when any ſubſtance is intercepted between the upper and lower teeth. Their ſtrength is very conſiderable, as the nature of their office obviouſly requires, and its extent is evinced by various inſtances of exertion. Veſalius mentions a man who could throw behind him an iron bar of twenty-five pounds weight held in the mouth, ſo as to fix it in a beam at the diſtance of thirty-nine feet; and inſtances are not uncommon of perſons balancing on the chin a plank or ladder ſo heavy that they can barely lift it. Haller has collected ſeveral examples, as the elevation of a maſt, and placing it on the ſhoulder; of a table ſix feet broad, with a weight of 60 pounds, hanging to the oppoſite ſide; and of 300 pounds weight, &c. We muſt recollect alſo that theſe exertions require much greater force than the weights would ſeem to indicate; ſince the muſcles are all inſerted near the centre of motion, and the force acts at a conſiderable diſtance from the lever; hence it has been calculated that the whole power would be equal to 1000 or 1800 pounds. Man, therefore, is admirably provided with inſtruments for triturating the food, more powerful indeed than ſeems neceſſary for the reduction of aliments, prepared by the various arts of cookery. Yet theſe are trivial compared to the ſtrength of the correſponding muſcles in predacious animals, where the jaws conſtitute moſt terrible inſtruments of attack and defence, and are able to comminute the bones, which are ſwallowed with the reſt of the prey.

Pterygoideus externus (ſpheni-maxillien) is a thick muſcle, placed obliquely between the pterygoid proceſs and the condyle of the lower jaw. It ariſes from the outer ſurface of the external pterygoid plate, from the neighbouring part of the os palati, and from the ſphenoid bone towards the temporal foſſa. Its fibres paſs obliquely backwards and outwards, and are inſerted into the foſſicula of the front of the condyle,

dyle, and into the articular cartilage of the jaw. It is covered externally by the temporal muſcle, and internal maxillary artery; internally by the pterygoideus internus, and the inferior maxillary nerve, and above by the zygomatic foſſa. The right and left muſcles acting in conjunction will carry the two condyles directly forwards under the articular eminence. If the right ſhould act ſeparately, it will carry forwards the condyle of its own ſide, and thereby move the chin towards the oppoſite ſide, and *vice verſâ*. It always acts upon the cartilage, as well as upon the condyle.

Digaſtricus or *biventer maxillæ inferioris* (maſto-maxillien) is placed at the ſide of the upper part of the neck; poſſeſſes an elongated form; and conſiſts, as its names imply, of two portions of muſcle joined by a middle tendon. It ariſes by a mixture of tendinous and fleſhy fibres from the groove within the maſtoid proceſs, and deſcends obliquely forwards and inwards. This, which is called the poſterior belly of the muſcle, grows at firſt gradually thicker from its origin; then again decreaſes, and is contracted into a roundiſh tendinous chord, which paſſes through the fibres of the ſtylo-hyoideus, or behind that muſcle, and running about half an inch above the os hyoides, is connected to that bone by a thin aponeurotic expanſion. Afterwards it is reflected upwards and forwards at an obtuſe angle, and ſpreads out into the anterior fleſhy belly, which is about an inch in length, advances to the lower edge of the front of the jaw, approximating to the oppoſite muſcle, and is inſerted into the ſuperficial foſſa at the ſide of the ſymphyſis.

The trachelo-maſtoideus, ſplenius, and ſterno-cleido-maſtoideus muſcles cover the poſterior fleſhy portion of the digaſtric, which again in its turn covers the muſcles of the ſtyloid proceſs, the internal jugular vein, and internal carotid artery; ſome branches of the external carotid artery, and the nerves of the ninth pair. The anterior part is placed between the mylohyoideus and latiſſimus colli. The ſubmaxillary gland, placed between the two diviſions of the muſcle, is bounded below by the middle tendon.

The contraction of this muſcle opens the mouth by drawing the front of the lower jaw towards the maſtoid proceſs; and the ſwelling both of its anterior and poſterior portions can be plainly perceived by the finger, when we open the mouth. The office of the digaſtricus does not ſeem to be much connected with the motions of the os hyoides, ſince its tendon paſſes above that bone, to which it is only connected by a ſlender aponeuroſis, and conſequently the curve deſcribed by the courſe of the muſcle is ſlight; now it is only in proportion to the degree of that curvature that the digaſtricus taken altogether can have the power of elevating the os hyoides. The anterior portion draws the os hyoides to the jaw, or *vice verſâ*, if the fixed points be changed; the poſterior carries the former bone backwards and upwards. Both will elevate the os hyoides when it is depreſſed. If the lower jaw be rendered a fixed point, the digaſtric may depreſs the back of the head upon the ſpine, and thereby open the mouth by elevating the upper jaw. That this part does more, when the lower maxillary bone is prevented from deſcending, is very obvious; and Soemmerring ſtates that the circumſtance may be obſerved particularly in infants when ſucking.—(De Corp. Hum. Fabr. t. 3. p. 105.)

Latiſſimus colli (platiſma myoides, thoraco-facien).—This muſcle conſiſts of a very thin layer of muſcular fibres, ſituated under the ſkin of the neck, the whole ſide of which is covered by it, and extending over a conſiderable part both of the face and cheſt. The weakneſs of its fibres is compenſated by its great breadth. Its ſituation is under the ſkin and adipous membrane. It ariſes by ſcattered and ſeparate portions among the cellular membranes at the upper part of the cheſt, at one or two inches below the clavicle. Theſe origins cover a part of the pectoralis major, deltoid and trapezius muſcles. Its ſeparate origins uniting into a broad and thin continuous ſtratum, extend upwards, forwards, and inwards, covering the muſcles, veſſels, and nerves, of the neck. The two muſcles decuſſate each other at the upper part of their inner edge, where they are attached to the lower jaw: they are not quite in contact below. The poſterior edge repreſents an oblique line deſcending from the angle of the jaw towards the middle of the ſhoulder. When the fibres have arrived at the baſis of the lower jaw, they terminate in two ways. The inner portion is fixed to the ſymphyſis of the bone, and to its lower edge, juſt under the origin of the depreſſor anguli oris; a few fibres however paſs over the bone to the integuments of the chin. The outer diviſion aſcends over the jaw, and turns, when it has arrived on the face, by a gentle ſweep, inwards and forwards, to the corner of the mouth. Here its fibres partly terminate in the cellular membrane of the face, and are partly connected with the orbicularis at the corner of the mouth, and with the depreſſor anguli oris throughout its whole external edge. The external ſurface of this muſcle is everywhere connected to the ſkin by an adipous membrane, not much charged with fat. On the oppoſite aſpect, it is in contact, on the cheſt, with the pectoralis major, deltoid, and clavicle. On the neck, it covers the greateſt part of the ſterno-cleido-maſtoideus, a part of the omo-hyoideus, the ſterno-hyoideus, digaſtricus, and mylo-hyoideus; the external jugular vein; the carotid and ſuperior thyroideal arteries; the ſub-maxillary, and a part of the parotid glands. In the face it lies upon the maſſeter, buccinator, and depreſſor anguli oris muſcles, and the external maxillary artery and facial vein, &c.

It draws down the ſkin of the lateral and lower part of the face, and particularly aſſiſts in depreſſing the lower lip, and corner of the mouth. It muſt conſequently be concerned in expreſſing the ſorrowful and indignant paſſions. It alſo acts very principally in depreſſing the lower jaw. In all its contractions the integuments muſt be thrown more or leſs into tranſverſe wrinkles, and this effect reſembles that produced by the panniculus carnoſus of animals; but we cannot regard this corrugation as the primary uſe of the muſcle.

Other muſcles aſſiſt in depreſſing the lower jaw, as thoſe which paſs from that bone to the os hyoides, alſo the depreſſors of the os hyoides, all which will be deſcribed in a ſubſequent part of the preſent article. The powers, which we have juſt conſidered as being concerned in opening the mouth, by carrying the lower jaw towards the cheſt, appear exceedingly weak when contraſted with their antagoniſts the maſſeters, temporal and pterygoid muſcles. The diſproportion will be leſſened by the circumſtance of the depreſſors being all inſerted at a diſtance from the centre of motion, and conſequently acting with a very conſiderable mechanical advantage. We muſt conſider alſo that the office of the laſt-mentioned muſcles requires no great exertion; that when the elevators are relaxed, the weight of the jaw itſelf aſſiſts in the depreſſion; and conſequently that the depreſſors of the jaw hold the ſame relation to the elevators, as the extenſors do to the flexors in the trunk and limbs; where all the great efforts are made in the direction of flexion, and extenſor muſcles are required only for the purpoſe of reſtoring the parts.

The cavity of the mouth is the ſpace included between the lips and cheeks on the front and ſides; the palatine arch and the ſoft palate above and behind; the tongue and membrane of the mouth below. It opens to the front by a tranſverſe aperture placed between the two lips, and differing in ſize and figure, according to the motions of thoſe parts; behind it

communicates with the bag of the pharynx. The general direction of the cavity, in the erect poſition of the body, is horizontal; with the former opening placed directly forwards, and the latter backwards.

The circumference of the palate is terminated on its anterior and lateral aſpects by the alveolar portion of the upper jaw, containing the upper ſeries of teeth. The correſponding part of the inferior maxillary bone, with the lower teeth, projects into the mouth below. When the cavity is ſhut, the two rows of teeth meet together, and divide it into two parts having no communication with each other; *viz.* an outer or front diviſion, ſituated between the lips and cheeks, on one ſide, and the outer ſurface of the teeth and their ſockets on the other; and an inner or back part, including the ſpace left within the arches deſcribed by the teeth. In the open ſtate of the mouth theſe two diviſions communicate by the wide aperture left between the two rows of the teeth.

The extent of the cavity of the mouth differs in its different directions. When it is ſhut, the ſuperior ſurface of the tongue is in contact with the palate, and the lips and cheeks are applied againſt the teeth; ſo that there is no cavity or empty ſpace at all in this condition of the organs. When the proceſs of maſtication is going on, the tongue and jaw deſcend, and the lips and cheeks are diſtended with the food; thus the cavity is increaſed in all its dimenſions. The perpendicular diameter, which in the quieſcent ſtate of parts was reduced to nothing, becomes more and more conſiderable in proportion to the depreſſion of the lower jaw. The meaſure from ſide to ſide, in the firſt-mentioned ſtate, is the diſtance between the outer edges of the teeth on each ſide; and that from before backwards is nearly the ſame as the laſt. Both theſe diameters will be affected conſiderably by the motions of the lips and cheeks, and will be greater or ſmaller, according to the diſtenſion of thoſe organs.

The cavity of the mouth is lined by a ſoft and vaſcular membrane, continuous at the front aperture with the common integuments of the face; extended behind into the pharynx; and differently organized in different parts of its courſe. From the looſe and tumid edges of the two lips, it is produced over their inner ſurface, and that of the cheeks; beſtowing a ſoft lining on both of theſe parts. It then covers the outer alveolar plate of the two jaws; and, in its reflection from the lips, it produces, both above and below, a ſmall fold, which confines theſe parts more cloſely juſt at the middle and front part of each maxillary bone. Theſe duplicatures are named the fræna of the lips. Aſcending over the outer alveolar plate, it approaches the necks of the teeth, aſſumes a greater firmneſs of texture, and forms the gums. On the alveolar edges of the maxillary bones, and, conſequently, in the middle of that part which forms the gum, the membrane is perforated by a number of holes equal to that of the teeth; and it adheres cloſely to the necks of the teeth at the margins of theſe perforations, where it is alſo connected with the periоſteum that lines the alveoli. It is then continued over the internal alveolar lamina of both jaws; affords a covering above to the bony palate; and is prolonged over the under ſurface of the ſoft palate, at the poſterior or looſe edge of which it becomes continuous with the pituitary membrane of the noſe. From the cheek it goes over the ramus of the jaw, and is continued with the membranous fold that paſſes from the ſoft palate to the tongue. After covering the inner alveolar plate of the lower jaw, it paſſes to the under ſurface and ſides, and then to the upper part of the tongue. Oppoſite to the ſymphyſis of the bone, and juſt over the attachment of the genioglоſſi, it makes a fold, called the frænum, which limits the motions of the tongue. In other ſituations the membrane is produced looſely from the bone to the tongue; and it covers on each ſide towards the front a ſmall oblong eminence, formed by the projection of the ſublingual ſalivary gland. From the back of the tongue the membrane is extended over the epiglottis, and forms three folds, connecting that organ to the ſurrounding parts.

The moveable and nearly hemiſpherical covering, conſiſting of common integuments on the outſide, of a ſoft vaſcular membrane internally, and having a conſiderable number of muſcles, together with more or leſs fat, and numerous glandular bodies interpoſed between theſe;—extended from the cheek-bone, upper jaw, and front of the noſe, ſo as to cover the two rows of the teeth, and attached below to the whole length of the alveolar portion of the lower jaw; and poſſeſſing a middle tranſverſe fiſſure, parallel to the teeth, and correſponding to the interval of the two rows, but much ſhorter than that interval;—conſtitutes the *lips* and *cheeks*.

The *lips* are the two moveable portions of the above-deſcribed production, placed before the front teeth, bounding the mouth at its anterior part, and forming, by their red and ſoftly-ſwelling edges, the margins of the opening of the mouth. The *upper lip* includes the part placed between that opening and the noſe: the *lower* is the portion between the ſame orifice and the lower jaw. Theſe organs are very important, from the influence which they exert on the general expreſſion of the countenance, not to mention their ſhare in articulation, maſtication, &c. They are united at the two corners of the mouth by acute angles, named their commiſſures. Theſe are entirely muſcular; ſo that they admit of conſiderable extenſion and retraction. Their looſe edge, which is their thickeſt part, and is marked by ſeveral lines croſſing between the two margins, is the point of continuity between the mucous membrane of the mouth, and the common integuments.

The external ſtratum of the lips conſiſts of ſkin remarkable for its thinneſs, as well as for the hairs which grow in it, and form the beard, one of the great characteriſtic differences between the male and female ſubject. This is ſucceeded by a layer of muſcular fibres, united to the former by a cloſe cellular texture, in which there is very little fat. This layer is compoſed principally of the orbicularis oris; to which are added the elevators of the upper lip, and of the corner of the mouth above, the buccinator zygomaticus and depreſſor anguli oris at the commiſſure, and the depreſſors of the lower lip below. The muſcular layer is followed by a conſiderable number of large, rounded, mucous glands (*glandulæ labiales*), arranged in an uniform ſtratum, covered towards the mouth by the mucus membrane, in which they often cauſe conſpicuous prominences, and poſſeſſing excretory ducts, which perforate that membrane. The mucous lining of the lip reſembles that of the mouth in general: it is very vaſcular, and becomes of a general and deep red from minute injections; its ſurface is moiſtened by the mucous ſecretion of the glandulæ labiales. The red ſwelling part, which forms the very opening of the mouth, is diſtinguiſhed from the common ſkin, externally, by a clearly defined line, and from the mucous membrane on the inſide. It is this part which forms, by its clear tranſparent redneſs, ſo beautiful a contraſt with the pearly whiteneſs of the teeth. It poſſeſſes cuticles, which often ſeparate in dry and ragged portions, particularly in cold weather. The cutis at this part is furniſhed with numerous villi, indicating a high degree of organization; and the pleaſurable phyſical ſenſation, experienced in kiſſing, correſponds with this ſtructure. The entire want of fat, or the very ſmall quantity which does exiſt in the lips, occaſions theſe parts to retain almoſt conſtantly the ſame thickneſs: which is not more favourable

to

to their functions than if they had changed according to the embonpoint, or thinneſs of the body in general.

The external opening of the mouth is the ſpace left between the two lips. Its direction in the quieſcent ſtate is tranſverſe; and it does not then exiſt as an opening, ſince the two lips are in contact. The free power of motion, which the ſides of the aperture poſſeſs in every direction, renders it ſuſceptible of very numerous varieties, both of ſize and figure. In the moſt contracted ſtate, it forms a ſmall tranſverſe groove with corrugated edges. It may be extended laterally by the ſeparation of both corners, until thoſe parts are brought oppoſite to the laſt bicuſpis, or firſt molar tooth. In the perpendicular direction, it is affected chiefly by the depreſſion of the lower jaw; but it may alſo be changed by the motions of the lips merely, which can be ſeparated to a conſiderable diſtance, their edges being at the ſame time turned out, and a larger ſurface of the red part being expoſed.

The *cheeks*, forming the lateral boundaries of the mouth, are parts of ſimilar organization to the lips, with which, indeed, they are entirely continuous, ſo that there is no natural diſtinction between them. Externally, their extent is not defined by any preciſe limits; but thoſe uſually aſſigned are the cheek-bone above, the baſe of the lower jaw below, the commiſſure of the lips in front, and the projection of the maſſeter behind. Towards the mouth on the contrary, they are bounded preciſely, both above and below, by the reflexions of the mucous membrane from their ſurface to the jaw-bones; behind by the folds of membrane deſcending from the velum palati, and in front by the commiſſure of the lips. Their thickneſs depends on the quantity of fat which they contain, which is ſubject to conſiderable variety. The external ſtratum of the cheek conſiſts of a thin and delicately organized ſkin, from which there are but few hairs growing, particularly towards the middle. In this part it is particularly diſtinguiſhed by its capillary ſyſtem, through which a large quantity of blood is conſtantly circulating in young and healthy perſons. This being liable to ſudden and accidental changes, either of increaſe or diminution, becomes an involuntary index of the affections of the mind; whether, as in the pleaſurable motions, and likewiſe in anger, indignation, its momentary diſtenſion gives riſe to that vivid redneſs of the cheek, which extends, in a diminiſhed degree, to other parts of the face; or, as in the depreſſing and ſorrowful paſſions, the ſame parts become overſpread with a more or leſs ſudden paleneſs. The capillary ſyſtem of the cheeks is alſo variouſly affected in diſeaſe, where it is ſometimes emptied of its blood, and in other caſes diſtended with an unuſual quantity. It alſo admits coloured injections very readily in the dead ſubject. Under the integuments of the cheek, we have the zygomaticus muſcle, covering a conſiderable quantity of ſoft fat, contained in a looſe cellular texture. This facilitates the motions of the buccinator and neighbouring muſcles, and augments conſiderably the tranſverſe diameter of the face. It is abſorbed very rapidly in various diſeaſes, and ſoon replaced in a ſtate of convaleſcence; ſo that the figure of the cheeks becomes an index of the general health. Under this fat the whole ſurface of the cheek is covered by the buccinator muſcle; which is lined *internally by the mucous membrane of the mouth*, ſeveral round mucous glands (*glandulæ buccales*) being interpoſed between it and the muſcle.

Muſcles of the Lips and Cheeks.

Naſalis labii ſuperioris.—This, which is deſcribed by Albinus as a diſtinct muſcle, is undoubtedly a part of the orbicularis. It ariſes in a pointed form from the tip of the noſe, and from the ſeptum narium, and, growing thicker as it deſcends, turns outwards, and terminates in the orbicularis. It will approximate the corners of the mouth, and depreſs the apex and ſeptum of the noſe. It will alſo elevate and turn outwards the upper lip, ſo as to apply it againſt the openings of the noſtrils.

Levator labii ſuperioris et alæ naſi, (pyramidal and lateral dunez).—This is very commonly deſcribed as forming two ſeparate muſcles, a proper elevator of the upper lip, and a common elevator of it and the ala naſi: we do not conſider the diſtinction ſufficiently marked, and therefore deſcribe them together. It ariſes in a pointed manner, from the naſal proceſs of the upper jaw, where it is confuſed with the frontal muſcle; it deſcends along the ſide of the noſe from this origin, and has a ſecond very broad attachment, diviſible into two or more portions, to the ſuperior maxillary bone, along the front edge of the orbit, and above the infra-orbitar foramen. This ſecond portion of its fibres paſſes obliquely downwards and inwards to join the former; and on its outer edge it is ſometimes continued by irregular fibres to the zygomaticus. Its inſertions are, 1ſt, into the alæ naſi, where it is united with the compreſſor narium, and depreſſor alæ naſi; 2dly, into the upper lip, as far as the corner of the mouth, by an union of its fibres with thoſe of the orbicularis oris, and levator anguli.

It is covered on the noſe partly by the integuments, and by the orbicularis palpebrarum and facial vein; lower down by the two former parts. It covers the os naſi, the naſal proceſs of the ſuperior maxillary bone, the depreſſor alæ naſi, levator anguli oris, and infra-orbitar veſſels and nerves. It elevates the upper lip, and the alæ of the noſe; and as both theſe effects are produced by the ſame muſcle, it is difficult to raiſe the lip without, at the ſame time, moving the noſe. Its action cauſes a ſwelling of the integuments between the lip and the eye. As it is attached towards the front of the lip, it turns that part outwards and upwards: and, in conſequence of the oblique courſe of a great part of its fibres, it extends the lip horizontally at the ſame time that it produces the elevation. It acts in the ſmile of deriſion, and is exerted in all the angry and ſcornful affections of the mind.

Zygomaticus major, or diſtortor anguli oris.—This is a rather elongated and ſlender muſcle, produced in an oblique direction from the convexity of the os malæ to the corner of the mouth, and terminating by a continuation of its fibres with thoſe of the orbicularis and other muſcles of the lips. It is covered externally by the ſkin of the cheek, and it lies upon the os malæ, the facial vein, and the buccinator muſcle. It draws the corner of the mouth towards the temple, and thereby cauſes a ſwelling of the cheek. The right and left muſcles acting together enlarge the mouth horizontally, and draw the corners upwards, as in laughing. There is ſometimes, but not conſtantly, a *zygomaticus minor*, placed in front of the preceding muſcle, and conſiſting of a thin faſciculus of fibres, which have a ſimilar origin, direction, inſertion, and uſe, as the greater zygomaticus.

Levator anguli oris, or *labiorum communis* (le canin).—It has a thin and flat origin from the hollow of the upper jaw-bone, juſt under the infra-orbitar foramen. Its fibres paſs obliquely downwards and outwards to the corner of the mouth, where it mingles with thoſe of the orbicularis and depreſſor anguli. On its anterior ſurface lie the levator labii ſup. et alæ naſi, with the infra-orbitar veſſels and nerves. Behind it are placed the ſurface of the jaw-bone, the membrane of the cheek, and the buccinator. It elevates the corner of the mouth, and thereby reſtores the parts which have been depreſſed in the ſorrowful emotions.

Depreſſor

Depreſſor anguli oris (triangularis), is a muſcle of a flattened and triangular figure, extended from the ſide of the chin to the corner of the mouth. It has a broad origin from the anterior part of the baſis of the lower jaw, grows narrower as it aſcends, has its fibres ſlightly arched towards the chin, and terminates at the corner of the mouth by uniting with the zygomaticus, levator anguli, and orbicularis. Its outer edge is a point of inſertion to numerous fibres of the platyſma myoides. Covered by the ſkin externally, it lies upon the depreſſor labii inferioris, and buccinator. It depreſſes the corner of the mouth, and is a very important muſcle, in a phyſiognomical point of view, as it acts in all the ſorrowful emotions. Its effects can be well ſeen in crying.

Depreſſor labii inferioris proprius (quadratus.)—It ariſes from about one inch of the anterior and lateral part of the jaw, covered at its origin by the former muſcle. Its fibres paſs obliquely upwards and inwards, and mingle with thoſe of the oppoſite muſcle. It terminates by a broad inſertion into the lower lip, confounding its fibres with thoſe of the orbicularis. The preceding muſcle, the levator menti, and the latiſſimus colli are alſo connected with it; and there is much fat mixed with its fibres. The depreſſor anguli and ſkin (to which it is ſtrongly united) cover this muſcle externally; and it covers on the other ſide the levator menti, the mental veſſels and nerves, and the orbicularis. It draws the lower lip down to the chin.

Levator menti (elevator proprius lab. infer.; inciſif inferieur).—This ariſes from the lower jaw-bone, about the ſocket of the cuſpidatus, by firm fleſhy fibres, which deſcend inwards, and join thoſe of the oppoſite ſide, being ſtrongly united with thoſe of the depreſſor lab. infer. It terminates in the cellular ſubſtance and ſkin of the projecting part of the chin. It elevates and corrugates the chin; it reſtores the lower lip, when that has been depreſſed. By drawing up the chin, it will evert the lower lip, as we ſee occaſionally in ſcorn and deriſion.

The *buccinator* is the largeſt muſcle of the lips. It is thin, but very broad; flattened on its ſurfaces, nearly quadrilateral, occupying the ſpace between the two jaws, and ſpread immediately over the membrane of the cheek. It ariſes from the tubercle of the upper jaw, from the pterygoid proceſs, ſide of the pharynx, and ſpace between the laſt grinder, and coronoid proceſs of the lower jaw. Its fibres purſue a tranſverſe courſe to the lips, and are parallel to each other. They terminate under the elevator and depreſſor muſcles juſt deſcribed, by uniting their fibres with thoſe of the orbicularis oris. It is perforated by the duct of the parotid gland. The buccinator muſcle is ſeparated from the coronoid proceſs, and maſſeter, which lie over it behind, and from the zygomaticus major, facial artery and vein, and latiſſimus colli, which cover it towards the front, by a conſiderable quantity of fat. Its inner ſurface covers the mucous membrane of the mouth. It draws the whole of the mouth backwards, and thereby corrugates the cheek. It admits of mechanical diſtenſion by air or food contained in the mouth, and acts on thoſe in various ways. It expels the air in perſons who are blowing wind inſtruments; it puſhes the food under the teeth in maſtication, or towards the back of the tongue previouſly to deglutition.

Orbicularis oris (le labial; ſemiorbiculaire ſuperieur and inferieur).—This muſcle, which ſurrounds the opening of the mouth, conſiſts of concentric fibres forming an elongated oval, with its long axis placed horizontally. It is flattened on its anterior ſurface. The fibres compoſing it may be divided into the common and the proper. The firſt of theſe conſtitute the exterior portion of the muſcles, and conſiſt of the union and intermixture of the various muſcles belonging to the lips: *viz.* the levator labii ſuperioris et alæ naſi, zygomaticus minor, and naſalis labii ſuperioris above; the depreſſor labii inferioris and levator menti below; and the zygomaticus major, levator anguli oris, buccinator and depreſſor anguli oris at the commiſſure. Theſe are all ſo mingled together, that we cannot deſcribe any particular courſe of fibres in that portion of the orbicularis which is formed by their union. The proper fibres of the orbicularis are placed within the former, being continuous with them, and correſponding to the looſe edge of lips. This muſcle is cloſely covered by the ſkin externally, by the red part of the lips on its inner circumference, and by the glandulæ labiales and mucous membrane towards the mouth. The orbicularis oris is the antagoniſt of all the other muſcles that move the lips, and reſtores theſe parts, when they have been moved out of their natural ſituation in any direction. It brings them into contact with each other in an horizontal line, ſo as to cloſe the mouth. When it is neceſſary to contract the mouth beyond this degree, as in blowing ſeveral wind inſtruments, the orbicularis is employed, and cauſes a corrugated ſtate of the lips. It brings theſe parts in cloſe contact with any body round which they may be applied in the act of ſuction. The action of their exterior fibres tends to evert the edges of the lips, ſo as to bring the red part more completely into view.

There are ſometimes connected with the muſcles above deſcribed ſome irregular fibres, which do not exiſt conſtantly. There is frequently a portion of muſcles croſſing tranſverſely between the right and left platyſma, juſt at the chin; the *tranſverſus menti* of Santorini. Some fibres ariſing in the cellular ſubſtance over the maſſeter, or from the platyſma myoides, and paſſing to the corner of the mouth, have been deſcribed under the name of *riſorius*. Soemmerring has deſcribed by the epithet of *anomalus maxillæ ſuperioris*, ſome irregular fibres, ſituated under the levator of the upper lip, and inſerted by both extremities into the upper jaw-bone.

The palate, compoſing the upper ſurface of the mouth, is nearly of a parabolic figure, extending rather more in length than in breadth. Its poſition is nearly horizontal in the ordinary erect attitude; and as its bony ſtructure renders it completely motionleſs of itſelf, it offers a fixed point of reſiſtance to the tongue in the motions of articulation and deglutition. It conſiſts of a vaulted bony ſurface, covered by a thick and compact membrane. We muſt diſtinguiſh in the bone the alveolar portion, and the proper palatine arch. The former conſtitutes a parabolical projection, which limits the palate at its anterior and lateral aſpects, and contains on its inferior ſurface the openings of the alveoli. This belongs entirely to the ſuperior maxillary bones, and ſurmounts the upper row of teeth which borders the palate. The proper palatine arch is made up of the horizontal portions of the ſuperior maxillary and palatine bones.

The palate, when conſidered in its perfect ſtate, preſents a very conſiderable concavity towards the mouth. In the child, which has not yet cut its teeth, and where conſequently the alveolar proceſs is not yet formed; and in the old ſubject, where theſe organs, together with the bone in which they were implanted, have been loſt, this part of the mouth preſents a very different appearance from that which it has in the intervening periods. It exhibits a nearly level ſurface, inſtead of a conſiderable concavity. The lower jaw-bone undergoes a ſimilar change in advanced age; hence the cavity that holds the tongue becomes very conſiderably diminiſhed, and the motions of that organ in articulation and chewing are proportionally impaired.

The membrane of the palate preſents a very different ar-

rangement on the alveolar and palatine portions of the bone. In the former ſituation, it conſtitutes in the fœtus a thick, denſe, firm, and whitiſh layer, covering the alveoli and rudiments of the teeth, and forming a reſiſting ſurface capable of the efforts required in that ſpecies of maſtication which is then exerciſed. This is pierced by the teeth when they appear in the mouth; and its ſides, adhering round the neck of the tooth, conſtitute the gum. When the teeth and alveoli are loſt, the perforations of the gum are deſtroyed by the cloſing of their ſides, and a ſimilar hard white ſubſtance to that of the fœtus again occupies the alveolar edges of the jaws, and affords conſiderable aſſiſtance in old age in the act of maſtication.

The membrane covering the palate is thick, and cloſe in its texture. It is divided by a middle line into two halves, more perceptibly in the fœtus than in the adult. Its ſurface is irregular, and marked towards the front by tranſverſe lines: between it and the bone are ſeveral mucous glands, *(glandulæ palatinæ,)* with excretory ducts, opening conſpicuouſly on the ſurface, which become more numerous towards the velum palati, with the anterior ſurface of which the palatine membrane is continuous.

The poſterior boundary of the mouth is formed by a fleſhy and moveable curtain, extended from the back of the palatine arch into the pharynx, and called the *ſoft palate*, or *velum palati*. Thus it is placed above the opening, which leads from the mouth into the pharynx, and is ſeparated by that aperture from the baſe of the tongue. Its figure is nearly quadrangular; and it poſſeſſes two ſurfaces, of which one is anterior, and the other poſterior; and four margins, of which two are lateral, one ſuperior, and the other inferior. The anterior ſurface, which is turned towards the tongue, and faces downwards and forwards, is ſmooth and uniform, and gently concave, preſenting ſeveral ſmall openings of the mucous ducts; the poſterior, which is directed upwards and backwards, has a conſiderable elevation on each ſide, ariſing from the courſe of the levator palati muſcle, and a ſmaller one in the middle from the azygus uvulæ. The ſuperior margin is fixed to the back edge of the palatine bones, and this is the thickeſt part of the velum. The inferior border hangs looſely into the pharynx, and is divided into two parts by a conically ſhaped body, projecting exactly from the middle of the velum, and named the *uvula*. The broader part of this organ is rather flattened, and is placed upwards; the ſmaller portion is more cylindrical in its figure, and is directed downwards, terminating in an obtuſe extremity. It varies in length in different individuals, and in the ſame perſon, according to the ſtate of its elevator muſcle. It ſometimes hangs down ſo as to touch the tongue; and when it is thus permanently relaxed, it cauſes a very diſagreeable irritation. In its natural ſtate it points nearly to the foramen cœcum of the tongue, and is therefore conſiderably in front of the epiglottis. It is peculiar to the human ſubject, and to animals of the monkey kind; in other inſtances, the lower edge of the ſoft palate is nearly ſtraight. The preſence of the uvula cauſes the correſponding part in man to form a double arch.

The lateral edges of the ſoft palate are continued with the tongue and pharynx by two membranous and muſcular folds. Theſe are united at their origin, which takes place at the outer corner of the lower edge of the palate; but they ſeparate from each other as they deſcend. The anterior *(gloſſo-palatine)* terminates on the ſide of the baſe of the tongue; the poſterior *(pharyngo-palatine)* is loſt on the ſide of the pharynx. A triangular ſpace, formed by their ſeparation, contains the tonſil.

The contracted opening, by which the mouth communicates with the pharynx *(iſthmus faucium)* is chiefly formed by the parts now deſcribed. If we take a front view of it, as when we look into the throat of a living perſon, we find it bounded below by the root of the tongue; above by the lower edge of the ſoft palate, divided into two arches by the uvula; and at the ſides by the gloſſo-palatine folds of membrane continued from the palate to the tongue. Juſt behind theſe the convex ſurface of the tonſils is diſcernible. In the back view of the ſame aperture, from the bag of the pharynx, we ſee, as from the front, the tongue below, and the double arch of the palate with the uvula above. But the ſides are here formed by the pharyngo-palatine folds, produced from the velum in a perpendicular direction to the ſides of the pharynx. The convexity of the tonſil is conſpicuous alſo in this view.

The ſoft palate has two membranous ſurfaces, of which the anterior is continuous with that of the palate, and the poſterior with the pituitary membrane. Theſe are continued into each other at the looſe edge of the curtain. The palatine portion of the membrane covers a thick layer of granular bodies, which pour out a copious mucous ſecretion from numerous pores eaſily diſtinguiſhable by the naked eye. The uvula contains a conſiderable maſs of ſimilar glands. The muſcles of the palate contribute alſo to its ſubſtance. The azygus uvulæ occupies the centre, and the levator and circumflexus palati are expanded in the lateral portions of the velum. The folds produced from the palate to the tongue and pharynx contain alſo muſcular fibres.

The remarks which we have to make reſpecting the motions of the ſoft palate, and the effect which theſe produce on the iſthmus faucium, will be given in the deſcription of the pharynx.

Muſcles of the Palate. Levator palati mollis (ſalpingo-ſtaphylinus; periſtaphylinus internus).—This muſcle conſiſts of a conſiderable collection of fibres; it is rounded above, and flattened below, and ſituated at the ſide of the poſterior opening of the noſe. Ariſing from the under ſurface of the petrous portion of the temporal bone, in front of the carotid canal, and from the cartilage of the Euſtachian tube, it paſſes obliquely downwards and inwards, and expands in the middle of the ſoft palate. The circumflexus palati and ſuperior conſtrictor of the pharynx cover it externally, and the membrane of the pharynx on the inſide. It will draw the ſoft palate upwards, and apply it againſt the poſterior openings of the noſe.

Circumflexus palati (ſpheno-ſalpingo-ſtaphylinus; periſtaphylinus externus).—This muſcle is flattened and elongated in its figure, and lies along the pterygoid proceſs of the ſphenoid bone. It ariſes from the cartilage of the Euſtachian tube, and from a ſuperficial foſſa of the internal pterygoid plate, to which it is attached as far as the commencement of the hook-like proceſs. It then forms an aponeuroſis, which turns round the hook, being furniſhed with a burſa mucoſa; turns horizontally inwards, and expands in the middle of the palate, uniting with the muſcle of the oppoſite ſide. It is ſituated between the external pterygoid muſcle and the internal pterygoid plate, and ſuperior conſtrictor of the pharynx.

Its action will be the ſame as if it had ariſen from the pterygoid hamulus. It will draw down the velum from the noſe, and will expand it laterally.

Azygus uvulæ (palato-ſtaphylinus; ſtaphylinus; epiſtaphylinus).—It is a ſmall muſcle, ſometimes double, of an elongated form, ariſing from the pointed projection at the back edge of the os palati, and running along the middle of the velum and uvula, in which latter it terminates. It is covered on its poſterior ſurface by the membrane of the palate, and

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in front by the expanded inſertion of the levator palati. It elevates the uvula, and ſhortens it; when we look into the throat of a living perſon, its action may be ſeen in the motions of the uvula.

Palato-pharyngeus (pharyngo-palatinus; pharyngo-ſtaphylinus).—The membranous folds continued from the ſoft palate to the tongue and pharynx contain muſcular fibres, and the poſterior ones are deſcribed under the above names. It has a broad origin in the ſubſtance of the palate from the aponeurotic expanſion ariſing from the union of the tendons of the circumflexi; paſſes firſt outwards, and then turns in an arched courſe downwards and backwards, conſiſting of a thin ſtratum of muſcular fibres. Here it follows the courſe of the pharyngo-palatine fold, the membrane of which covers it towards the pharynx. It expands into the ſide of the bag, and has its fibres mixed with the middle conſtrictor and ſtylopharyngeus, and ſlightly connected to the thyroid cartilage. In the palate it is ſituated in front of the levator palati; and below, between the membrane of the pharyngo-palatine fold, and the conſtrictores pharyngis. As both its inſertions are moveable, it may influence them both by its contraction. The ſuperior muſt be conſidered as the moſt capable of motion; it will therefore depreſs the ſoft palate, carry it away from the noſe, and bring it againſt the root of the tongue. It may, at the ſame time, contribute to elevate and dilate the pharynx. If the larynx were held in its depreſſed ſtate, it would act merely on the palate, and would bring that part in contact with the tongue; as, on the contrary, if the palate were fixed by its elevating powers, it would draw up the pharynx.

Palato-gloſſus (gloſſo-palatinus; gloſſo ſtaphylinus; conſtrictor iſthmi faucium).—This is the muſcle ſituated in the anterior or gloſſo-palatine fold of membrane, and it poſſeſſes an arched form like the preceding one. It deſcends from the palate along the anterior part and ſide of the iſthmus faucium, conſiſting of a few but eaſily diſcernible fibres, covered only by the thin membrane. It is attached to the root of the tongue. The effect of its action is very ſimilar to that of the former, the approximation of the palate to the root of the tongue.

The *tonſils* are glandular bodies occupying the ſpace left between the gloſſo-palatine, and pharyngo-palatine folds of membrane, extending above to the point at which theſe folds are united, and below to the baſe of the tongue. The palato-gloſſus muſcle lies in front of the gland, and the palato-pharyngeus behind. The two muſcles juſt mentioned preſs the tonſils between them in the act of deglutition, and ſqueeze out the ſecreted fluid from their excretory ducts. When they are inflamed, as in the various affections of theſe parts denominated ſore throat, &c. this preſſure gives riſe to the difficulty and pain experienced at that time in the act of ſwallowing. The form of the tonſil, which is ſubject to much variety, approaches moſt nearly to the oval figure, with the long axis placed perpendicularly; and the ſize is tolerably well expreſſed by the common compariſon to an almond, from which the name of *amygdalæ* has been given to theſe glands. They are often divided into lobes more or leſs diſtinct from each other. Their colour is rather grey, and their texture ſoft. The convex portion of the glands, which projects between the two folds of membrane, has ſeveral openings on its ſurface, leading into ſmall cells hollowed out in the ſubſtance of the tonſil, and lined by continuations of the membrane of the mouth. The mucus ſecreted by the veſſels of the part is depoſited in theſe cells by the excretory tubes, from which it may be preſſed out in the dead ſubject. This fluid, which is tranſparent in the healthy ſtate, becomes white and opaque in certain inflammatory affections, and then lodging in the ſuperficial cells, gives the deceptive appearance of a ſmall ulcer or ſlough in the part.

Smaller glandular maſſes of a ſimilar ſtructure and office exiſt, as we have already mentioned, in conſiderable numbers, in the ſubſtance of the velum palati and uvula. The back of the tongue is furniſhed likewiſe with ſeveral ſmall roundiſh flattened prominences, which give it an irregular and tuberculated appearance in this ſituation; there are alſo mucous glands, called *linguales;* and they diſcharge their fluids by an opening which is conſpicuous in the centre of each tubercle. The uſe of this mucous apparatus, exiſting in ſuch abundance in every part of the iſthmus or contracted aperture, which forms the communication between the mouth and pharynx, ſeems very obvious; that of furniſhing a lubricating fluid, to facilitate the paſſage of the food, particularly when it is of a dry nature.

The *tongue* conſtitutes the organ of taſte; but it is by no means confined to that office; we conſider it here as forming a part of the mouth, and as concurring by its motions in the proceſſes of maſtication and deglutition. It is alſo moſt immediately and eſſentially concerned in the production of articulated ſounds. Beſides the offices now enumerated, it performs a moſt important part in the earlier periods of our exiſtence, as an indiſpenſible agent in the act of ſuction; as the means therefore by which we derive our firſt nouriſhment.

Two parts are to be conſidered in treating of this organ: the bone ſituated under it, and affording it a firm ſupport, as well as a point of origin for the various muſcles which move it; and the ſoft muſcular body forming the tongue properly ſo called.

The *os hyoides*, or *linguale*, is ſituated between the baſe of the tongue and the larynx: the former part is cloſely connected with it above, and the latter is no leſs firmly attached below. It receives the inſertions of the muſcles of both theſe organs, and therefore is a part of the firſt importance in the ſubject of the preſent article.

It has received the name of hyoides from its reſemblance to the Greek *υ*, to which indeed it may be very well compared. It is placed in the neck, with its convexity forwards, and the two extremities backwards; and is divided into a baſis, which is the middle part, and two cornua, which form the ſides. Theſe are joined together by ſynchondroſes. The *baſis*, which is the thickeſt portion, is rather flattened in its form, and preſents an oblique ſurface to the front, marked with a more or leſs regular crucial projection, and giving attachment to the following muſcles in a ſeries from before backwards; *viz.* digaſtrici, ſtylo-hyoidei, mylo-hyoidei, genio-hyoidei, and hyagloſſi. Behind it is rather concave, and gives attachment to a membranous ligament tying it to the thyroid cartilage. The ſuperior margin has the hyogloſſus fixed to it, and the inferior receives the inſertions of the ſterno-hyoidei, omo-hyoidei, and thyro-hyoidei. It terminates at each end by a ſmooth ſurface, united to a correſponding one of the cornu, by means of cartilage; and the two parts are ſeldom anchyloſed together. The two *cornua* are much longer and thinner than the baſe, and are alſo flattened in their form. They are broader before than behind, and ſlightly bent inwards towards each other. The hyo-gloſſus and middle conſtrictor of the pharynx are inſerted into them above; the thyro-hyoideal membrane and a part of the thyro-hyoideus below. Internally they are covered by the membrane of the pharynx. The anterior and broadeſt extremities of the cornua are ſurmounted by two ſmall bits of bone, named the *cornicula* of the os hyoides. Their ſize and figure are very much like thoſe of a grain of wheat, and their poſition is inclined; one extremity pointing

downwards and forwards, the other upwards and backwards. By the former of theſe it is united to the ſynchondroſis, which connects the baſis and cornu of the os hyoides, but is moveable in its ſituation. Some fibres of the hyogloſſus are fixed to it; and its upper extremity receives the inſertion of the ſtylo-hyoideal ligament. The poſterior extremity of the cornu of the os hyoides terminates in a ſomewhat rounded tubercle, to which the hyo-thyroideal ligament is fixed. The baſis of this bone contains much of the cancellous texture; but that is leſs abundant in the cornua. Its oſſification commences by five points; one for the baſis, one for each of the cornua, and one for each corniculum. Theſe bony pieces are ſeparated at firſt by much cartilage, which is gradually oſſified, except at the points of junction, where a lamina of cartilage remains through life.

Independently of the numerous muſcles which fix the os hyoides in its place, it is attached by various ligamentous connexions. Below, the thyro-hyoideal membrane and ligaments tye it to the larynx in ſuch a way that this part follows all its motions. Thus being interpoſed between the larynx and tongue, it is a common centre neceſſary to the motions of both thoſe parts. Properly ſpeaking, it has no functions of its own; its motions are not relative to itſelf, but are deſigned merely to produce motion of the tongue or larynx. It is only connected to the tongue by means of muſcular fibres; but it is fixed to the baſis cranii by a ligament which we proceed to deſcribe.

The *ſtylo hyoideal ligament* ariſes from the ſtyloid proceſs of the temporal bone, deſcends obliquely forwards and inwards, and is fixed to the leſſer cornua of the os hyoides. It is of different thickneſs in different individuals; and often contains ſmall granulated portions of cartilage or bone. Indeed it is ſometimes converted into bone in almoſt its whole extent, and it appears then as a continuation of the ſtyloid proceſs. It prevents the depreſſion of the larynx from proceeding beyond a certain point. That cavity cannot deſcend without carrying with it the os hyoides, which is not at all reſtrained by the tongue, ſince that alſo is moveable.

Muſcles moving the os hyoides.—The digaſtricus or biventer maxillæ, which we have already deſcribed, muſt be enumerated with theſe; ſee its deſcription in a preceding part of the article.

Tranſverſus mandibulæ (mylohyoideus).—This is a very broad and rather thin muſcle; flattened on its ſurfaces, and extending tranſverſely acroſs the ſpace left between the two ſides of the lower jaw-bone. It has a tendinous origin, from an oblique ridge of the inner ſurface of the jaw, which commences juſt under the laſt molar tooth, and then extends obliquely downwards and forwards to the ſymphyſis. Its fibres are continued to the ſame point on the oppoſite ſide in an arched direction, the muſcle being concave on its ſuperior, and convex on its inferior aſpect.

In the middle of the muſcle, in a ſtraight line from the ſymphyſis of the jaw to the baſe of the os hyoides, there is a portion of tendon, broader towards the lower part, and then growing gradually narrower. All the fibres, derived from the lateral portions of the jaw-bone on either ſide, form right angles with this middle line. It muſt be immediately obvious, from the preceding deſcription, that the fibres of the muſcle differ much in length; the poſterior ones are the longeſt, and are inſerted into the upper edge of the baſe of the os hyoides, juſt behind the digaſtricus; the ſucceeding fibres become progreſſively ſhorter and ſhorter to the anterior edge of the muſcle, where their length is very inſignificant. The external ſurface of this muſcle is in contact on either ſide with the anterior portion of the digaſtricus, with the ſubmaxillary gland and latiſſimus colli. Internally it covers the genio-hyoideus, genio-gloſſus, hyogloſſus, ſublingual gland, Whartonian duct, and nerve of the ninth pair.

It elevates the os hyoides, and at the ſame time raiſes all the parts in front of that bone, which are contained in the concavity of its fibres. Hence it muſt preſs the tongue againſt the palate, and compreſs the ſublingual glands. When the os hyoides is fixed, it may depreſs the lower jaw.

Genio-hyoideus.—This muſcle, which is placed immediately behind the middle tendinous line of the tranſverſus mandibulæ, is of a rounded form, and extends from the inferior tubercle of the inner ſurface of the chin, obliquely downwards and backwards, to the middle of the baſis of the os hyoides. It lies very cloſe to its fellow of the oppoſite ſide, to which it is connected by fine and ſhort cellular threads, ſo that on a ſuperficial inſpection they would appear to form one muſcle. It is covered on its anterior and inferior aſpect by the tranſverſus mandibulæ, and lies in contact, by its oppoſite or poſterior ſuperior edge, with the genio-gloſſus.

It elevates and carries forwards the os hyoides; and of courſe it draws up the larynx at the ſame time. It aſſiſts in protruding the tongue from the mouth. When the os hyoides is fixed by the powers that depreſs it, it will draw down the lower jaw.

Stylo-hyoideus.—This is a ſlender elongated muſcle, having a tendinous origin from the ſtyloid proceſs, deſcending obliquely forwards and inwards, rather increaſing in breadth as it deſcends, and inſerted into the baſis or the front end of the cornu of the os hyoides. It is generally, but not always, furniſhed with a ſlit, through which the tendon of the digaſtricus paſſes. It is covered externally by the digaſtric, and on the inſide has the ſame relations as that muſcle. It draws the os hyoides upwards and backwards and towards its own ſide; and therefore contributes to reſtore the tongue when it has been protruded from the mouth; both muſcles acting together, muſt elevate it nearly in a ſtraight direction. If it is employed in concert with the genio-hyoideus and tranſverſus mandibulæ, the larynx will be elevated directly, as the oppoſition of the powers tending to carry it forwards and backwards prevents it from moving in either of theſe ways.

Omo-hyoideus (coraco-hyoideus, coſto-hyoideus, omoplato-hyoideus).—It ariſes by tendon from the ſuperior coſta of the ſcapula, juſt behind the notch at the root of the coracoid proceſs, and ſometimes from the ligament ſtretched over that notch. Forming a thin, flat, and narrow muſcle, it aſcends along the neck obliquely forwards and inwards, connected, as it paſſes behind the clavicle, to the back of that bone, by an aponeuroſis. It goes between the ſterno-cleido-maſtoideus, and the veſſels of the neck, and is contracted at that part into a thin and narrow tendon. Afterwards it aſſumes again the ſame fleſhy form which it poſſeſſed before, and emerging from under the ſterno-cleido-maſtoideus, aſcends more directly in the front of the neck, and contracting in its breadth is inſerted tendinous into the lower margin of the baſis of the os hyoides. It is the longeſt and thinneſt of the muſcles of the neck. It poſſeſſes in the embryo a nearly equal breadth throughout, without any middle tendinous portion. It is covered by the latiſſimus colli, ſterno-cleido-maſtoideus, clavicle, and trapezius; and lies upon the ſcaleni, the cervical nerves, carotid artery, and internal jugular vein, ſuperior thyroideal veſſels, and hyothyroideus muſcle. The ſterno-hyoideus lies along the front edge of its upper portion. It ſometimes ariſes from the clavicle. It will draw the os hyoides obliquely backwards and downwards towards its own ſide; or directly downwards, if it

acts

acts in conjunction with the oppoſite muſcle. By depreſſing the os hyoides, and fixing it in its depreſſed ſituation, it will aſſiſt, as well as the three ſucceeding muſcles, in carrying down the lower jaw. For the os hyoides is then a fixed point, from which the muſcles extending from its upper part to the jaw may act.

Sterno-hyoideus.—This is a broad, thin, and flat muſcle, ſituated on the front of the neck, juſt under the platyſma myoides, and extending from the top of the cheſt to the front of the larynx. It has a broad tendinous origin from the outer part of the poſterior ſurface of the firſt bone of the ſternum, from the contiguous cartilage of the firſt rib, from the joint of the clavicle and ſternum, and from the clavicle itſelf. It grows rather narrower as it aſcends, covers the ſurface of the trachea, and approximates to the muſcle of the oppoſite ſide. The two together completely cover the front of the larynx, and are inſerted into the middle of the lower edge of the baſis of the os hyoides, in the ſpace left between the attachments of the two omo-hyoidei. It is covered by the platyſma myoides, and ſterno-cleido-maſtoideus; and lies upon the ſterno-thyroideus, hyo-thyroideus, crico-thyroideus, thyroid gland, and ſuperior thyroid veſſels. It draws down the os hyoides and parts connected to it, as the tongue, larynx, lower jaw, &c. It may even, through the connexions of the os hyoides, bend the head forwards.

The *ſterno-thyroideus* is a muſcle of ſimilar ſhape and ſituation to the former, behind which it lies. Its origin is by a broad tendon from the poſterior ſurface of the firſt bone of the ſternum, from which part it aſcends in front of the trachea, and thyroid gland, and is ſoon marked by a tranſverſe tendinous line. Its edge at firſt touches that of the oppoſite muſcle in front of the trachea; it grows narrower as it paſſes upwards, and at the ſame time ſeparates from the other: it terminates by a tendinous inſertion into the oblique ridge of the ala of the thyroid cartilage. Its ſurface is every where covered by the ſterno-hyoideus; and it lies upon the ſubclavian, and internal jugular veins, the carotid artery, the trachea, the thyroid gland and its veſſels, and the crico-thyroideus. It depreſſes the thyroid cartilage, and at the ſame time the whole larynx, os hyoides, and parts connected with it. It concurs therefore in producing the ſame effect with the preceding muſcles, for which reaſon we deſcribe it here, although it is not attached to the os hyoides.

The *hyo-thyroideus* is a muſcle of a flattened form, ariſing from the oblique ridge of the thyroid ala, and aſcending in a ſtraight direction to the under edge of the cornua of the os hyoides, in which it is inſerted. It is covered by the ſterno-hyoideus, and omo-hyoideus externally, and it lies on the thyroid cartilage. It will mutually approximate the os hyoides and larynx; elevating the latter, or depreſſing the former, according as the fixed and moveable points may be changed. It is obvious that the muſcles, which we have juſt deſcribed, muſt be regarded in reference to the effects which they produce on parts connected to the os hyoides. The aſcent and deſcent of that bone cannot take place without correſponding motions of the larynx, and theſe are one of the means by which the tone of the voice is altered in ſpeaking or ſinging. Again, the pharynx is ſo intimately connected with the larynx, that it follows every motion of the latter; and its aſcent and deſcent in the neck, in the proceſs of deglutition, are effected through the action of the hyoideal muſcles. We ſee that the os linguale is a very moveable part; that its connexions in the neck leave it a free power of motion, and that it poſſeſſes numerous muſcles, capable of moving it in every direction.

The *tongue* occupies the lower part of the mouth; is bounded in front and at the ſides by the teeth and alveolar portions of the two jaws, behind by the epiglottis, above by the palate, and below by the os hyoides and its muſcles. Its bulk and form are ſubject to much variety, as it admits of elongation and retraction by the action of its various muſcles. It is ſmaller in ſize, and looſe towards the front; here it terminates by a rounded end, rather flattened on its upper and lower aſpects, and named the apex. At the back part it becomes broader, thicker, and more convex, and is cloſely attached below to the ſurrounding parts: this is called the baſis or root of the tongue. The ſuperior ſurface, which is perfectly looſe and unconnected in its ſituation, preſents a ſlight and general convexity, divided however by a ſuperficial groove running along its middle from before backwards, into two equal halves. Theſe are loſt towards the ſides in the two edges of the tongue, which correſpond with the interval of the two rows of teeth, and like the ſuperior ſurface are free from all kinds of attachment. The lateral portions of the organ, which are in contact with the inner ſurface of the lateral teeth, and the inner alveolar plate of the lower jaw, are flattened in their form, and are unconnected in their ſituation. The inferior ſurface of the tongue cannot be very clearly defined, as we cannot exactly point out the boundaries between the tongue itſelf and its muſcles. It is connected below, throughout at leaſt two thirds of its under ſurface, in the ſpace left between the two lateral diviſions of the lower jawbone, with ſeveral muſcles, ariſing from the jaw, ſtyloid proceſs and os hyoides, and continued into the ſubſtance of the organ, which they have the power of moving in every direction, in the cavity of the mouth. It is the intermixture of theſe muſcles with the lingual nerves and veſſels, and with a large maſs of a very peculiar muſcular fibre, called the lingualis muſcle, that forms the ſubſtance of the tongue. Towards the front of the organ the inferior ſurface is looſe and unconnected, except towards its middle, where it is tied by the frænum to the lower jaw at the poſterior ſurface of its ſymphyſis. The back edge of the tongue is connected to the epiglottis by three folds of membrane.

The membrane of the mouth, after covering the inner alveolar plate of the lower jaw, is produced over the projecting portion of the ſublingual gland, and then arrives at the inferior ſurface and ſides of the tongue; from which it is continued to the upper convex part of the organ. In the former ſituation it is ſmooth like the lining of the cheeks; but in the latter it forms a moſt rough ſurface, preſenting innumerable prominences named papillæ, and conſidered to be the immediate organs of the ſenſe of taſte; for a deſcription of which, ſee TONGUE.

Muſcles of the Tongue.—The *ſtyloglooſſus* is a ſlender elongated muſcle, having a very thin tendinous origin from the ſtyloid proceſs; it deſcends growing gradually broader, and becomes connected to the poſterior and lateral part of the tongue, along the ſide of which it runs as far as the very apex of the organ, mixed with the fibres of the hyo-gloſſus. The parts in contact with it are the digaſtricus, ſubmaxillary gland, and nerve of the ninth pair externally; the ſuperior conſtrictor of the pharynx and the lingualis internally.

Hyo-gloſſus, (baſio-gloſſus, cerato-gloſſus, and chondro-gloſſus of Albinus).—This is a broad and thin muſcle, ariſing extenſively from the os hyoides, to the baſis, cornu, and corniculum of which it is attached, aſcending in a ſtraight direction, and terminating in the ſide of the tongue. The parts in contact with it are, externally, the digaſtricus, ſtylo-hyoideus, mylo-hyoideus, nerve of the ninth pair. and ſublingual gland; internally, the lingual artery, gloſſopharyngeal nerve, and genio-gloſſus muſcle.

Genio-

Genio-gloſſus.—This is a very large, ſtrong, and broad muſcle, flattened in its front, and paſſing from the poſterior ſurface of the chin to the ſubſtance of the tongue. It has a ſmall but ſtrong tendinous origin from the higheſt of the eminences placed behind the anterior part of the lower jaw-bone. From this point its fibres extend in a radiated form; the lower ones paſs obliquely downwards and backwards, and are inſerted into the baſis of the os hyoides; and the others are continued in various directions towards the ſuperior ſurface of the tongue, according as they paſs towards the baſis, the middle, or the apex of the organ. Its fibres are moſt intimately blended with thoſe of the lingualis, as well as with the hyo gloſſus. With the external ſurface of this muſcle the following parts are in contact, *viz.* ſublingual gland, hyo-gloſſus and ſtylo-gloſſus. The oppoſite muſcle is connected by a fatty ſubſtance to its inner ſurface; and the genio-hyoideus lies along its lower and front edge.

The *lingualis* is uſually deſcribed as a ſmall elongated faſciculus of fibres placed below and at the ſide of the tongue, between the hyo-gloſſus and ſtylo-gloſſus externally, and the genio-gloſſus on the inſide, and running from the baſis to the apex of the organ. This, however, is only a ſmall part of the fibres of the tongue, the whole ſtructure of which is muſcular. It is very difficult to follow the courſe of the fibres lying under the ſuperior mucous ſurface; ſeveral are tranſverſe, ſome oblique, and others longitudinal. Their union with each other, and with thoſe of the genio, hyo, and ſtylo-gloſſi above deſcribed, conſtitutes an inextricable mixture, and all the fibres not belonging to either of thoſe muſcles muſt be ſet down to the lingualis. It is this union of muſcular fibre, together with more or leſs of a ſoft fatty matter, covered by the mucous membrane of the mouth, that conſtitutes the tongue.

Motions of the Tongue.—Theſe may be conſidered in two points of view: 1ſt, as far as they are produced by the fibres of the tongue itſelf, which form the lingualis; and 2d, thoſe which ariſe from the action of the exterior muſcles. In the firſt claſs we may enumerate 1ſt, a retraction of the tongue in the mouth, by the action of the longitudinal fibres of the lingualis; 2dly, an elongation, ſhort of the paſſage of the apex between the teeth, from the relaxation of thoſe fibres; 3dly, a curvature in the tranſverſe direction, bringing the point againſt the ſurface of the cheek, by means of the lateral longitudinal fibres; 4thly, a curvature of the apex by the inferior fibres, ſo as to bring it towards the frænum; or by the ſuperior ones, ſo as to expoſe the under ſurface of the tongue when the mouth is opened, to bring the point againſt the palate, and even to direct it towards the iſthmus faucium. It has been ſuppoſed, that the apex may be carried backwards in this direction, ſo as to produce ſuffocation. It is rather difficult to conceive this, even ſuppoſing a very peculiar natural conformation to obtain, as a remarkable looſeneſs of the frænum. But it is altogether out of the queſtion to admit it as a circumſtance generally practicable, and capable of being produced at pleaſure. The motions now deſcribed take place chiefly towards the front of the tongue, which being entirely unattached, has a great power of motion.

The following motions take place in the tongue from the action of the external muſcles. It is carried forwards, ſo that the apex paſſes between the teeth and the anterior looſe portion is protruded from the mouth, by the inferior fibres of the genio-gloſſi: the os hyoides accompanies the tongue in this motion to ſome extent, being ſlightly elevated and carried forwards. The anterior fibres of the genio-gloſſus, and the ſtylo-gloſſus reſtore the tongue to its former poſition. The depreſſion of the tongue, conſidered as affecting the whole organ, is effected by the whole of the genio-gloſſi, with the hyo-gloſſi. The elevation of the tongue, as far as the apex is concerned, is chiefly effected, as we have already ſtated, by the lingualis: the baſis is drawn upwards by the ſtylo-gloſſus. The whole organ together will be raiſed in the mouth, and preſſed againſt the palate by the tranſverſus mandibulæ. By the varied and combined actions of the muſcles, which are ſituated towards the ſides and middle of the organ, it may be rendered concave or convex in its ſuperior ſurface. It is not however to theſe ſimple motions that the tongue is confined: theſe may be modified and combined in a variety of ways which it would be difficult to deſcribe with preciſion, and which we ſhall beſt underſtand by adverting to the functions of the part as an organ of maſtication and articulation.

Maſtication.—By the parts now deſcribed the food is taken into the mouth, and retained there for the purpoſe of maſtication. There is ſome muſcular exertion at its entrance into the mouth: the lips are ſeparated, and ſlightly everted, exerting ſometimes a kind of prehenſile power, the lower jaw gently carried downwards. Liquids are taken in by the united agencies of the lips and tongue, which are obſerved to exert themſelves in two ways. The firſt method is that of ſuction, and is almoſt peculiar to the child. The nipple of the mother is embraced by the lips, which contract cloſely round it from the action of the orbicularis. The tongue formed into a longitudinal channel, by the action of the genio-gloſſi, is applied in front to the nipple, receives the fluid which comes from that part, and tranſmits it to the pharynx. When the lips and tongue are thus placed, the enlargement of the cheſt forms a vacuum in the mouth, and the preſſure of the external air on the ſurface of the breaſt forces out the milk. We can alſo drink by immerſing the lips in a fluid; and the mechaniſm is the ſame, in this inſtance, as in the preceding. This is the way in which the horſe drinks. The other method is by applying the lips to a veſſel containing the fluid, in which caſe alſo the tongue forms a channel. Here the fluid paſſes into the mouth chiefly by its own weight, as we in a manner pour it in from the containing veſſel. There is a third poſſible method of taking liquids; but it is very ſeldom employed; *viz.* by opening the mouth widely, throwing back the head, and pouring them into the throat. The food, whether ſolid or fluid, is retained in the mouth by cloſing the aperture, and applying the lips and cheeks againſt the teeth. It is propelled into the back part of the mouth by means of the lips or cheeks preſſing on it; and is moved about into every part of each diviſion of the cavity by the wonderfully quick and varied motions of the tongue, which by the elevation of its ſides is formed into a ſort of cup for that purpoſe. Or its point is paſſed between the teeth to clear the food from the corners and ſides of the cavity. At the ſame time the teeth are either brought together perpendicularly, ſo as to divide the food by the act of biting; or the inferior molares, by the lateral motions of the lower jaw, grind the alimentary ſubſtance againſt the ſuperior ones, which remain immoveable. The different portions are collected, and repeatedly ſubjected to this action by the motions of the tongue and cheeks; and when ſufficiently reduced, it is placed in a maſs on the ſuperior ſurface of the tongue, previouſly to ſwallowing.

This mechanical trituration is of the greateſt importance in preparing the food for the action of the digeſtive organs. For there is no force applied to the aliment in the ſtomach, or inteſtines, that can be at all conſidered as equivalent to the effect of maſtication. It is well-known that even the ſkin of a grape is not broken in its paſſage through the whole alimentary canal. Imperfect maſtication muſt

therefore much injure digeſtion; and hence old perſons digeſt badly, unleſs they cut their food minutely ſo as to reſemble the effect of chewing. "I can eaſily believe," ſays a great phyſiologiſt, "that a much ſmaller quantity of food would afford a ſufficient proportion of nouriſhment, if it were more completely chewed. Hence nature has attached a great pleaſure and enjoyment to the performance of this proceſs: and I have found the drieſt bread become ſweet and grateful to the palate, when long and thoroughly chewed." Haller Elem. Phyſ. t. 6. p. 40.

Salivary Glands.—The proceſs of maſtication, if it were performed on the food alone, would reduce it to a dry, or at leaſt a very tenacious maſs. that could not be moved about in the mouth for the purpoſe of complete trituration, without clogging the teeth very much, and adhering very unpleaſantly to the ſurface of the parts; and that could not certainly be ſwallowed without extreme difficulty. Theſe ſources of inconvenience are obviated by the ſalivary and other glandular apparatus placed in the neighbourhood of the mouth, and furniſhing large quantities of fluid for the purpoſe of moiſtening the food to the requiſite degree. The utility of the liquor, poured into the mouth from theſe glands, may be eſtimated from the inconvenience experienced when it is too ſmall in quantity. When we are eating very dry food, as mealy potatoes, they abſorb the ſaliva very rapidly, and require ſo much dilution, that the fluid is not ſupplied in ſufficient abundance: a difficulty is then experienced in chewing; and the morſel, which has not been duly moiſtened, often ſtops in the fauces, producing a ſenſe of ſuffocation, and paſſing down to the ſtomach very ſlowly.

The proper ſalivary glands are three in number; and they reſemble each other in their general ſtructure, although differing in ſituation, form, &c.

The ſalivary glands are ſymmetrical; that is, they are exactly alike on the right and left ſides of the body. They are all ſituated in the neighbourhood of very moveable parts, and are conſequently ſubjected by their ſituation, to compreſſion from the motions of ſuch parts. The preſſure which they thus experience from the ſurrounding bones and muſcles contributes to evacuate the contents of their excretory tubes, and to excite a farther ſecretion. As the parts, by which the glands are compreſſed, are the organs employed in maſtication, the ſecreted fluid is prepared in large quantity and poured into the mouth at the particular period when its preſence in that cavity is eſpecially neceſſary. They receive their blood veſſels in numerous ramifications, but theſe are generally produced from a large arterial trunk; and ſeveral branches of nerves from the brain are diſtributed in them. They are of a reddiſh grey colour, and tolerably firm texture. They are made up of ſeveral very diſtinct lobes, united by a cellular texture; theſe are formed by the conglomeration of many ſmaller lobules, in which we can again diſcern numerous diviſions into ſtill ſmaller particles. A thin layer of cellular ſubſtance, continuous with that which unites the different lobes, covers the ſurface of the gland; and this is again incloſed in a diſtinct and tolerably denſe capſule, connected by cellular texture of a looſe kind to the ſurrounding parts. Each of the minute particles, of which the gland conſiſts, furniſhes an excretory tube; and thoſe of the neighbouring lobuli unite together, forming larger and larger trunks, which open ultimately into the mouth, and poſſeſs an internal lining continuous with the mucous membrane of that cavity.

The Parotid Gland.—This largeſt of the ſalivary glands derives its name from being ſituated near the ear. On removing the integuments and adipous membrane from the ſide of the face, a large and flattened glandular maſs, of an irregularly oval figure, is diſcovered lying between the maſſeter muſcle and external ear before and behind, and the zygoma and angle of the jaw above and below. The gland however is much more conſiderable in its bulk than this ſuperficial view would indicate: for its ſubſtance extends conſiderably in an internal direction, in the deep hollow behind the ramus of the lower jaw. There is no diſtinction between theſe two parts, although we deſcribe them ſeparately.

The external broad portion of the gland extends more or leſs towards the face. Its outer ſurface is ſlightly convex, and partly covered by the latiſſimus colli, partly by the integuments. It covers a conſiderable portion of the maſſeter, from which it is ſeparated by the chief ramifications of the facial nerve: above it extends to the under edge of the zygoma, and lies on the joint of the lower jaw, in ſome inſtances; below it is not continued further than the ramus of the jaw, and behind it lies againſt the cartilage of the ear. The front edge is thin and irregular, and the parotid duct uſually comes off from it about a finger's breadth below the zygoma. A ſmall appendix of the gland generally accompanies the duct juſt where it emerges. The more internal portion of the gland, which is buried behind the ramus of the lower jaw, is bounded above by the joint of the jaw; in front by the inner ſurface of the ramus, and the edge of the pterygoideus internus; behind by the meatus auditorius, maſtoid proceſs and ſuperior extremity of the ſterno-cleido-maſtoideus, internally by the ſtyloid proceſs and its muſcles, the internal jugular vein and internal carotid artery. The external carotid artery paſſes through the ſubſtance of the gland, towards its poſterior part; and divides in its ſubſtance into the three branches by which it terminates; *viz.* the ſuperficial temporal, the tranſverſalis faciei, and the internal maxillary. Hence thoſe veſſels ſeem to emerge from the gland. The facial nerve paſſes alſo through the parotid, and divides in its courſe into thoſe numerous branches which form the pes anſerinus. The nutrient arteries and the nerves of this gland are derived from the trunks of both kinds which traverſe its ſubſtance. Its weight, as given by Wharton, is four drams and a half.

The *Parotid* or *Stenonian Duct*, coming out of the gland in the ſituation already deſcribed, paſſes in an horizontal direction upon the tendon of the maſſeter, and turns inwards at the front edge of that muſcle. Penetrating the fat of the cheek it goes through a diviſion in the fibres of the buccinator and opens in the mouth by a very ſmall round orifice oppoſite to the firſt molar tooth of the upper jaw. It is accompanied by ſeveral vaſcular and nervous ramifications; and ſituated ſuperficially while it is croſſing the maſſeter. In front of that muſcle it is ſurrounded by much adipous ſubſtance, and partly covered by the zygomaticus major. Its coats are very thick, and compoſed of a white, denſe, and firm ſubſtance: the calibre of the veſſel is of courſe ſmall in compariſon with its bulk. After leaving the parotid gland, it receives the excretory duct of that acceſſory portion, which is placed above it.

Sub-maxillary Gland.—This is of a roundiſh ſhape, much ſmaller than the parotid, and weighing about four drams and a half. It conſiſts of larger lobes than that gland, and is uſually ſurrounded by ſeveral lymphatic glands. It occupies the ſpace left between the inner ſurface of the ſide of the jaw, the mylo-hyoideus, and the digaſtricus. Behind it is continued nearly to the angle of the jaw, and has been ſometimes connected with the lower end of the parotid in that ſituation: towards the front it is bounded by the anterior portion of the digaſtric and the genio-hyoideus. It is covered externally partly by the baſis of the jaw, and partly by

by the latiſſimus colli; internally it lies on the lingual nerve, the ſtylogloſſus, hyogloſſus, and facial artery. A portion of this gland, continued behind the back edge of the mylo-hyoideus, joins the ſublingual, ſo that theſe two are compoſed of one continuous ſubſtance.

The arteries of the ſub-maxillary gland are derived from the facial, which is imbedded in the gland, and the lingual. The nerves are from the lingual branch of the inferior maxillary.

The excretory tube of this gland is generally called the *Whartonian Duct*. It is of large ſize, and thin in its coats. It comes off from the gland near the appendix above-mentioned, accompanies it behind the mylo-hyoideus, then goes along the inner ſurface of the ſublingual gland to perforate the membrane of the mouth juſt at the ſide of the frænum of the tongue. The aperture is much ſmaller than the diameter of the duct, and it is formed in a projecting and extenſile papilla of the membrane. It is placed, in the firſt part of its courſe, between the mylo-hyoideus and hyogloſſus: and afterwards between the ſublingual gland and genio-gloſſus. It is accompanied by the lingual branch of the inferior maxillary nerve.

The *ſub-lingual*, or ſmalleſt of the three ſalivary glands, is flattened in its figure, and very narrow from ſide to ſide, but deep from above downwards. It lies, as the name imports, under the tongue, and has the two flat ſurfaces looking right and left. It is placed between the mylo-hyoideus, and the genio-gloſſus: the two glands are parallel, and are ſeparated by the genio-gloſſi muſcles. The mylo-hyoideus covers its outer flat ſurface, and ſeparates it from the ſub-maxillary gland: the inner is in contact with the genio-gloſſus. The front edge touches the ſymphyſis of the jaw, while the poſterior reaches to the hyo-gloſſus. The ſuperior margin forms a projection in the mouth, covered only by the mucous membrane, and extending from the frænum of the tongue backwards, between the under ſurface of that organ, and the ſide of the lower jaw. The arteries come from the lingual, and the nerves from the lingual branch of the inferior maxillary. Haller has given us a minute account of the excretory ducts of this gland in the 6th volume of his great work, ſect. 2. § 7. When the ſub-maxillary and ſub-lingual glands are not connected by the appendix which we have deſcribed, and even ſometimes when they are, there is a duct ſimilar to that of Wharton, accompanying it, and opening cloſe to it. More frequently the Whartonian duct receives a large branch from the ſub-lingual gland, juſt before it opens near the frænum; and often one or two more ſub-lingual ducts open into the Whartonian. Other ſmaller ducts penetrate the membrane of the mouth on the ſurface of that longitudinal eminence, which lies by the ſide of the tongue; and Haller has ſometimes found theſe amounting in number to twenty. Small portions of a doubtful nature are ſometimes found near the ſub-lingual, and theſe too have openings into the mouth.

The fluid ſecreted by theſe glands is a pure and limpid water, as we may aſcertain in caſes of ſalivary fiſtulæ, where it may be obſerved free from any foreign admixture. But the ſaliva, as it appears when ſpit out of the mouth, is a mucous fluid, and ſo viſcid in its nature, that it entangles air in conſiderable quantity, and acquires thereby the well-known frothy appearance of ſpittle. This mucous portion of the fluid is furniſhed by very numerous ſmall glandular maſſes diſpoſed in various ſituations of the external ſurface of the membrane of the mouth, and already noticed, in preceding parts of the preſent article, under the epithets of labial, buccal, palatine, and lingual glands, and tonſils. The fluid formed in theſe glands, deſtined to moiſten and lubricate the ſurface of the mouth, is mixed with the water of the proper ſalivary glands.

Theſe mucous glands are of a roundiſh form, ſomewhat grey colour, and firm texture. They are very numerous in the lips and palate; and have ſhort ducts penetrating the membrane, and leaving conſpicuous openings on its ſurfaces; one or two of a larger ſize are occaſionally obſerved between buccinator and maſſeter, and have been deſcribed under the name of molares.

Chemical Compoſition of the Saliva.—We have already deſcribed this fluid as being made up of two different component parts, produced by very differeut organs. Dr. Thomſon gives the following account of it in the third edition of his Syſtem of Chemiſtry, vol. v. book 5. ſect. 12. "Saliva is a limpid fluid like water, but much more viſcid: it has neither ſmell nor taſte. It has a great affinity for oxygen, which it abſorbs readily from the air. Beſides water, which conſtitutes at leaſt four-fifths of its bulk, it contains the following ingredients: mucilage, albumen, muriate of ſoda, phoſphate of ſoda, phoſphate of lime, and phoſphate of ammonia. The ſaliva ſecreted in the glands above deſcribed, muſt be conveyed into the mouth by means of a contractile power reſiding in the coats of their excretory ducts. Its ſeparation is going on conſtantly, in a greater or leſs degree, ſo as to keep the mouth moiſtened, and the ſuperfluous part is uſually ſwallowed. But it is during maſtication that theſe organs are moſt actively employed, and the ſecretion which they then afford is far greater in quantity than what they furniſh in the quieſcent ſtate of the organs. The compreſſion which the glands experience from the motions of the jaw, and from the ſurrounding muſcles, is one cauſe of this increaſed quantity. For the mere motions of the jaws will increaſe the fluid of the mouth, even when no food is contained in that cavity. Another explanation has aſſigned a ſpecies of irritation in the glands produced by the preſence of the food, and aſſiſted perhaps by the mind, as in the inſtance of the taſtes. This muſt be allowed to exert an influence, as well as the mechanical preſſure. It is known familiarly to every one, that the mere ſight or ſmell of food will excite the ſalivary glands of a hungry perſon; and hence the common phraſe of one's mouth watering. Various accidental circumſtances will alſo increaſe the ſalivary ſecretion, as any ſharp or irritating ſubſtances taken into the mouth; and the effect of mercury in the ſame way is well known. The quantity of the ſalivary ſecretion in a healthy perſon can hardly be determined with any degree of accuracy. Nuck calculated from ſome experiments that twelve ounces were furniſhed in twenty-four hours; and others have ſtated it at a pint and a half. In various inſtances of ſalivary fiſtulæ, large quantities of ſaliva have been diſcharged from one gland in a ſhort time, as five or ſix ounces during ſupper time; and it is often poured out very copiouſly in perſons affected by mercury.

Paſſage of the Food into the Pharynx.—The maſticated maſs is ſuppoſed to be placed on the dorſum of the tongue, which is extended laterally, and has its margins drawn up by the ſtylogloſſi, for the purpoſe of holding it more conveniently. The muſcles of the lips and cheeks cloſe the mouth in every direction; and the lower jaw is alſo elevated, to afford a fixed point to thoſe muſcles which draw up the os hyoides. The food cannot, therefore, eſcape in any direction. The apex of the tongue is applied againſt the palate, ſo that the whole tongue repreſents an inclined plane, facing backwards and upwards; the reſt of the organ is brought ſucceſſively in contact with the roof of the mouth from before backwards, and the food is thereby forced through the iſthmus faucium into the pharynx. Theſe motions are performed

formed by the lingualis and ſtylogloſſus. The latter muſcle, together with the ſtylohyoideus and poſterior portion of the digaſtricus, carries the whole tongue backwards, ſo that it forces the portion of food into the pharynx, and oppoſes any attempt at a return. The part which the tongue has to perform is not ſo great in the act of drinking: the power of ſuction there aids the paſſage of the fluid, which runs along a channel formed in the dorſum of the tongue; that organ is, however, carried backwards in a certain degree, to convey the liquor into the pharynx. The further progreſs of the aliment in the pharynx, and the action which it undergoes in that cavity, cannot be underſtood until the parts have been deſcribed.

The *pharynx* is a large membranous receptacle, placed at the back of the noſe, mouth, and larynx, and communicating freely with thoſe organs. Thus it ſerves as a medium for the paſſage of the atmoſpheric air to and from the lungs, in the proceſs of reſpiration; for the reception of the food, which has undergone trituration in the mouth, and for its propulſion towards the ſtomach. It is adapted to the latter purpoſe by an external covering of muſcular fibres, arranged in ſtrata ſlightly diſtinguiſhed from each other, and deſcribed under the name of conſtrictores pharyngis muſcles. This bag, which is of an elongated form, extends from the baſis of the ſkull above to the point at which the larynx terminates in the trachea below. It is bounded at the ſkull by the baſilar proceſs of the occiput, below by the œſophagus, which is a cylindrical muſcular tube continued from it to the ſtomach; in front by the cavities of the noſe, mouth, and larynx; behind by the cervical vertebræ. Its breadth at the upper part is equal to the ſpace left between the pterygoid proceſſes; it is ſomewhat enlarged towards the middle, oppoſite to the os hyoides and thyroid cartilage, the cornua of which cauſe conſpicuous riſings in the membrane of the pharynx, when the bag is laid open. It diminiſhes gradually in breadth below, ſo as to become ſomewhat funnel-ſhaped: and its moſt contracted portion forms the beginning of the œſophagus. It cannot be regarded as a complete cavity, ſince it is deficient on the anterior part. When its back ſurface is laid open by a perpendicular cut, we ſee nothing in front but the openings of the naſal and laryngeal cavities and mouth. The pharynx is therefore an imperfect bag, common in the greateſt part of its extent to the air and food; and interpoſed between the external openings, which give admiſſion to thoſe, and the reſpiratory and digeſtive organs, which are the points of their ultimate deſtination.

It is firmly attached above to the baſilar proceſs of the occiput, and the body of the ſphenoid, by a ſtrong and denſe aponeurotic ſubſtance, which is gradually loſt on the mucous membrane. It is continued below into the œſophagus, oppoſite the firſt cartilaginous rings of the trachea; and a ſudden contraction at this part, viſible externally, indicates the point of continuity between the two organs. The lateral boundaries are the parts giving origin to the conſtrictor muſcles; *viz.* the pterygoid proceſſes, cornua of the os hyoides, and the ſides of the thyroid and cricoid cartilages.

In taking an internal view of its lateral connections, we find it attached, in a ſeries from above downwards, to the following parts; *viz.* the poſterior openings of the noſe, ſoft palate, back of the mouth, root of the tongue, and larynx. On the front are ſeen the wide openings of the noſe and mouth, towards the upper part; but below the bag poſſeſſes an anterior portion, which is cloſely connected to the root of the tongue, and which lies againſt the back of the larynx.

The external ſurface of the bag is connected to the bodies of the vertebræ behind by a looſe cellular ſubſtance: and along its ſides we notice the courſe of the carotid arteries and jugular veins.

The ſides of the pharynx are compoſed of muſcular fibres externally, and of membrane on the inſide. The latter is a continuation of the general mucous membrane, which belongs to the digeſtive and reſpiratory organs. This is expanded in an uniform manner over the poſterior ſurface of the bag, and by its anterior prolongations on either ſide becomes continuous with various parts. Above it is continued at the choanæ narium with the pituitary membrane, and the lining of the Euſtachian tube: lower down it is connected with the pharyngo-palatine arches, and through them with the lining of the mouth; lower ſtill it paſſes over the front of the larynx, and covers the projection which the back of that organ makes into the front of the pharynx. At the opening of the glottis it becomes continuous with the membrane that lines the organ of the voice. At the top of the pharynx it is extended along the under ſurface of the body of the ſphenoid bone, and thus becomes continuous with the pituitary membrane at the upper margin of the choanæ narium. At the bottom it is prolonged by a circular continuation into the œſophagus. It is ſmooth on its ſurface, and poſſeſſes conſiderable vaſcularity: it contains many mucous glands, affording a ſecretion which moiſtens the part, and facilitates the paſſage of the food through its cavity.

Muſcles of the Pharynx.—Theſe are four in number, according to the arrangement of the moderns; but much more numerous in the deſcriptions of ſome older writers. It follows neceſſarily, from the preceding deſcription, that they muſt be ſituated at the back of the pharynx; and they may be moſt conveniently brought into view by removing the head at the firſt vertebra, and leaving the pharynx and larynx connected to the baſis of the ſkull. We ſhall then diſcover three broad, thin, and flattened muſcles, named *conſtrictores pharyngis*, expanded like an uniform muſcular coat at the back and ſides of the bag; diſtinct from each other only at their origin, but intimately united on the pharynx, where they overlap each other ſucceſſively. The fibres from the right and left ſides meet together in the middle, and there is a white longitudinal line marking the junction: the reader will therefore underſtand, that each conſtrictor has the ſame attachments on both ſides of the body.

Conſtrictor pharyngis inferior (thyreo-pharyngeus and crico-pharyngeus).—This ariſes from the ſide of the cricoid cartilage, from the inferior cornu, and back of the ala of the thyroid; its fibres all proceed backwards, to expand over the lower part of the pharynx. The ſuperior portion aſcends obliquely towards the middle of the bag, where, together with thoſe of the oppoſite ſide, they terminate in a pointed form; the middle fibres are tranſverſe, and the inferior deſcend ſlightly, and ſurrounding the commencement of the œſophagus, are cloſely united to the muſcular covering of that organ. Hence its figure approaches on the whole to the lozenge. It is in contact, by its poſterior ſurface, with the muſcles on the front of the vertebræ; and entirely with the middle conſtrictor, ſtylo-pharyngeus, palato-pharyngeus, and membrane of the pharynx. It is covered a little at the ſide by the thyroid gland.

Conſtrictor pharyngis medius (hyo-pharyngeus).—This muſcle is exactly of the lozenge figure. Its origin is from the cornu of the os hyoides, and its fibres purſue very different directions in their expanſion over the middle of the bag. The lower ones deſcend very obliquely, and form a pointed end, covered for a conſiderable extent by the preceding muſcle; the middle ones purſue a tranſverſe courſe, and the ſuperior aſcend to terminate by a ſharp extremity fixed above into

into the baſilar proceſs of the occiput. The external ſurface of this muſcle is covered, juſt at its origin, by the hyogloſſus: in the reſt of its extent it is covered by the inferior conſtrictor, or is in contact with the front of the vertebræ. On its anterior ſurface it is in contact with the ſuperior conſtrictor, with the ſtylo-pharyngeus, palato-pharyngeus, and membrane of the pharynx.

Conſtrictor pharyngis ſupremus (pterygo-pharyngeus, mylo-pharyngeus, and gloſſo-pharyngeus).—Its fibres are tranſverſe and parallel to each other, and cover the top of the bag. Its origins are the inferior half of the internal pterygoid plate, the attachment of the buccinator to both jaws, and the ſides of the baſe of the tongue. Some of the upper fibres aſcend a little to be fixed to the baſilar part of the occiput. Covered behind chiefly by the preceding muſcle, it is contact in front with the circumflexus palati, palato-pharyngeus, and membrane of the pharynx.

The action of theſe three muſcles conſiſts in contracting the pharynx, and propelling the food through it towards the ſtomach.

Stylo-pharyngeus.—This is a thin elongated muſcle, placed at the ſide and back part of the pharynx, ariſing from the root of the ſtyloid proceſs, deſcending downwards and inwards, and paſſing under the middle conſtrictor to expand its fibres over the bag, and unite with the ſurrounding muſcles. It has an attachment alſo to the thyroid cartilage: it elevates and expands the pharynx.

Cavity of the Pharynx.—When we have laid open the pharynx by a longitudinal inciſion extending along the whole length of its poſterior ſurface, we ſee the ſoft palate hanging down into the middle anterior portion of the cavity, and ſeparating the poſterior openings of the noſe from that of the mouth. Above the ſoft palate are two large and ſomewhat oval apertures, the poſterior openings of the noſe (choanæ narium), for a deſcription of which ſee the article Nose. Through theſe the atmoſpheric air is conſtantly paſſing into and out of the pharynx, in its progreſs to and from the lungs in the alternate proceſſes of inſpiration and expiration. Through theſe openings alſo polypous tumours deſcend from the noſe into the pharynx, and are then viſible from the throat. In the ſame way the mucous ſecretion of the noſe is drawn into the pharynx; from which it is expelled by the mouth in the act of ſpitting.

The Euſtachian tube, or canal, which conveys the external air to the cavity of the tympanum, commences from the throat juſt oppoſite to the middle meatus narium. Its broad or trumpet-ſhaped opening is placed in the point of communication between the noſe and pharynx, and is kept permanently open by the cartilaginous nature of its ſtructure. Juſt behind the aperture a conſiderable ſwelling is obſerved, cauſed by a piece of the cartilage. For a more particular account of this tube, ſee Ear.

The contracted opening of the mouth into the pharynx (*iſthmus faucium*) is placed juſt under the ſoft palate. The mode in which this communication is formed has been already deſcribed in the preſent article. The ſize of this aperture, and the ſituation of the velum palati, are ſubject to much variation at different times. The ſoft palate may be drawn down againſt the tongue, and its two ſurfaces will then be anterior and poſterior. It may be elevated ſo as to ſhut the choanæ narium, and then the ſurfaces, which before were anterior and poſterior, become exactly reverſed. In the mid ſtate between the two juſt mentioned, the velum will be parallel to the horizon, and the poſterior ſurface is then ſuperior, and the anterior is inferior. The choanæ narium are cloſed by the velum palati during the act of vomiting; when the contents of the ſtomach are thrown forcibly up the œſophagus and pharynx, and would enter the noſtrils, if they were not cloſed by the elevation of the velum. Some of the ejected matter does actually paſs in this direction, which we cannot be ſurprized at, when we conſider the violence with which it is driven into the pharynx. The ſoft palate is alſo drawn up in the ſame way, when the proceſs of reſpiration is carried on through the mouth only. Haller mentions an inſtance, in which fluids injected from one noſtril returned through the other, which can only be explained by the elevation of the ſoft palate.

The larynx projects into the lower part of the front of the pharynx. In the middle and upper part of this projection there is a large opening, named the glottis, which is the entrance of the larynx. This is ſituated juſt at the root of the tongue, ſo that all the food neceſſarily paſſes over it in the act of deglutition; yet the membrane of the larynx is ſo exquiſitely ſenſible, that it cannot bear the contact of a foreign body. When by accident any extraneous ſubſtance touches this delicately organized part, a convulſive cough is excited to expel the cauſe of irritation. A drop of pure water is ſufficient to produce this effect; and if the offending matter be not immediately diſlodged, a ſenſe of ſuffocation and the moſt diſtreſſing and painful feelings enſue. If we reflect on the fatal conſequences that are almoſt immediately attendant on the interruption of reſpiration, we ſhall conſider this acute ſenſibility of the lining of the trachea and larynx as a wiſe proviſion againſt ſuffocation; by which we receive the alarm on the moſt diſtant approach of danger. Since then all the aliment muſt paſs over the glottis, and the entrance of any particle into the cavity muſt be moſt carefully guarded againſt, we have a moveable valve, called the epiglottis, cloſely connected with the root of the tongue. For a more particular deſcription of the glottis and epiglottis, ſee the article Larynx.

Progreſs of the Food in Deglutition.—At the time that the elevation and retraction of the tongue urges the morſel of aliment into the pharynx, the velum palati is drawn up againſt the choanæ narium. Hence when the ſoft palate is either partially deſtroyed by ulceration, or ſo diſeaſed as to have its motions impaired, ſubſtances which we ſwallow get into the back opening of the noſe.

The elevation and dilatation of the pharynx are accompanied by a ſimilar motion of the larynx, which cloſes the glottis, and therefore prevents the food from entering that cavity. The powers producing that elevation are the ſtylogloſſi, ſtylo-hyoidei, ſtylo-pharyngei, mylo-hyoidei, genio-hyoidei, digaſtrici, and hyo-thyroidei. Now when the larynx is raiſed, it is rather inclined forwards, ſo that the glottis is brought under the epiglottis, which amply covers it. The cloſing of the mouth, and approximation of the jaws, which take place when we ſwallow, favour the elevation of the larynx, by affording a fixed point for the action of its muſcles. This indeed is not eſſential, as we can ſwallow (fluids in particular) with the mouth open; but the act of deglutition is then inconvenient and dangerous.

The elevation and retraction of the tongue, by which the food is thruſt into the pharynx, contribute alſo to the application of the epiglottis over the opening of the larynx. For by ſuch motion of the tongue, the valve is turned backwards and downwards, and thereby meets the aſcending larynx. Yet this is not neceſſary; for we can prove on the dead ſubject, that the mere elevation of the larynx will cloſe the glottis, while the tongue is not moved at all; and indeed, if we advert to the connexions of the genio-hyoidei and genio-gloſſi, we muſt ſuppoſe that the tongue often does not contribute to the effect in queſtion. Hence we ſhall find that deglutition is practicable with the tongue held firmly to

the palate. Some phyſiologiſts have ſtated, that the food, by its preſſure on the epiglottis, depreſſes that organ more completely, and applies it more cloſely over the opening; and this appears probable enough reſpecting the more ſolid maſſes: but if we conſider that a drop of fluid, totally inadequate to produce any effect on the epiglottis, is ſwallowed juſt as well as the heavier portions of aliment, we ſhall not aſcribe much influence to this cauſe.

It is obvious, from the preceding account, that reſpiration muſt experience a temporary interruption, while the food is paſſing over the epiglottis. Hence if a perſon imprudently laugh, or attempt to ſpeak, while he is ſwallowing, the eſcape of air from the lungs, which is neceſſary in both caſes, lifts up the epiglottis, and gives admiſſion to the food, which is then not inaptly ſtated in common language to go the wrong way. No ſooner has the food paſſed into the pharynx, than the tongue aſcends, and the larynx is reſtored to its former poſition; the glottis becomes again open for reſpiration, which had ſuffered a merely momentary interruption. We cannot conclude this part of the ſubject without making one obſervation, which will naturally ſuggeſt itſelf to the reflecting mind, on the conſideration of the parts whoſe functions we are now deſcribing. We ſee that nature has deſtined the ſame organ to the performance of two important proceſſes: that the lungs derive their ſupply of air through the pharynx, and that the ſame tube conveys our food to the ſtomach; alſo, that the courſe of the aliment is eſtabliſhed directly over the opening that admits the air. We know, at the ſame time, that ſo cloſe a connexion ſubſiſts between life and reſpiration; that the interruption of this function, even for a very ſhort time, produces inevitable death. Now we can ſee very clearly, that if the glottis were left open when we ſwallow, ſuffocation would be a probable conſequence of the firſt meal, from the entrance of the food into the trachea. Hence the cloſure of the glottis has not been entruſted to the agency of any of thoſe means, which depend on the exertions of the will, which are always irregular and uncertain, and influenced by numerous circumſtances liable to change, from alterations in the bodily or mental ſtate of individuals; but it follows as a neceſſary and mechanical conſequence from certain motions of the organs, and will take place in the dead as well as in the living ſubject. Further, the very ſame condition of parts, which produces the danger, brings with it the proviſion againſt that danger. The riſk obtains only in the act of ſwallowing; and the elevation of the larynx, which is an eſſential part of the proceſs of deglutition, cloſes the glottis, and thereby obviates the riſk.

From the connexion ſubſiſting between the larynx and pharynx, as we have already explained, the latter part is elevated together with the former. It is at the ſame time dilated by the ſtylo-pharyngei; and, as the larynx is rather carried forwards, a greater ſpace is left between it and the vertebræ for the diſtenſion of the pharynx.

The ſoft palate, which at firſt was drawn up againſt the back openings of the noſtrils, is again depreſſed, as ſoon as the food has paſſed the iſthmus; and its depreſſion aſſiſts in promoting the deſcent of the food into the pharynx. This motion is performed by the palato-gloſſus and palato-pharyngeus, which bring the velum palati in contact with the back of the tongue, and thereby cut off the return of the food into the mouth, at the ſame time that its deſcent is aſſiſted. This part of the proceſs is performed with difficulty when the tonſils are ſwelled and inflamed; and the palate is not completely depreſſed at that time. No ſooner has the food entered the pharynx than that bag contracts, and then the ſpace between the tongue and vertebræ is deſtroyed by the approximation of the poſterior part of the pharynx to the tongue. This motion ſeems to ariſe from the irritation produced by the preſence of the food; for we cannot avoid ſwallowing whatever has entered the fauces. The action of the ſuperior conſtrictor muſcle draws the upper part of the pharynx againſt the ſoft palate, and thereby prevents the food, when preſſed by the muſcular powers below, from riſing towards the noſe; while the approximation of the palate itſelf to the root of the tongue prevents it from aſcending again into that cavity. The ſucceſſive contractions of the middle and lower conſtrictors now urge the food through the pharynx into the œſophagus; the arytenoidei probably cloſing the rima glottidis while the food paſſes behind that part. The larynx is now reſtored to its natural poſition by the ſterno-hyoidei, ſterno-thyroidei, and omo-hyoidei; the epiglottis riſes by its own elaſticity; and the levator palati and azygus would bring back the palate and uvula to their uſual condition.

We ſee, therefore, that the buſineſs of deglutition requires the concurrence of numerous parts, and the co-operation of ſeveral motions, and becomes conſequently a complicated and difficult ſtudy. We can underſtand how eaſily the proceſs may be deranged and impaired by the effects of accident or diſeaſe; as by wounds or diſeaſe of the tongue, by ulcers of the palate and tonſils, or fiſſures either in the bony or ſoft palates, by deſtruction of the epiglottis, or by diſeaſe affecting its motions, &c. We obſerve, alſo, that although the paſſage from the mouth to the ſtomach is placed perpendicularly, the aliment by no means deſcends from its own weight, but is urged through the whole courſe by muſcular contraction. Hence we may ſwallow with the trunk inverted; and in ſeveral animals the food paſſes upwards to the ſtomach. Hence deglutition is deſtroyed altogether by paralytic affections of the muſcles concerned in it. The ſwallowing of fluids can no more be effected by their own weight than that of ſolids: the contact of the ſides of the pharynx and œſophagus preſents an obſtacle which a mouthful of fluid is not capable of overcoming, and which requires a contraction of the muſcles. Between the oppoſing ſides of the tube, and the contracting fibres of the organ, fluids are collected into a globular form, like the more ſolid ſpecies of food; as we may obſerve in a horſe when drinking, where the paſſage of the fluid in the manner juſt deſcribed is very obvious.

The *œſophagus* is a cylindrical muſculo-membranous tube, extending from the pharynx to the ſtomach, and deſigned to convey the food from the former to the latter of theſe organs.

It deſcends through the lower part of the neck, between the trachea and the vertebræ; being not exactly behind, but rather to the left of that tube. In enters the cheſt in company with the trachea, between the two bags of the pleura; paſſes behind the left branches, and to the right of the arch of the aorta; then, turning over the deſcending aorta, goes behind the left muſcle, and deſcends through the poſterior mediaſtinum, juſt in front of that part of the aorta which lies againſt the vertebræ of the back. At its lower part it advances ſlightly forwards from the vertebral column, paſſes through the cardiac aperture of the diaphragm, and terminates in the ſtomach.

The connexions of the œſophagus to the ſurrounding parts are formed by a looſe cellular texture; on the front it is covered, in the neck, by the trachea, by a part of the thyroid gland, the left inferior thyroid veſſels, and the ſterno-thyroideus of the ſame ſide; in the cheſt, by the end of the trachea, and left bronchus, the back of the pericardium, and baſe of the heart. It correſponds behind, in the

neck, to the column of vertebræ, where it is covered by the longus colli; in the back to the thoracic duct above, and to the whole of the deſcending aorta.

The internal jugular veins and carotid arteries are on its lateral aſpects in the neck; the recurrent nerve is alſo near it on the left: in the upper part of the cheſt, the arch of the aorta lies on its left, and lower down the two pleuræ cover its ſides. At its very termination it is connected in its whole circumference to the cardiac orifice of the diaphragm. It is ſurrounded, in the lower part of its courſe, by the plexus formed by the nerves of the eighth pair.

This canal, in its empty ſtate, collapſes, and is then flat on its anterior and poſterior aſpects: when diſtended, it is cylindrical, and may have a diameter of three quarters of an inch, or more. It is uſually rather contracted, where it paſſes the diaphragm. It is, on the whole, the narroweſt portion of the alimentary canal. It extends in length from the fifth cervical to the ninth dorſal vertebra.

It is made up of two parts, very different in their ſtructure, connected by cellular ſubſtance. The external ſurface is compoſed of a muſcular expanſion, called ſometimes tunica muſcularis œſophagi, and poſſeſſing ſuch thickneſs, that the œſophagus may be deemed the moſt muſcular part of the alimentary tube. It is made up of fibres following two oppoſite directions. The external ſtratum is the ſtrongeſt, and has a longitudinal direction; they radiate below over the ſtomach; the internal are tranſverſe, and deſcribe right angles with the former.

The internal covering of the œſophagus (*tunica interna, vaſculoſa*, or *nervea*) is a white ſmooth membrane, continued from the mucous lining of the pharynx. Its ſurface is denſe and firm. It forms numerous longitudinal folds, and conſequently admits very eaſily of dilatation. It is connected by ſuch a looſe cellular ſubſtance to the muſcular covering, and poſſeſſes ſo much leſs elaſticity, that when the tube is cut tranſverſely, the latter retracts, and leaves a portion of the membranous lining protruding from the cut edge in a flaccid form. Hence a divided œſophagus ſeems to conſiſt of two tubes placed one within the other; an external thicker, red, and fleſhy; an internal thinner, white, and membranous. Small openings are ſeen on its ſurface, which are the orifices of mucous excretory ducts, ariſing from ſmall glands ſituated between the two coverings of the œſophagus. It contains a large network of veſſels, and becomes quite red from minute injections. It is continuous above with the lining of the pharynx, and below with that of the ſtomach; from which, however, it is manifeſtly diſtinguiſhed by a diſtinct and abrupt line of ſeparation, which marks the commencement of the villous ſurface.

This tube receives the food from the lower part of the pharynx, and urges it forwards into the ſtomach by the ſucceſſive action of its tranſverſe fibres: the longitudinal fibres ſeem to have the effect of ſhortening the tube, and dilating it for the reception of the food. The diaphragm preſſes on it in its contraction, ſo as to prevent the paſſage of food, and even ſo as to impede the egreſs of air from the ſtomach.

Deglutition, *Difficulty of.* See Dysphagia.

DEGNECHAM, or Dennecham, in *Geography*, a town of Holland in Overyſſel, ſeated on the Dinckel; 10 miles N.W. of Bentheim.

DEGNEZO, a town of Tranſylvania; 10 miles N.W. of Biſtricz.

DEGNIZLU, or Denizstey, a town of Aſiatic Turkey, in the province of Natolia, near the ruins of the ancient Laodicea, deſtroyed by an earthquake, which ſwallowed up many of the inhabitants: excellent grapes grow in the environs; to the eaſt and ſouth are mountains covered with ſnow; 108 miles E.S.E. of Smyrna. N. lat. 37° 51′. E. long. 29° 14′.

DEGO, a ſmall town of France, in the department of the Tanaro, chief place of a canton, in the diſtrict of Acqui, with a population of 1627 individuals. The canton contains 3 communes, and 6619 inhabitants.

Dego is ſituated near the river Bermida, and is remarkable for a victory gained in its neighbourhood over the Auſtrians, by the French under Bonaparte, in 1796.

DEGOMBAH, a Mahometan kingdom of Africa, ſituated immediately to the eaſt of Kong, or Gonjah, (the Conche of D'Anville,) and oppoſite to the Gold coaſt. Its capital is Degomba, N. lat. 12° 50′. W. long. 0° 30′. This country has on the W. Gonjah, to the N. Kaffaba, to the E. Kambah, and to the S. between it and the Gold coaſt Tonouwah. It abounds with gold, with which it ſupplies the merchants of Fezzan; and its inhabitants are diſtinguiſhed by the cuſtom of taming the elephant, and by that of ſelling for ſlaves the priſoners they take from ſuch of the bordering nations as motives of religion or avarice prompt them to invade. Afric. Aſſoc. p. 176.

DEGRADATION, in *Geology*, is a term which Mr. Kirwan has uſed (Geol. Eſſ. 437.) for the lowering or diſintegration of mountains, in ſome theories which endeavour to account for the formation of what are called alluvial or ſecondary ſtrata. See Secondary and Flætz Strata.

Degradation, in our *Law-Books*, called diſgradation, and depoſition, the act of depriving, or ſtripping a perſon for ever of a dignity, or degree of honour; and taking away the title, badge, and privileges thereof.

The degradations of a peer, a prieſt, a knight, a gentleman, an officer, &c. are performed with divers ceremonies. That which anciently obtained in degrading a perſon from his nobility, is very curious. It was practiſed in the time of Francis I. upon captain Fangel, who had in a cowardly manner given up Fontarabia, whereof he was governor.

On this occaſion, twenty or thirty cavaliers, without blemiſh or reproach, were aſſembled; before whom the gentleman was accuſed of treaſon, and breach of faith, by a king at arms. Two ſcaffolds were erected; the one for the judges, heralds, and purſuivants; and the other for the guilty cavalier, who was armed at all points, and his ſhield placed on a ſtake before him, reverſed with the point upwards. On one ſide aſſiſted twelve prieſts, in ſurplices, who ſung the vigils of the dead. At the cloſe of each pſalm they made a pauſe, during which the officers of arms ſtripped the condemned of ſome piece of his armour, beginning with the helmet, and proceeding thus, till he was quite diſarmed; which done, they broke his ſhield in three pieces with a hammer. Then the king at arms emptied a baſon of hot water on the criminal's head; and the judges, putting on mourning habits, went to the church. This done, the degraded was drawn from off the ſcaffold, with a rope tied under his arm-pits, laid on a bier, and covered with mortuary cloths; the prieſt ſinging ſome of the prayers for the dead, and then he was delivered to the civil judge, and the executioner of juſtice.

For a more domeſtic inſtance: ſir Andrew Harcla, earl of Carliſle, being attainted and convicted of treaſon, 18 Edw. II. *coram rege;* after judgment was pronounced on him, his ſword was broken over his head, and his ſpurs hewn off his heels; ſir Anthony Lucy, the judge, ſaying to him, "Andrew, now thou art no knight, but a knave." By ſtat. 13 Car. II. William lord Monſon, ſir Henry Mildmay, and others, were degraded from all titles of honour, dignities, and pre-eminences, and prohibited to bear, or uſe, the title

of lord, knight, eſquire, or gentleman, or any coat of arms, for ever afterwards.

It has been maintained that the king may degrade a peer; but it appears from later authorities, that he cannot be degraded but by act of parliament.

As to eccleſiaſtics, we have an inſtance of degradation before condemnation to death, in the eighth century, at Conſtantinople. It is in the perſon of the patriarch Conſtantine, whom Conſtantine Copronymus cauſed to be executed. He was made to aſcend the ambo; and the patriarch Nicetas ſent ſome of his biſhops to ſtrip him of the pallium, and anathematized him: then they made him go out of the church backwards.

But we have a much later inſtance in our own hiſtory: when Cranmer, archbiſhop of Canterbury, was degraded, by order of queen Mary, they dreſſed him in epiſcopal robes, made only of canvas, put the mitre on his head, and the paſtoral ſtaff in his hand; and in this attire ſhewed him to the people. Which done they ſtripped him again piece by piece.

At preſent they do not ſtand ſo much on the ceremony of degradation, in order to the putting of a prieſt to death; by reaſon of the delays and difficulties that it would occaſion. Pope Boniface pronounced, that ſix biſhops were required to degrade a prieſt; but the difficulty of aſſembling ſo many biſhops, rendered the puniſhment frequently impracticable.

With us, a prieſt, after having been delivered to his ordinary, if he cannot purge himſelf of the crime laid at his door, has his gown, and other robes, ſtripped over his ears by the common hangman; by which he is declared diveſted of his orders.

It is decided, however, that degradation does not efface the prieſtly character.

Degradation only ſeems to differ from depoſition in a few ignominious ceremonies; which cuſtom has added thereto. Accordingly in the buſineſs of Arnoul, archbiſhop of Rheims, ſentenced in the council of Orleans, in 991, it was deliberated, what form they ſhould follow in the depoſition; whether that of the canons, that is, ſimple depoſition; or that of cuſtom, *viz.* degradation. And it was declared, that he ſhould ſurrender the ring, paſtoral ſtaff, and pallium; but that his robes ſhould not be torn off.

In effect, the canons preſcribe no more than a mere reading of the ſentence. It is the reſt, therefore, added thereto by cuſtom, *viz.* the ſtripping off the ornaments, and the tearing the pontifical veſtments, that properly conſtitutes degradation.

Degradation, in *Painting*, expreſſes the leſſening and rendering dim and confuſed the appearance of diſtant objects in a landſcape, ſo that they ſhall appear there, as they would do to an eye placed at that diſtance from them. See Perspective.

DEGRADED, in *Heraldry*. A croſs degraded, is a croſs marked, or divided into ſteps at each end, diminiſhing as they aſcend towards the middle, or centre; by the French called *perronnée*. See Cross.

DEGREE, in *Algebra*, denotes the higheſt power of the unknown quantity in an equation, *viz.* the equation is ſaid to be ſimple or of the firſt degree, when it contains only the unknown quantity in its ſimpleſt ſtate; it is ſaid to be of the ſecond degree, when the ſquare of the unknown quantity is the higheſt power of that quantity contained in it; when that higheſt power is the cube of the unknown quantity, the equation is ſaid to be of the third order, and ſo forth.

Degrees, in *General*, are parts of a quantity, which is arbitrarily divided into a certain number of thoſe parts. Geometrical extenſion is in itſelf deſtitute of diviſions; the augmentation, and the decreaſe of natural powers, or forces, are (as far as we can perceive) progreſſive and uninterrupted accumulations, or diminutions of ſuch powers, wherein no natural ſteps or diviſions can be diſcerned. Thus the ſcale of heat riſes progreſſively; the ſcale of moiſture in the air, which is indicated by the hygrometer, varies uninterruptedly from the loweſt to the higheſt ſtate of ſaturation; and ſo forth. Yet, notwithſtanding the cloſe continuation of thoſe progreſſions, we have degrees of a circle, degrees of heat, degrees of moiſture, &c. Theſe degrees then only denote ſmall accumulations of thoſe powers, or certain aliquot parts of a given extenſion, which have been agreed upon by various perſons, and have been adopted for the purpoſe of underſtanding each other; or for expreſſing, without circumlocution, certain quantities of thoſe powers, or certain parts of a given circular extent.

The weight of bodies, the intenſity of light, the quantity of rectilineal geometrical extenſion, &c. are, by common conſent, likewiſe divided into parts; but thoſe parts are not always called degrees. Thus the weights of bodies are denoted by pounds, ounces, grains, &c.; rectilineal extenſion is expreſſed by miles, feet, inches, and ſo on. In geometry and in trigonometry, the appellation of degrees has been applied to angular magnitude, which is meaſured by the portion of the circumference of a circle, whoſe centre coincides with the vertex of the angle, and part of whoſe circumference is contained between the ſides or legs of the ſame angle. The magnitude or quantity of angles is reckoned in degrees; becauſe the curvature of the circle being uniform in all its parts, equal angles at the centre are ſubtended by equal arcs, and by ſimilar arcs in peripheries of different diameters. This denomination of degrees is alſo applied to denote the intenſity of heat, the quantity of aerial moiſture, and occaſionally, or leſs frequently, to ſome other natural powers.

The circumference of a circle, whatever the ſize of it may be, is ſuppoſed to be divided into 360 equal parts, called *degrees*; hence, inſtead of ſaying that a certain angle comprehends the tenth part of the circumference of a circle, we call it *an angle of* 36 *degrees*; 36 being exactly the tenth part of 360. Alſo an angle, which comprehends the 360th part of the circumference of a circle, is called an angle of one degree, and ſo of the reſt. But as the angle might not coincide with any of the degrees, therefore each degree was ſuppoſed to be divided into 60 equal parts, called *minutes*; alſo each minute was ſuppoſed to be divided into 60 equal parts, called *ſeconds*; each ſecond into 60 equal parts, called *thirds*, and ſo on. Then if an angle does not coincide with any of the degrees, it may coincide with one of the minutes, or of the ſeconds, &c.; it may, for inſtance, be equal to 11 degrees, 15 minutes, 3 ſeconds, and 45 thirds. For the ſake of brevity, inſtead of the words, the number of degrees is marked by a little ° ſet over the figure, a little on the right hand ſide of it; the number of minutes is marked with a little comma in the ſame place, the number of ſeconds with two ſuch commas, the third with three, &c. Therefore the proper or cuſtomary mode of writing the above-mentioned angle is thus, $11^\circ\ 15'\ 3''\ 45'''$. But ſince the inſtruments made for the purpoſe of meaſuring angles are not calculated to ſhew diviſions ſmaller than ſeconds, therefore the preſent more uſual way of expreſſing angles, is by writing degrees, minutes, ſeconds, and decimals of a ſecond, as, for inſtance, $82^\circ\ 13'\ 42''.347$..

It may be naturally inquired how the circle came to be divided into 360 degrees, in preference to any other number of parts? but in anſwer to this we can only offer a conjecture,

jecture, that the Egyptians, to whom this diviſion is attributed, choſe the number 360 on account of its admitting many diviſors; and perhaps alſo on account of its nearly equalling the number of days in the year, in which the ſun performs its annual revolution in the zodiac. But notwithſtanding the long eſtabliſhed uſe of this diviſion, there have not been wanting perſons, who at various times have endeavoured to recommend and to introduce a decimal or a centeſimal diviſion, inſtead of the above-mentioned one. Stevinus, Oughtred, Wallis, Briggs, Gellibrand, Newton, and lately Hutton, beſides ſeveral others, have been of this opinion. Stevinus aſſerts, that this diviſion of the circle obtained in the wiſe age, "in ſæculo ſapiente," (Stev. Coſmog. l. i. def. 6.) Hutton propoſed to divide the quadrant into equal decimal parts of the radius; by which means the degrees or diviſions of the arc would be the real lengths of the arcs in parts of the radius. See his paper in the Phil. Tranſ. for 1783. Tables of ſines, chords, &c. have even been calculated and publiſhed upon thoſe plans; and lately, in France, the decimal diviſion of the circle was actually adopted; but it appears that this new mode is attended with very little advantage in practical calculation, at the ſame time that it proves very difficult in the practice of dividing inſtruments, and liable to occaſion perplexity and confuſion in the compariſon of the new ſtatements with thoſe which fill all the innumerable and well-eſtabliſhed aſtronomical, trigonometrical, and other books. See DIVISION *of Inſtruments*.

The inſtruments generally uſed for the purpoſe of meaſuring or of laying off degrees, minutes, &c. in aſtronomy, navigation, ſurveying, and other branches of mixed mathematics, are quadrants, circles, ſextants, ſectors, theodolites, micrometers, protractors, and others. See the nature and the uſe of thoſe inſtruments under the articles of their various names.

The denomination of degrees has likewiſe been applied to a variety of other inſtruments; but principally to thermometers and hygrometers. Their meaning in thoſe inſtruments is various. In the thermometer and the hygrometer, the degrees are only parts of the diſtance run through between two fixed points. Thus in the thermometer the length of tube through which the rarefied mercury runs between the point of melting ice, and that of boiling water, is divided into a number of equal parts, which are called the degrees of the thermometer; and the ſame kind of diviſions, or of degrees, is carried on below and above the ſaid fixed points. But that very ſame length of tube, which lies between the above-mentioned two fixed points, is divided differently by different philoſophers. In Fahrenheit's thermometer, it is divided into 180 degrees; in Reaumur's, it is divided into 80 degrees; in Deliſle's, it is divided into 150 degrees; in the centigrade thermometer, it is divided into 100 degrees, &c. Hence, in order to know what part of the ſcale of heat a degree, or a given number of degrees, means, we muſt firſt know whether the thermometer is divided according to Fahrenheit, or to Reaumur, or other perſon. See THERMOMETER.

The degrees of the thermometer are marked with a little ° above and towards the right-hand ſide of the figure or figures, as 43°, 12°, &c.; but they are not ſubdivided into minutes and ſeconds. Their parts are only expreſſed by means of vulgar or decimal fractions; thus 14 degrees and three quarters of a degree, are expreſſed by $14^{\circ}\frac{3}{4}$, or by $14^{\circ}.75$.

The authors who originally propoſed and adopted the above-mentioned various diviſions of the thermometer, were undoubtedly induced to adopt their peculiar modes by various conſiderations, which at preſent are imperfectly known; nor indeed do they deſerve any particular inquiry. It is, however, curious to obſerve, that Reaumur's degrees are thouſandths of the bulk of his diluted alcohol, with which he filled his thermometers; Deliſle's degrees are thouſandths of the bulk of the mercury, neglecting the expanſion of the glaſs; and Fahrenheit's degrees are nearly thouſandths parts of the bulk of the mercury, without the laſt-mentioned inaccuracy.

It has been ſaid above, that the degrees of the thermometer are equal parts of the ſpace run through by the mercury between the points of melting ice and boiling water. This, however, is only the caſe with the mercurial thermometer, in which the degrees indicate nearly equal increments of heat; but in the ſpirit-thermometer, when properly conſtructed, the degrees are not equal, becauſe, with equal increments of heat, the bulk of ſpirit of wine increaſes unequally; hence the ſpirit-thermometer is divided with unequal degrees; but ſo as to anſwer to the equal degrees of the mercurial thermometer, *viz.* ſo as to indicate nearly equal increments of heat. See EXPANSION and THERMOMETER.

In the beſt hygrometers, the degrees are equal parts of the expanſion of the hygrometrical ſubſtance between the points of extreme dryneſs, and complete moiſture; and that ſpace is divided into 100 equal parts or degrees, which are likewiſe marked with a little ° over the figure. But in a great variety of common hygrometers, the degrees are merely arbitrary diviſions, the meaning of which cannot properly be underſtood; as moſt of thoſe hygrometers have no fixed points, and of courſe they cannot be compared with one another.

A ſimilar uſe of the word degrees muſt be underſtood with reſpect to other graduated inſtruments, which need not be particularly ſpecified.

The denominations of minutes and ſeconds, beſides their denoting the parts of a degree of a circle, are likewiſe uſed to denote the parts of an hour in the menſuration of time; an hour being divided into 60 minutes, and a minute into 60 ſeconds. But, when uſed for the menſuration of time, the minutes are more commonly (though not always) marked with a little ^{m}, and the ſeconds with a little ^{s}, inſtead of the comma or commas. Thus $13^{\circ}\ 41'\ 12''$ means 13 degrees, 41 minutes, and 12 ſeconds of a circle; and $13^{h}\ 41^{m}\ 12^{s}$, means 13 hours, 41 minutes, and 12 ſeconds of time.

It is alſo uſual to ſay, that ſuch a ſtar is elevated ſo many degrees above the horizon, meaſured in a vertical circle, or declines ſo many degrees from the equator; and that ſuch a town is ſituated in ſo many degrees of latitude and longitude; and, moreover, that a ſign of the zodiac includes 30 degrees.

DEGREE, in *Aſtronomy* and *Geography*. All circles being ſuppoſed to be divided into degrees, as explained above; we ſay degree of latitude, of longitude, of right aſcenſion and declination, to expreſs a 360th part of the circle on which thoſe quantities are meaſured. See LATITUDE, LONGITUDE, &c. &c.

If the earth were a ſphere, all the degrees on the ſame circle would be equal; but, on the ſuppoſition of its being a ſpheroid, or any irregular figure, we do not define a degree to be exactly the 360th part of the whole of a given circle, but ſuch a part of it as correſponds with a degree in the heavens. The terreſtrial degrees, therefore, are unequal, and vary according to the nature of the curve to which they belong. Thus, the degrees of the meridian are parts of an ellipſe; and the degree perpendicular to the meridian will be part of a curve of double curvature; for

for the prime vertical in the heavens is ſuppoſed to be formed by a circle paſſing through the zenith of the ſpectator at right angles to the meridian. The line paſſing through all the points on the ſurface of the earth, that have their zeniths in this circle, is the perpendicular to the meridian, and is on the ſpheroid a curve of double curvature, except at the equator and the poles. At the equator it is the equator itſelf, and at the poles a meridian. For let A (*Plate* VI. *Aſtronomy*, *fig.* 47.) be a place ſituated between the pole and the equator, and A B B be the perpendicular to the meridian P A. The firſt element, or ſide of this line, will be in the plane A M B, determined by the vertical A M, and the ſide A B. For the ſame reaſon, the ſecond ſide B B′ will be in the plane B M B′, B N B′ being the vertical of the point B. From the nature of the ſpheroid, C M is always greater than C N; the vertical B N will be, therefore, inclined to the plane A M B, as will likewiſe the line B B′, which repreſents the prolongation of the line A B, bent in the direction of a ſtraight line parallel to B N. It can be equally proved, that B B″ ſeparates from the plane B N B′; conſequently, the four points A, B′, B″, B‴, are not in the ſame plane. Thus, finally, the perpendicular to the meridian is, in general, a curve of double curvature.

The degrees of latitude which, on a ſphere, would be equal, increaſe as they approach the pole on an oblate ſpheroid. The degrees of longitude are always equal on the ſame circle, both on the ſphere and regular ſpheroid.

On the ſphere they decreaſe as they recede from the equator, in the proportion of radius to the coſine of the latitude. On a ſpheroid, the degree of longitude is equal to a degree of a great circle perpendicular to the meridian, multiplied by the coſine of the latitude, as will be demonſtrated hereafter.

Meaſurement of a Degree.

It is by the meaſurement of different degrees on the ſurface of the earth, that we acquire our knowledge of its magnitude and figure; and as this problem has engaged the attention of mathematicians and aſtronomers in all ages, and is, beſides, one of the moſt important and intereſting in practical geometry, we ſhall enter into all the details relating to it at conſiderable length, and endeavour to trace its hiſtory from the earlieſt times to the preſent day.

There is every reaſon to believe that the ſolution of this problem was attempted at a very remote period of antiquity. And if it be allowed to ſupply the ſilence of hiſtory by conjecture, we may preſume that an attentive conſideration of the ſame phenomena that firſt indicated the ſpherical figure of the earth, ſuggeſted the idea that its whole magnitude might be aſcertained by the meaſure of a ſmall portion of its ſurface.

The firſt attempts to accompliſh this purpoſe were, doubtleſs, very rude and inaccurate; but it is evident, that a great and unexpected ſtep was made in the progreſs of human knowledge, the moment a juſt conception of this theory was obtained.

It is in vain that we now inquire at what period this diſcovery was made; we know with what myſterious ſecrecy the learned in thoſe early ages veiled their knowledge from the vulgar, either becauſe their opinions were too much at variance with the prejudices of the ignorant to have been communicated with ſafety, or, what is equally probable, the temporal advantages they derived from this reſerve were too conſiderable to be hazarded by an indiſcreet diſcloſure of their ſecrets, which would have reduced them nearer to the level of ordinary men.

To what accuracy the ancients really did attain in their endeavours to meaſure the magnitude of the earth, is a diſputed queſtion among the learned to this day.

Bailly, indulging in his favourite theory, ſtrives to perſuade us that traditionary meaſures muſt have been tranſmitted from the antediluvian world, which were thoſe of the aſtronomers of the early ages; and that theſe being very preciſe aliquot parts of a degree, were neceſſarily founded on an accurate meaſure of a portion of the earth's circumference. It is not our deſign to enter into this controverſy, or to treat with diſreſpect the opinions of a man whoſe talents were ſo deſervedly celebrated, and whoſe fate is ſo juſtly deplored. We ſhall content ourſelves with obſerving, that we can meet with nothing on this ſubject ſufficiently authentic to merit the attention of the reader, previouſly to the eſtabliſhment of the Alexandrian ſchool, about 300 years before the Chriſtian era.

The firſt meaſurement we find upon record, to which tradition has affixed the name of an individual, is that of Eratoſthenes of Alexandria, the ſucceſſor of Ariſtarchus. We regret that a more detailed account of this celebrated operation has not been tranſmitted to us.

It appears that Eratoſthenes determined the difference of latitude between Syene and Alexandria in Egypt to be 7° 12′; and this diſtance having been previouſly meaſured (as is ſaid) by the royal ſurveyors of Alexandria to be 5000 ſtadia, he concluded the circumference of the earth to be 250,000 ſtadia.

The length of this ſtadium is not exactly known. Some of the learned men who accompanied the French expedition into Egypt, have, by means of an ancient nilometer found in the ruins of Elephantis, eſtabliſhed with great preciſion the relation which the ancient Egyptian cubit bears to our modern meaſures; and they have endeavoured, with great ingenuity, to deduce the exact dimenſion of the ſtadium from the ſame data. If they are correct, we ſhould infer, that the degree meaſured by Eratoſthenes did not differ from the truth above one thouſandth part of the whole. We believe that every perſon, who has any practical knowledge of the difficulties attending an operation of this kind, will require very little argument to be convinced, that if ſuch a remarkable coincidence does really exiſt, it muſt be attributed to the effect of accident alone. For the latitude of Syene was only determined by obſerving, that a deep well received the vertical rays of the ſun on the day of the ſummer ſolſtice, without any perceptible ſhadow. The latitude of Alexandria might, perhaps, be determined ſomewhat more correctly. But the amplitude of the whole arc could ſcarcely be eſtimated to within 10′ of the truth; ſuch an error alone would produce a correſponding one of above 1000 toiſes in the value of the degree.

Of the trigonometrical meaſurement we know ſtill leſs. It would certainly be a very favourable ſuppoſition, to admit it true to the one-hundredth part of the whole; and to this, likewiſe, muſt be added the uncertainty in determining the direction of one place, relative to the meridian of the other. All theſe circumſtances conſidered, we muſt allow, that if the reſult did not differ from the truth more than one-fiftieth of the whole, it muſt have been by a very fortunate compenſation of errors.

Poſſidonius is the next aſtronomer whoſe name we find connected with this ſubject. He was a native of Apamea, in Syria, from whence he removed to Rome. He is ſaid to have determined an arc of the meridian, and to have eſtimated the circumference of the earth at 240,000 ſtadia. The ſilence of cotemporary writers relative to the details

neceſſary

neceſſary to an operation of this kind, renders it probable that the determination of Poſſidonius was only founded on an inveſtigation of the labours of others. His data were neceſſarily extremely vague, ſuch as the diſtances of different places computed by navigators, and their latitudes probably determined in a moſt inaccurate manner; ſo that the obſervation we made on the degree of Eratoſthenes applies, with equal propriety, to that of Poſſidonius: and really theſe meaſures would ſcarcely deſerve the notice of men of ſcience, but for the importance which ſome learned men have attached to them.

Ptolemy, who lived near 300 years after Eratoſthenes, conſiders the circumference of the earth as equal to 180,000 ſtadia. It has been conjectured, that this meaſure is identical with that of Poſſidonius of 240,000, a different ſtadium being referred to by each of them. This opinion is the more admiſſible, as we know that the Egyptian cubit has been divided at different times into 32 and 24 digits. It is poſſible, therefore, that the ſtadium ſuppoſed to be derived from the cubit, might, likewiſe, be liable to the ſame proportional variation.

During a long dark period of nearly 1400 years, but one ſolitary inſtance occurs of any attempt either to verify or improve theſe ancient meaſures. About the year 814 the caliph Almamon, the ſon of Haroun al Raſchid, aſſembled his aſtronomers on the plains of Meſopotamia, and ordered one party to travel north and the other ſouth, till they had changed the ſituation of their zenith one degree from the place of their departure. We neither know how they determined their latitude, nor how they meaſured their diſtance.

The degree reſulting from this meaſurement is reported to have been eſtimated at 56 miles and a half; but ſo great is the uncertainty relative to the ſtandard employed, that this meaſurement, like many others, may be conſidered as loſt to poſterity.

In the year 1528, Fernel undertook to meaſure the length of a degree, and aſcertained the diſtance between Paris and Amiens by counting the revolutions of the wheel of a carriage. He eſtimated the degree at about 68,096 geometric paces. Here is, likewiſe, ſome uncertainty as to the value of theſe geometric paces.

Picard eſtimates Fernel's degree at 57,070 toiſes, Riccioli at 62,706.

Thus, the labour of this meaſurement is likewiſe loſt, from the circumſtance of ſeveral meaſures exiſting in the ſame country of one denomination. We have not much to regret, perhaps, in this particular caſe, but had the operation been ever ſo exact, we ſhould equally have been deprived of the advantage of it. Nevertheleſs, M. de la Lande thinks Fernel's meaſure pretty well known, and conſiders it as accurate, which muſt have been accidental, conſidering the imperfect nature of this method. He determined the latitude of his extreme ſtations by taking the altitude of the ſun with parallactic rules ſimilar to thoſe of Ptolemy of eight feet radius.

Snellius, in the year 1617, meaſured a portion of the meridian between Alknaar and Bergenopzoom: his method was in its principle perfectly correct. He meaſured a baſe, and deduced the diſtance of two extreme ſtations by a ſeries of triangles, obſerving the latitude of each of them. He failed in computing the degree very exactly, which, in ſome meaſure, aroſe from his having taken too ſhort a baſe, only 631 toiſes; and, likewiſe, from not being provided with inſtruments ſufficiently accurate for the purpoſe.

Norwood, a native of this country, in the year 1635, meaſured the arc of the meridian, contained between London and York, with conſiderable care.

He determined the altitude of the ſun on the day of the ſolſtice, in two different years, at each place, and found the difference of latitude 2° 28′; he meaſured the diſtances by chains, ſometimes by paces, eſtimating, as well as he could, the various windings in the direction of the road, and found the degree to contain 367,196 Engliſh feet, or 57,300 toiſes. This meaſurement of Norwood ſeems entitled to more reſpect than it obtained: it had at leaſt the merit of being more exact than any that preceded it.

We ought not in this place to omit the meaſurement of Riccioli, founded on a method firſt ſuggeſted by Kepler, which conſiſts in obſerving the depreſſion of two diſtant objects below the horizon. It may be inferred, from the property of the ſphere, that the ſum of the depreſſion of two diſtant objects is equal to the arc intercepted between them. This may be eaſily underſtood by referring to *Plate* VI. *fig.* 48. A and B are two ſtations, ſufficiently elevated for either to be viſible to a ſpectator placed at the other: A *c*, B *c*, the reſpective horizons. In the trapezium A *c* B C, A and B being right angles, the angles C and *c* are together equal to two right angles. Therefore, the angle *c* A B, and *c* B A, or the ſum of the depreſſions, is equal to the angle C. Riccioli meaſured the angle A B C on the mountain of Paterno, near Bologna, formed by the perpendicular B C, and the tower of Modena. He then obſerved the angle C A B at the tower of Modena, which the perpendicular A C made with a ſignal on the tower of Paterno to be 90° 15′ 7″. The ſum of theſe two angles, 179° 41′ 20″, being taken from 180°, leaves 18′ 40″ for the angle A C B.

He then meaſured the included diſtance, and found it equal to 20,016 paces of Bologna: from theſe data the value of a degree might be calculated by a ſimple proportion. Riccioli appears to have taken a great deal of pains with this method, which, however, is very defective in practice, both from the uncertainty of the terreſtrial refractions, and likewiſe from the ſmallneſs of the included arc. And, therefore, it is not ſurpriſing that the reſult was inaccurate: he made the degree 63,000 toiſes, which is not within one-tenth of the truth.

Such was the ſtate of uncertainty, relative to this intereſting problem, till the eſtabliſhment of the academy of ſciences in France. One of the firſt operations of that learned body was the determination of the magnitude of the earth; and Picard was entruſted with the execution of the project. But, to enable the reader to underſtand the different operations that ſucceeded theſe imperfect eſſays, it may be proper to ſtate the nature of the problem a little more diſtinctly, and to give a general outline of the principle on which its ſolution is founded.

Fig. 49. Let A and B be two places nearly north and ſouth of each other. M N, a meridian paſſing through A. B *x*, a perpendicular from the ſtation B, falling on the meridian M N. The object is to determine the difference of latitude between A and *x*; to aſcertain the diſtance between them in terms of ſome known ſtandard meaſure; and then, by a ſimple proportion, to find the value of a degree. Thus, if the difference of latitude between A and *x* ſhould be found to be 40′, and its meaſured diſtance 40,000 fathoms, we ſhould ſay, 40′ : 40,000 fath. :: 60′ or 1° : 60,000 fath. = the meaſure of a degree.

For this purpoſe, the moſt uſual method is to meaſure a baſe line, as *a b*, with all imaginable care: a number of intermediate ſtations are then to be ſelected. as conveniently ſituated for the purpoſe as poſſible. Theſe conſiſt of ſuch ſteeples, towers, or other conſpicuous objects as are to be met

met with; and when theſe are wanting, ſignals erected to ſupply their place. By means of theſe ſtations, a ſeries of triangles are formed, by which A and B are connected with each other, and with the baſe line *a b*, as in *fig.* 49. The reſpective angles of theſe triangles are then accurately meaſured with a theodolite, and as the baſe line forms one ſide of one triangle, all the others may be found by a trigonometrical calculation. When the baſe line is ſituated near one extremity of the arc, it is not unuſual to meaſure a baſe of verification near the other extremity, and to compare its length by actual meaſurement with that deduced by computation by means of the intervening triangles. This is an excellent teſt of the accuracy of the trigonometrical proceſs.

The baſe being meaſured, and the ſides and angles of the triangles determined, two more operations, entirely aſtronomical, are requiſite to complete the proceſs. The difference of latitude of the extreme ſtations muſt be determined with the greateſt preciſion, and likewiſe the direction which one of the ſides of the firſt triangle makes with the meridian M N. Sufficient data are now obtained for finding the perpendicular diſtance of each ſtation from the meridian M N; as *p p'*, *q q'*, *r r'*, and B *x*; and alſo the diſtance of each perpendicular from A, as A *p'*, A *q'*, A *r'*, and A *x*. A *x* and B *x* being thus obtained, the diſtance and bearing of B may be found by the rules of plane trigonometry. The latitude of the other point *x*, which is uſed in finding the amplitude of the arc A *x*, is deduced from the obſerved latitude of B. It is true, that this can only be done rigorouſly by a ſpherical calculation, the ſmall arc B *x*, found in toiſes or feet, being converted into minutes and ſeconds of a degree. To do this, we muſt ſuppoſe known the very thing we are in ſearch of, that is, the relation the degree bears to our ſtandard meaſures. But as the arc B *x* is always taken very ſmall, compared with A *x*, no practical inconvenience is found to ariſe from this approximation.

It appears then, that the whole proceſs conſiſts of four diſtinct operations; the meaſurement of a baſe; the determination of the angles of a ſeries of triangles, ſo conſtructed, as to connect the extreme ſtations, both with the baſe and with each other; the determination of the latitudes, or, at leaſt, the difference of latitude of the extreme ſtations; and, laſtly, the relative bearing of one ſtation with the meridian of the other.

From the varied and uneven nature of the ſurface of the earth, ſeveral complicated conſiderations ariſe in practice, that have been entirely omitted in the preceding deſcription. For, as theſe ſtations are taken in an extended range of country, it muſt neceſſarily happen that they will be very unequally elevated or depreſſed above one common level. So that, if we ſuppoſe triangles to be formed by lines joining their ſummits, theſe will produce a moſt irregular figure; no two triangles, probably, lying in the ſame plane. Before the requiſite calculations can be made, theſe ſtations muſt all be reduced to the level of one uniform ſpherical ſurface (which ſurface is uſually ſuppoſed to be the level of the ſea). *Fig.* 50. is intended to illuſtrate the nature of theſe reductions. A, B, C, D, E, are the elevated ſignals; *a*, *b*, *c*, *d*, *e*, their places reduced for computation. To have an accurate idea of this reduction, we may ſuppoſe lines drawn from the centre of the globe to the vertices of the ſtations: the points formed by the interſection of theſe lines with the imaginary ſpherical ſurface, every where level with the ſea, are thoſe which are to be uſed in the ſubſequent calculation.

The triangles formed by theſe points may either be conſidered as plane or ſpherical: in one caſe, their ſides are chords paſſing through the earth; in the other, curved lines drawn over its ſurface.

We may here likewiſe explain the principle of another method, which hereafter we ſhall have occaſion to deſcribe more at length; this is the determination of the value of an arc oblique or perpendicular to the meridian, by means of azimuthal angles, by which the direction of the meridian with the adjoining ſtation is aſcertained.

Let P (*fig.* 51.) be the pole of the earth, A any place whoſe latitude is known, B a ſtation viſible from A; an obſerver at A determines the azimuthal angle P A B, the angle P B A is likewiſe obſerved at the ſtation B, and the diſtance between A and B meaſured trigonometrically; then in the triangle P A B, P A is known, being equal to the co-latitude of the place; and the two angles being known, the ſide A B may be found; and thus the value of a degree, or an oblique circle, obtained. If A *p* be drawn perpendicular to A P, then in the triangle A B *p* the two angles *p* A B and *p* B A are given, as likewiſe the ſide A B, as found above. By theſe we may find the value of A *p*, which is a portion of the great circle perpendicular to the meridian. And this arc A *p* may be always known in linear meaſure, by the rules of plane trigonometry.

It is evident that on a ſphere all theſe degrees ſhould be equal.

We may now return to the hiſtorical part of our ſubject, and reſume the narrative of the operations of Picard, who, as was before ſtated, was entruſted with the meaſurement of a degree between Paris and Amiens. (A. D. 1699.)

In *Plate* VI. *fig.* 52, may be ſeen the general diſpoſition of Picard's triangles. The angles were meaſured with a quadrant of three feet radius, furniſhed with two teleſcopes, the one fixed, the other moveable.

He began his operation by meaſuring the diſtance between Villejuive and Juveſy, which places being nearly joined by an even paved road, were thought moſt eligible for his purpoſe: he found this diſtance to be 5863 toiſes.

Beginning at Juveſy, he meaſured the angle which a mill at Villejuive, that terminated his baſe, made with the ſteeple at Brie. The angle made by the two teleſcopes was 95° 4′ 55″. He then carried the inſtrument to Villejuive, and there directing one teleſcope of the quadrant to a ſignal at Juveſy (which formed the other extremity of his baſe), and the other to the ſteeple at Brie, he found the angle ſubtended by theſe two objects to be 54° 4′ 35″. With theſe two angles, and the included ſide, it was eaſy to deduce the diſtance from Villejuive to Brie, = 11,012.8 toiſes. This meaſure was verified by taking the inſtrument to Brie, and obſerving the third angle of the triangle, which appeared by obſervation to be the ſame as it ſhould have been by computation from the other two. The diſtance thus found by the firſt triangle ſerved as a baſe to the next, whoſe vertex was the celebrated tower of Montlhery. The angles at Villejuive and Brie being 77° 25′ 50″, and 47.34 reſpectively, the diſtance from Brie to Montlhery was deduced 13,121 toiſes. This diſtance was found, by a more careful meaſurement in the year 1756, to be 13,108. The third and fourth triangles were both formed on this baſe; one was limited on the north by the tower of Montjay, the other on the ſouth by the flag ſtaff of Malvoiſine. Theſe gave the diſtances from Montlhery to Malvoiſine 8870½ toiſes, and Montlhery from Montjay, 21,658. The fifth triangle, founded on this baſe, terminated at Mareuil. From theſe triangles the diſtance from Malvoiſine to Mareuil was calculated to be 31,897.

Having determined this great triangle by means of the ſubordinate ones, he was deſirous of verifying it by direct meaſure-

measurement, and for this purpose procured large fires to be lighted, of three feet diameter. When viewed through the telescope of the quadrant, these are said to have resembled in appearance stars of the third magnitude: they seemed however to subtend an angle of 8″ instead of 3″ or 4″, which they should have done by calculation; from which it was inferred that luminous bodies sometimes appear larger than they really are. By proceeding in this manner, he found, by means of 13 triangles, the distance from Malvoisine to Sourden, near Amiens, to be 68,430½ toises, and with a zenith sector of 10 feet radius, he found the difference of latitude to be 1° 11′ 57″.

By observing the azimuth of the pole-star at its greatest digression at Mareuil, he determined the direction which the sides of his triangles made with the meridian; and drawing perpendiculars from the stations to the meridian, he was enabled to complete the intercepted portions.

From these data he concluded a degree in the latitude 49° 7′ to be 57,060 toises. This result differs very little from that deduced from later measurements; yet this great precision arose, in some degree, from a compensation of errors.

In 1756 two pyramids were erected at the extremities of the base, at Villejuive and Juvesy, at the exact distance of 5786 toises, when, upon a re-examination of Picard's operation, his distances were found to be too great by one toise in a thousand, either because his measure was not identical with that subsequently used, or that his base had not been determined with sufficient precision.

The success that attended Picard's measurement, and the accuracy that trigonometrical operations were found to possess, determined the academy to extend his triangles still farther in the direction of the meridian both to the north and south.

This was partly carried into execution by Dominique Cassini, in the year 1683. He assumed as a base the distance between Montlhery and Brie, as determined by Picard, and had completed a chain of twenty principal triangles, to a station 60 leagues south of Paris, when the death of Colbert, the great patron of science, for a time interrupted these pursuits.

It was not till the year 1700 that they resumed their labours. Cassini, assisted by his son Jaques Cassini, and Maraldi his nephew, continued the series of triangles as far as the neighbourhood of Perpignan, above 6° south of the observatory of Paris.

They traced a base of verification 7246 toises, a little to the eastward of Perpignan, the length of which, by direct measurement, was found to agree very exactly with that deduced by calculation from the triangles.

The northern part of the arc from Paris to Dunkirk was not terminated till the year 1718. The astronomers employed on this occasion were Jaques Cassini, Maraldi, and De la Hire. They likewise measured a base of verification in the vicinity of Dunkirk. When the result of these operations was examined, the southern degree was found equal to 57,097 toises, and the northern 56,960. It was thus that, after a period of 30 years from its commencement, this great work was brought to a termination.

The result, as far as it related to the relative magnitude of different degrees, was certainly erroneous; but this we cannot be surprised at, when we recollect the imperfect state of astronomical instruments at that period; but by these operations the foundation for the improvement of the science of geography was laid. The advantage of combining astronomical and trigonometrical observations was distinctly perceived, and the project formed of extending these triangles over the whole superficies of the kingdom.

But the above mentioned operations began to derive an additional interest, from a question of great importance that about that time engaged the attention of the scientific world; this was the determination of the *true* figure of the earth. Hitherto we have considered the measure of a degree as the only requisite step for determining the earth's magnitude, upon the supposition of its being perfectly spherical; in which case, all the degrees of latitude being equal, it is evident that the measure of one would have afforded sufficient data for estimating the value of the whole circumference.

But the discoveries of Huygens and Newton, about this time, rendered it more than probable that the equatorial parts of the earth must at some period of its existence have yielded to the centrifugal force acting on them in consequence of the diurnal motion, in such a manner, as to have given to the globe an oblate form, such as we may conceive produced by the revolution of an ellipse about its shorter axis. If this theory be just, the degrees should increase in proportion as we recede from the equator, and approach the poles.

For we define a degree of the meridian to be that space which we must pass over (in moving directly north or south), to produce a change in the vertical line equal to that quantity. We have seen above, that the degrees measured in France indicated a contrary tendency; and we cannot wonder that those, who had bestowed so much pains in an operation which, if exactly performed, should have solved the problem at once, should be unwilling to see their labours overturned by a hypothetical calculation. Men of science were very much divided on this question; the arguments derived from theory were certainly very strong in favour of the flattened figure at the poles; on the other hand, it had so happened, that the best known measures at that time, indicated that the polar axis was the longest. Cassini proposed measuring trigonometrically a degree of longitude, or, what was still preferable, a degree of a great circle perpendicular to the meridian. This scheme was adopted and carried into effect; and it so happened, that the result likewise of this experiment rather favoured the idea that the polar axis was the longest. We know now that this operation is of a more delicate nature, and attended with greater practical difficulties, than the measurement of an arc of the meridian. But though these trigonometrical measurements were insufficient to clear up the doubt that existed relative to a difficult point in the theory of the earth; yet the addition made to geographical science was very great: for an arc perpendicular to the meridian was measured from the western coast to Strasburg; and, as we have before mentioned, these triangles being afterwards extended over the whole kingdom, gave to the geography of that country a precision unknown in any other part of the world.

The trigonometrical measurement, even at that period, was very correct; the errors were occasioned chiefly by want of accuracy in the astronomical part of the process.

Cassini de Thury, who was engaged at a subsequent period in continuing these operations, had so much confidence in his trigonometrical operations, that, having met with an astronomer in the range of his triangles who congratulated him on their accuracy, because they agreed with his observations: rather, replied Cassini, let me offer you my compliments on the correctness of your observations, since they are so fortunate as to agree with my triangles.

It was in the year 1733 that Condamine represented to the academy, that the best way of arriving at the truth, amidst such a variety of opinions, would be to procure a measure of the degree at, or very near, the equator, and he offered himself to share the difficulties and celebrity of the enterprise.

The following year Godin read a memoir to the ſame effect, accompanied by the ſame offer. It was not long before the king's conſent was obtained; and paſſports having been procured from the court of Spain, Condamine, Godin, and Bouguer embarked on this celebrated expedition at Rochelle, on the 16th of May, 1735.

No ſooner had this expedition left France than M. Maupertuis repreſented to the miniſter, the count de Maurepas, that a ſtill greater certainty would be obtained by meaſuring another degree, as near as poſſible to the pole. In conſequence of this, the academy received an order from the king to chooſe ſuch perſons as they ſhould think moſt proper, to carry this deſign into execution. The academicians appointed to make this celebrated voyage were Maupertuis, Clairault, and Monier; to theſe were added the Abbe Outhier, who poſſeſſed conſiderable ſkill in aſtronomical obſervations. They left France in the year 1736, and arrived at Tornea, a town ſituated at the northern extremity of the gulf of Bothnia, about the beginning of ſummer. The country deſtined to be the ſcene of this important operation is ſtrange and inhoſpitable beyond deſcription; and the entrance of ſcience into theſe dreary abodes, almoſt on the confines of the world, forms a contraſt ſo ſtriking, as to excite the moſt lively intereſt in the difficulties they had to encounter; nor do we think the reader will be diſpleaſed to find their narrative, and deſcription of the country, blended with the ſcientific account of their proceedings.

Their firſt deſign was to eſtabliſh their ſignals on the coaſt of the gulf of Bothnia; but this, from local circumſtances, was found impracticable. Fortunately, by following the courſe of the river Tornei, which runs nearly north and ſouth, the mountains on each ſide were found to afford many diſtant points of view, well adapted for the erection of their ſignals.

They ſet off from Tornea on the 6th of July, and began their journey by ſailing up the great river, which, riſing in the middle of Lapland, purſues its courſe to the gulf of Bothnia. From that day forward, their only habitation was the deſerts, and the ſummits of the mountains, which were to form their triangles.

They aſcended theſe with great difficulty, and erected on their tops ſignals, compoſed of large trees ſtript of their bark, and formed into hollow cones, which, from their whiteneſs, were viſible at 10 or 12 leagues diſtance.

The months of July and Auguſt were ſpent in exploring theſe mountains, erecting ſignals, determining the angles of the triangles, and chooſing a proper place for their baſe, the meaſurement of which they thought better to defer till all the other obſervations were finiſhed, which the approach of winter might have rendered impracticable. By referring to the map, *Plate* VI. *fig.* 53, it will be ſeen, that their triangles formed a heptagon. Kittis and Tornea were the extreme ſtations. Near the middle of the heptagon was placed the baſe line, having the advantage of a perfectly ſmooth level, as it was to be meaſured on the river itſelf as ſoon as the ſeverity of the cold ſhould have frozen its ſurface.

The angles of their triangles were meaſured on a quadrant of two feet radius, the centre being placed in the centre of the ſtation; the elevation or depreſſion of the adjoining ſignals was likewiſe obſerved, by which they could reduce the angles to the plane of the horizon.

The aſtronomical obſervations were finiſhed at Kittis by the latter end of September. The zenith diſtance of δ draconis was obſerved with a zenith ſector of nine feet radius, conſtructed in London by Graham; and the direction of the meridian with the ſignal at Pullingi was found, by obſerving the preciſe moment of time when the ſun paſſed the vertical. For this purpoſe they had a ſmall moveable tranſit inſtrument, the teleſcope of which was 15 inches. The axis of this being levelled, and the ſignal biſected, they obſerved the time by the clock, when the ſun's centre paſſed the vertical wire of the teleſcope; by calculating the azimuth of the ſun anſwering to the time of obſervation, the direction of Pullingi with the meridian line was found to be 28° 51′ 52″.

Having completed all that was neceſſary to be done at Kittis, they loſt no time in removing to Tornea, where they arrived the end of October. Here the ſame obſervations were repeated as had been at Kittis. The zenith diſtances of the ſame ſtar was obſerved, and the direction of the meridian eſtimated by the ſame method, as deſcribed above, differed about 30″ from the determination at Kittis.

The angles of the triangles, the amplitude of the arc, and the direction of the meridian being determined, nothing now remained but to meaſure the baſe. As this operation was conducted under peculiar difficulties, we ſhall give the account of it, as related by M. Maupertuis himſelf. "On Friday the 21ſt of December, the day of the winter ſolſtice, and a very remarkable one for ſuch an enterpriſe, we began the meaſure of our baſe towards Avaſaxa, where it lay. In this ſeaſon the ſun but juſt appeared above the horizon at noon; but the long twilight, the whiteneſs of the ſnow, and the meteors that are continually blazing in the ſky, afforded us light enough to work four or five hours every day.

"At eleven in the forenoon we left the curate's houſe, where we had taken up our abode till this operation ſhould be finiſhed, and went upon the river to begin our ſurvey, attended by ſo many ſledges, and ſo great an equipage, that the Laplanders, attracted by the novelty of the ſight, came down from the neighbouring mountains. We ſeparated into two bands, each of which carried four of the rods juſt mentioned. I ſhall ſay little of the fatigues and dangers of this proceſs. Judge what it muſt be to walk in ſnow two feet deep, with heavy poles in our hands, which were continually to be laid on the ſnow and lifted up again, in a cold ſo extreme, that whenever we wiſhed to taſte a little brandy, the only thing that could be kept liquid, our tongues and lips froze to the cup, and came away bloody:—In a cold that congealed the fingers of ſome of us, and threatened us with yet more diſmal accidents. While the extremities of our bodies were thus freezing, the reſt, through exceſſive toil, was bathed in perſpiration; brandy did not quench our thirſt, and therefore we were obliged to have recourſe to deep wells through the ice, which were ſhut almoſt as ſoon as opened, and from which the water could ſcarcely be conveyed unfrozen to our lips, and thus run the hazard of the dangerous contraſt which iced water muſt produce in our heated bodies."

The ſeverity of the climate, as above related, did not prevent them from completing the meaſurement of their baſe, with greater exactneſs than they had dared to hope for. They made uſe of eight deal rods, of 20 feet each in length; and their party, as above mentioned, being divided into two companies, taking four of theſe rods, each meaſured the ſame baſe, independently of the other. In the whole meaſurement of 7406 toiſes, only four inches difference was found between the two meaſures. The whole party now retreated to Tornea, where they ſpent the winter. Here they applied the meaſure of their baſe to their triangles, and found the arc, included between the parallels of Kittis and Tornea, to be 55,023½ toiſes, its amplitude being 57° 27′. This was nearly 1000 toiſes greater than it ſhould have been, according to the theory of Caſſini.

"The town of Tornea, at our arrival, on the 30th of December, had really a moſt frightful aſpect. Its houſes were buried to the tops in ſnow, which, if there had been any day-

light, would have effectually ſhut it out; but the ſnow continually falling, or ready to fall, commonly hid the ſun for the few moments that he might have been viſible at noon-day. In the month of January the cold was increaſed to that extremity, that Mr. Reaumur's mercurial thermometers, which at Paris, in the great froſt, 1709, it was thought wonderful to ſee fall 14 degrees below the freezing point, were now got down to 37. The ſpirit of wine in the others was frozen. If we opened the door of a warm room, the external air inſtantly converted all the vapour in it to ſnow, whirling it round in white vortices. If we went abroad, we felt as if the air was tearing our breaſts in pieces, and the crackling of the wood of which our houſes were made, as the violence of the froſt ſplit it, continually alarmed us with an approaching increaſe of cold. The ſolitude of the ſtreets was no leſs than if the inhabitants had been all dead; and in this country you may often ſee people that have been maimed, and had an arm or a leg frozen off. The cold, which is at all times very great, increaſes ſometimes by ſuch ſudden and violent fits, as almoſt infallibly to be fatal to thoſe who happen to be expoſed to it. Sometimes there riſe ſudden tempeſts of ſnow that are ſtill more dangerous. The winds ſeem to blow from all quarters at once, and drive about the ſnow with ſuch fury, that in a moment all the roads are loſt. Unhappy he who is ſurpriſed by ſuch a ſtorm in the fields; his acquaintance with the country, or the marks he may have taken by the trees, cannot avail him; he is blinded by the ſnow, and loſt if he ſtirs but a ſtep."

Though they had no reaſon to doubt the accuracy of their obſervations, yet that their truth might not be called in queſtion, they agreed on the return of ſpring to repeat the aſtronomical obſervations at Tornea and Kittis. δ Draconis was the ſtar which had been obſerved the preceding autumn for determining the amplitude of the arc. They now fixed on α in the ſame conſtellation; and it was obſerved during the months of March and April, at both the ſtations, as δ had been before. They now found the amplitude $57'\ 30\frac{1}{2}''$, which only exceeds the former determination $3\frac{1}{2}''$, Tornea not being exactly on the ſame meridian line as Kittis, but 31,495 toiſes to the eaſtward, a correction of 3.48 toiſes was applied to the mean amplitude, and the degree ultimately determined at 57,438 toiſes. Some minute corrections for refractions having been made by later aſtronomers, the degree of Maupertuis is uſually eſtimated at 57,420 toiſes. Notwithſtanding the diligent attention that was beſtowed by theſe aſtronomers on every part of the proceſs, later and more exact obſervations have ſhewn, that their obſervations were affected with ſome conſiderable error. It is conjectured that the inaccuracy originated in the zenith obſervations with the ſector. The degree, as determined above, is too long by above 200 toiſes, according to the late meaſurement of the Swediſh aſtronomers. This correſponds to an error of 10″ in the amplitude of the arc. This quantity exceeds what we ſhould have thought probable, and unfortunately it was found that Maupertuis had not deſcribed his ſtation with ſufficient preciſion, to enable thoſe who wiſhed to verify his operations, to repeat the obſervation on the identical points that had been formerly choſen by the French aſtronomers.

We have now to return to the ſouthern expedition, which, as we have already ſtated, ſailed from France in the ſummer of the year 1735. After making ſome ſtay at St. Domingo, they proceeded by way of Carthagena to Porto Bello, croſſed the iſthmus which ſeparates the two continents, and embarking at Panama, arrived at Manta on the coaſt of Peru, in the month of March, 1736. At this place the party ſeparated, and afterwards arrived by different routes at Quito. They had been joined at Carthagena by Don George Juan, and Don Antonia Uiloa, marine officers in the Spaniſh ſervice, who were ordered by the king of Spain to facilitate the labours of the French academicians by all the aſſiſtance in their power to give. The difficulties which preſented themſelves on the firſt ſurvey of the country were even more formidable than thoſe which had occurred in the expedition to the north. The ſummits of the lofty mountains on each ſide the plains of Quito are not only covered with perpetual ſnow, but almoſt always obſcured by miſt or clouds. Nothing but the moſt ardent zeal for the ſucceſs of their enterprize could have enabled them to have perſevered in ſo unpromiſing a taſk. Succeſs was not abſolutely impoſſible, and this was thought ſufficient encouragement to perſevere. It was often neceſſary to wait for weeks at a ſtation to get a favourable opportunity of viewing the ſurrounding country; and when this occurred, they found perhaps that their ſignals had diſappeared, either overturned by the violence of the hurricanes, or ſtolen by the neighbouring Indians. The Spaniſh government did not ſeem diſpoſed to render them ſuch efficacious aſſiſtances as they were entitled to expect from the nature of their miſſion, and we perceive with regret from their reſpective accounts, that there was a want of that union and cordiality among themſelves ſo neceſſary to enable them to proſecute with cheerfulneſs ſo laborious an undertaking.

With theſe difficulties and vexations, they ſtruggled eight years before their operations were completed; and it was nearly ten years after their departure from France, before they returned with the fruit of their labour.

We ſhall now give, as briefly as poſſible, an outline of their operations.

When they arrived at Quito, their firſt care was to ſelect a ſpot for the meaſurement of a baſe, and they were rather fortunate on meeting with a tolerably level ſituation, in a plain called Yarouki in New Quito. The party divided into two, Godin with Don George Juan, and Bouguer with Condamine. Theſe each meaſured the baſe 6272 toiſes, and the difference of the meaſures did not exceed two inches.

Some difficulties occurred in meaſuring the baſe, but they were nothing compared to thoſe they encountered in conſtructing the triangles. The whole country conſiſting of mountains, ſome covered with perpetual ice, others, leſs lofty, almoſt conſtantly enveloped in ſnow and miſt. This operation was not completed for two years: Godin and Don Juan finiſhed their triangles at Cuença, but afterwards prolonged them to Pueblo veijo de Mira, about $\frac{1}{2}$ a degree to the ſouth, the whole arc being near $3°\frac{1}{2}$.

The arc meaſured by Condamine and Bouguer was not quite ſo long; it extended by the medium of 32 triangles from the equinoctial line beyond the third degree of ſouth latitude. The extreme ſtations were Cotcheſqui on the north, and Tarqui on the ſouth. A baſe of verification was meaſured at the ſouthern extremity of 5259 toiſes, which agreed within a toiſe of its calculated length. The meaſure of Godin and the Spaniſh officers was put to the ſame teſt by a ſimilar verification of a baſe meaſured on the plain of Cuença.

The reſt of the operation was likewiſe conducted by ſeparate parties. Bouguer and Condamine having finiſhed their trigonometrical meaſurements, commenced their obſervations for determining the amplitude of the arc. Their efforts to obtain a ſatisfactory coincidence were for a long time ineffectual. Their ſector of 12 feet radius met with frequent derangements, and the length of time neceſſary for its removal from one extreme ſtation to the other rendered the obſervations very diſcordant; for at that time the

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theory of aberration and nutation was not known. Their ſector proving defective, they were obliged to alter its conſtruction, and after much loſs of time, they adopted the expedient of conſtructing a new one, and obſerving at the ſame time at each ſtation. They now began to have greater confidence in their operations, and by repeated obſervations of the diſtance of ε Orionis, obſerved at Tarqui and Cotcheſqui, they determined the intercepted arc to be 3° 7′ 1″, and the meaſure of a degree 56,750 toiſes. Godin and the Spaniſh officers undertook likewiſe on their part a ſeries of ſeparate obſervations, to determine the amplitude of the arc between Mora and Cuença. But the latter, being ordered on profeſſional duty, quitted the party for a period of two years, during which Godin continued to obſerve alone. When the Spaniſh officers returned, they completed their operations, ſo that, in fact, there were three determinations obtained depending very little on each other; the latter determination gave the amplitude between Mora and Cuença 3° 36′ 52″, and the degree 56,768 toiſes.

Bouguer ſet off firſt on his return to Europe; he followed nearly the ſame route by which he went, and arrived in France, June 1744. He publiſhed a very full and detailed account of his operations in one large quarto volume, "La figure de la Terre:" a book containing many valuable diſquiſitions, both aſtronomical and phyſical, with a learned inveſtigation of ſeveral problems relative to the figure of the earth.

Condamine purſued his journey to Europe over a large tract of country, almoſt unknown. He traverſed the whole of the continent of South America, deſcending the river of the Amazons, to the Portugueſe ſettlements. He was thus enabled to contribute moſt uſefully to our geographical knowledge of that country, of which the moſt imperfect and fabulous accounts only had been publiſhed. He arrived in France in the year 1745. Beſides various memoirs preſented to the academy, and which are to be ſeen in their memoirs, he publiſhed in three volumes, quarto, a very full account of every circumſtance that had taken place, not only relating to the great work in which he had been engaged, but alſo his own adventures, and obſervations on the nature of the country, and its inhabitants, climate, natural hiſtory, &c. His work is divided into two parts; one, "Introduction Hiſtorique," containing the hiſtorical part of this intereſting voyage, written in a moſt pleaſing and animated ſtyle; the other, "Meſure des trois premiers Degrees du Meridien," is dedicated to the obſervations immediately relative to the object of the expedition.

The two Spaniſh officers returned by the way of Cape Horn, and arrived in Spain in 1746. Don Antonia de Ulloa was taken by the Engliſh in his paſſage, and brought to London, where he was treated with all the reſpect due to his character as a man of ſcience. He was admitted a fellow of the royal ſociety, and all his papers were reſtored to him. On his return to Spain, in conjunction with Don Juan, he publiſhed an account of their voyage in three quarto volumes, which was afterwards tranſlated into French, and printed at Amſterdam, in two volumes, quarto. This work, like that of Condamine, is extremely intereſting, containing a great variety of amuſing matter, beſides the account of their own operations, relative to the meaſure of the meridian.

Godin, after having been detained by various occupations in Peru, till 1748, and witneſſing the dreadful cataſtrophe which deſtroyed the two cities of Callao and Lima, ſet off on his journey towards Europe. He traverſed the wide extended provinces of Peru, Tucuman, and Paraguay, and arrived at Buenos Ayres, from whence he returned to France through Portugal and Spain. The king of Spain, in whoſe ſervice he had held ſome employ during his reſidence in Peru, appointed him director of the royal marine academy at Cadiz. At this place he had the misfortune to loſe his ſight, which prevented him from giving any relation of his own, as the other academicians had done, which is much to be regretted, as he is ſaid to have poſſeſſed much valuable information. His brother Godin des Ordonnois accompanied him. He married whilſt in the country, and travelled to Paraguay, from which place he ſent to his wife to join him. She, with her brothers and family, were to traverſe the continent, as Condamine had done before, by the river of the Amazons. The whole party loſt themſelves in the immenſe deſerts of South America, and madam Godin, after ſeeing her brothers and moſt of her attendants periſh one by one with hunger and fatigue, arrived after a journey of unparallelled diſtreſs and danger ſafe at her deſtination. Her ſingular adventures are related in a ſmall work publiſhed by Condamine in 1773, entitled, "An Account of the Fate of the Academicians and their Aſſiſtants, who were employed in the Expedition to Peru."

Juſſieu, the botaniſt, having ſtaid ſome time after the departure of his companions, to increaſe his collection of plants, and other objects of natural hiſtory, returned to France, but publiſhed no ſeparate account of his voyage. Seniergue, their ſurgeon, was aſſaſſinated at Cuença, during the celebration of a bull feaſt.

Three different meaſures had now been obtained with great labour and difficulty at the equator, in the latitude 45°, and at the arctic circle, and no doubt any longer remained as to the oblate figure of the earth; it was univerſally admitted that the equatorial exceeded the polar axis by a conſiderable quantity, but the exact ratio between the two was very far from being accurately aſcertained. It became evident that ſome conſiderable error had been committed in the meaſurement formerly made in France. The aſtronomers who had returned from the northern expedition, conjointly with other members of the academy, undertook a re-examination of Picard's operations. They employed the ſame ſector as in Sweden, and by a careful compariſon of the zenith diſtances of ſeveral ſtars obſerved at Paris and Amiens, they found it neceſſary to correct the amplitude of the arc determined by Picard, by a quantity amounting to about 6″. But about the ſame time it was diſcovered, that an error exiſted in the baſe of Picard, of about one toiſe in a thouſand. This was ſuppoſed to ariſe from the non-identity of the meaſures, and not from want of care on the part of Picard. It ſo happened that theſe errors nearly compenſated each other, ſo that Picard's determination ſtill remains very near the truth. To diſcover the errors that were thought inevitably to exiſt in the great meridian between Perpignan and Dunkirk, it was reſolved to undertake this great work a ſecond time: it is the leſs neceſſary to enter into the details of this operation (known by the name of Le Meridien verifié), as it has been again re-meaſured within theſe few years paſt, with a degree of preciſion that would have appeared incredible to the aſtronomers formerly employed in the ſame operation. We ought, however, to mention that Caſſini de Thury and La Caille undertook a complete reviſal of all the former triangles, meaſured two new baſes, divided the arc into four parts of about $2°\frac{1}{2}$ each, and found that the degrees increaſed as they approached the north, but not according to any law that could be deduced from any probable theory. Thére were ſome other meaſures of a degree made about that period, that deſerve to be mentioned: La Caille, at the Cape of Good Hope, meaſured an arc of the meridian, and found the degree in latitude 33° 18′ ſouth = 57,037 toiſes. As La Caille was furniſhed with very imperfect inſtruments, we ſhall enter into no further detail of theſe operations,

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which are deſcribed at large in the memoirs of the academy for 1751. About the ſame period, Boſcovich, a learned Jeſuit, and celebrated mathematician, meaſured an arc of two degrees between Rimini and Rome, in latitude 43°, and found the degree = 56,973 toiſes. The whole of this operation is minutely deſcribed in a quarto book, publiſhed at Rome in 1755, "De Litterariâ Expeditione per Pontificam Ditionem ad Dimetiendos duos Meridiani Gradus," &c.

A tranſlation of this work appeared in 1770. It contains inveſtigations of ſeveral problems relating to the figure of the earth.

Meſſrs. Maſon and Dixon meaſured a degree of the meridian in America, a full account of which is to be found in the Phil. Tranſ. 1768. Their mode of meaſurement differed from all others in this; that inſtead of adopting the method of triangles, the whole ſpace was actually meaſured. From this meaſurement the degree in latitude 39° 12′ appeared to be 56.888 toiſes.

In 1777, Beccaria undertook a ſimilar operation in the plains of Piedmont, the reſult of which gave 57,024 toiſes for the length of a degree, in latitude 44° 44′. Gradus Taurinenſis, quarto, 1774. Pere Lieſganig, a Jeſuit, meaſured two degrees, one in Hungary, in lat. 45° 57′, which gave 56,881, the other in Auſtria, lat. 48° 43′. 43 = 57,086.

The following account of the meaſurement of a degree of latitude in China is taken from the German Muſeum, the 9th number, Auguſt 1800.

"In the month of December 1702, father Anthony Thomas, a Jeſuit, was ordered by the emperor Kanghy to meaſure a degree of latitude. For that purpoſe, a very extenſive plain was choſen, and the buſineſs of meaſuring carried on in the preſence of all the mandarins of the mathematical tribunal, and even of one of the ſons of the emperor, who wiſhed to be an eye-witneſs of the operation. The reſult was, that 1° 1′ 32″, the part of the meridian they meaſured, comprehended exactly 200 Chineſe ſtadia, at 360 geometrical paces each, conſequently 1°, 70,206 paces. The proportion of the Chineſe foot to the old Roman foot, according to Villalpando, is ſtated by the Jeſuits to be 16 : 15; which makes 74,886 geometrical paces, as meaſured by the Roman feet, and reduced to French toiſes by the proportion of 1440 : 1315, gives 56987.9 toiſes. This curious piece of geographical intelligence has been taken from a letter of father Caſparus Caſtner, a German Jeſuit, to father Francis Schuck, of the ſame order, at Munich, dated Rome, January 10th, 1705, communicated to Major de Zach, at Gotha, as late as April 19, 1800, by Mr. Gabriel Knogler, profeſſor at Ingolſtadt. It is a pity that neither the degree of latitude, nor the method of meaſuring, is pointed out in this communication. From circumſtances, however, it may be inferred, that a meaſurement, at which the whole mathematical court and the emperor's ſon himſelf attended, was performed not far from Pekin. And as they had taken their meaſures on an extenſive level ground, and proceeded as far as 200 ſtadia, it may be concluded that the mode of menſuration they adopted was to meaſure from one end to the other of a ſtraight line, extended to that number of ſtadia. If this, as it appears, has really been the caſe, it is aſtoniſhing how a method ſo tireſome in its nature, and ſo imperfect in its principles, could give a reſult by which the meaſurement in queſtion may claim a rank among the moſt exact operations of this kind, performed with better inſtruments, and on more accurate principles."

When we conſider how important it muſt have been to the learned Jeſuits at the court of Pekin, that no great error ſhould be committed in this operation, we ſhould not be ſo much ſurpriſed at the accuracy of the reſult, which moſt probably was very little connected with the correctneſs of the proceſs.

We have omitted to mention the meaſure of a degree of longitude, by Caſſini and La Caille, in the latitude of 43° ½.

One obſerver placed on mount St. Victoire, near Aix, the other on a mountain near Cette, obſerved ſeveral times the moment of exploſion of 10lbs. of powder upon the church of St. Marie, a little village on the banks of the Rhone.

By a baſe meaſured near Arles, they found the diſtance 1° 55′ 19″ = 41,358 toiſes. It would have been 260 toiſes leſs on the ſpherical hypotheſis.

Notwithſtanding theſe labours, great uncertainty ſtill remained reſpecting the true figure of the earth: the different meaſures could by no means be made to agree with any probable hypotheſis. The ellipticity reſulting from theſe meaſures varied from $\frac{1}{150}$ to $\frac{1}{300}$.

It ſeemed difficult to decide whether this diſcordance aroſe from irregularity in the figure of the earth, or from errors in the meaſurement. We now know that both theſe cauſes concurred to produce this diſagreement. Later and more exact ſurveys have taught us that the plumb line is affected by great irregularities; and that the determination of the true figure of the earth by actual meaſurement, is an operation of much greater difficulty than was at that time imagined.

Account of the trigonometrical Operations carried on in England.

Soon after the peace of 1783, a project was undertaken for connecting the obſervatories of Greenwich and Paris, which gave riſe to the conſtruction of two inſtruments, ſo greatly excelling any that had been previouſly uſed in geodetical operations, that they abſolutely form a new era in the ſcience of trigonometrical ſurveying. One of theſe was the theodolite of Ramſden, the other the repeating circle of Borda. (For a particular deſcription of each, ſee THEODOLITE and CIRCLE.)

The great trigonometrical ſurvey of this kingdom originated in a great meaſure from a memorial of Mr. Caſſini de Thury, tranſmitted by the French ambaſſador to Mr. Fox, then ſecretary of ſtate, ſetting forth the advantage that aſtromony would derive from conſtructing a ſeries of triangles that ſhould connect trigonometrically the two obſervatories of Greenwich and Paris, and thus determining their relative poſitions, more accurately than it was ſuppoſed could be done by aſtronomical obſervation.

Both nations were at that time enjoying the bleſſings of peace, and the learned men of each country readily obtained from their reſpective governments, the aſſiſtance and patronage which ſuch an undertaking required. The execution of the plan on the Engliſh ſide of the channel was committed to the ſuperintendance of general Roy, who had long been eminent in his profeſſion as a ſkilful engineer, and had been much engaged in purſuits of this kind, though on a ſmaller ſcale, chiefly with a view to his own amuſement.

The firſt conſideration was to find an appropriate place for the meaſurement of a baſe; and Hounſlow-heath was ſelected for that purpoſe, both from its great extent, and the evenneſs of its ſurface.

On the 16th April, 1784, the preſident of the royal ſociety, ſir Joſeph Banks, accompanied by ſeveral others of its members, attended the firſt examination of this place, and they had the ſatisfaction to find that a ſtraight line might be drawn with little difficulty from King's-Arbour on the N.W. extremity of the heath, to Hampton poor-houſe, on the S.E. extremity, a diſtance of above five Engliſh miles. It ſo happened that this line coincided with a remarkable ſpire ſeen at the diſtance of 10 or 12 miles, known afterwards to belong to Banſtead church. This object was of conſiderable

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uſe in clearing the baſe line, which was done by a party of ſoldiers, who removed the bruſh wood and other inequalities of the ſoil, in a tract of about three yards in breadth.

Various methods were ſuggeſted, and tried for the meaſurement of the baſe, as on the accuracy of this delicate operation all the ſubſequent deductions would depend. Deal rods were firſt employed, and afterwards abandoned, as they were found to be affected by the moiſture and dryneſs of the air, in a manner not eaſily reducible to rule. Glaſs rods were ſubſtituted inſtead of them, and ultimately adopted. Pyrometrical experiments were inſtituted to aſcertain the exact law of their variation from heat and cold. The extremities of the baſe were marked by two pipes, and afterwards by cannon. The line joining them was meaſured through the air, and not by a ſucceſſion of level lines of unequal altitudes, as had been uſually practiſed in other countries. The inclination of this hypothenuſal line to the horizon was meaſured by a proper inſtrument, and the requiſite correction applied.

The firſt meaſurement of the baſe with the glaſs rods gave for its total length 27404.08 feet.

In the year 1791, this baſe was meaſured a ſecond time, with a ſteel chain of exquiſite workmanſhip, conſtructed by Ramſden, and this meaſurement gave 27404.315 feet, differing but $2\frac{3}{4}$ inches from the former. The ſtandard meaſure uſed on this occaſion was taken from a braſs ſcale 42 inches in length, in the poſſeſſion of the royal ſociety. A baſe of verification was likewiſe meaſured on Romney-marſh, in the ſame manner as had been done on Hounſlow-heath, except that the ſteel chain was ſubſtituted for the glaſs rods.

The length of this baſe, after all the requiſite reduction, was 28,535 feet, 8.128 inches.

The theodolite deſtined to meaſure the angles ſurpaſſed, as we have before mentioned, in its dimenſions and elaborate workmanſhip, every inſtrument of the kind that had been ſeen in Europe; it meaſured angles with ſuch preciſion, that it became neceſſary, in the calculation of the triangles, to take into conſideration the exceſs of three ſpherical angles above two right angles, a quantity that had hitherto been too minute to be aſcertained by any inſtrument, and was only known by theory to have an exiſtence. The amount of the total error in the ſum of the three angles never exceeded $3''$, ſo that the angles generally muſt have been meaſured to the neareſt ſecond. A portable obſervatory, and portable ſignals, were likewiſe uſed in this ſurvey, ſo that the centre of the theodolite was conſtantly brought into the very point, which was to conſtitute the ſignal from the next ſtation; by which means all the troubleſome corrections, which we ſhall have occaſion to notice in the French ſurvey, were avoided, and all cauſe of error ariſing from them entirely removed.

As the ſituation of Paris, with reſpect to Dunkirk, had been ſettled by former operations, the only part of this proceſs that required the co-operation of French aſtronomers, was to continue the triangles from Dover to Dunkirk. This was undertaken by Caſſini, Mechain, and Le Gendre, men of deſerved celebrity, and members of the academy of ſciences. It was by them that the firſt trial was made with the repeating circle. The one they uſed on this occaſion was only twelve inches diameter, and the firſt that had been conſtructed; yet it is beyond a doubt, but that the angles taken with it differed but little in exactneſs from thoſe obſerved with the theodolite. The latter was certainly the ſuperior inſtrument, but it was large and of difficult tranſport; whereas the French inſtrument went into a ſmall box, which the aſtronomers carried with them in their voiture.

The inſtrument was ſucceſſively carried to twenty-three different ſtations, which were diſtinguiſhed into two ſets; the firſt were permanently marked by pipes ſunk in the earth, the others were thoſe where the inſtrument was elevated to the top of ſome tower, ſteeple, or other building.

The ſtations of the firſt ſet marked with pipes are fourteen in number, *viz.*

Hampton poor-houſe, } the extremities of Hounſlow-heath baſe.
King's-Arbour, }
St. Ann's-hill, about the middle of the eaſt edge.
Hundred-acres, near the weſt end of the garden.
Norwood, towards the Croydon end of the heights.
Botley-hill, in a field belonging to Simpsfield-Lodge farm.
Wrotham-hill, in a field belonging to Mr. Johnſton.
Hollingborn-hill, in a field belonging to Mr. Duppa.
Fairlight-down, 347 feet ſouthward from the windmill, which makes with Fairlight church an angle of 105° 53′ 20″.
Ruckinge, } the extremities of the baſe of verification.
High-Nook, }
Allington-knell, an artificial mount belonging to ſir John Honeywood.
Paddleſworth, eaſtward from the church in the broomfield belonging to Mr. Brockman.
Folkſtone turnpike, weſtward from the public houſe.

The ſtations of the ſecond ſet, where the inſtrument was elevated on buildings, are nine in number.

Hanger-hill tower.
Tranſit room of Greenwich royal obſervatory.
North-weſt turret of Sevendroog caſtle, on Shooter's-hill.
Swingfield church ſteeple.
North turret of the ſteep of Dover caſtle.
Lydd ſteeple.
Tenterden ſteeple.
Goodhurſt ſteeple.
Frant ſteeple.

The ſtations on the French ſide were,

Montlambert.
Calais.
Blancnez.
Fiennes.
Watten.
Mount Caſſel.
Dunkirk.

The direction of the ſides of the triangles was determined by placing the theodolite over the tranſit inſtrument at Greenwich, and obſerving the angle which the meridian mark made with the next ſtation.

When theſe were corrected, they found 37 triangles, as repreſented in *Plate* VIII., the ſides and angles of which were obſerved and calculated as follows:

Baſe at Hounſlow-heath meaſured with glaſs rods - - -	27404.01 feet.
By meaſurement with a ſteel chain in 1791 - - -	27404 32
Mean length - -	27404.2

No of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excess.	Diff. or Error.	Angles corrected for Calculation.	Distances.
I.		° ′ ″	″	″	° ′ ″	Feet.
	Hanger-hill tower - -	42 2 32			42 2 34	
	Hampton Poor-house	67 55 39			67 55 39	
	King's Arbour - -	70 1 48			70 1 47	
		179 59 59	0.29	— 1.29		
	The Base between Hampton Poor-house and King's Arbour -				— — —	27404.2
	Hanger-hill tower from { Hampton Poor-house -				— — —	38460.4
	Hanger-hill tower from { King's Arbour - -				— — —	37921.9
II.	St. Ann's hill - -	44 18 51.5			44 18 51.5	
	Hampton Poor-house - -	61 26 33.1			61 26 33.5	
	King's Arbour - -	74 14 35			74 14 35	
		179 59 59.6	0.21	— 0.61		
	St. Ann's-hill from { Hampton Poor-house -				— — —	37753.6
	St. Ann's-hill from { King's Arbour - -				— — —	34455.2
III.	Wardrobe tower of Windsor castle - - -	— — —			58 9 58.5	
	King's Arbour - -	62 40 27.5			62 40 27.5	
	St. Ann's-hill - - -	59 9 14			59 9 14	
			0.25			
	Windsor castle from { King's Arbour - -				— — —	34819
	Windsor castle from { St. Ann's-hill - -				— — —	36032
IV.	Hundred Acres - -	53 58 35.75			53 58 36.5	
	Hanger-hill tower - -	68 24 44			68 24 44	
	St. Ann's-hill - -	57 36 39.5			57 36 39.5	
		179 59 59.25	1.08	— 1.83		
	Hundred Acres from { Hanger-hill tower - -				— — —	71932.8
	Hundred Acres from { St. Ann's-hill - -				— — —	79209.7
V.	Severndroog castle, Shooter's-hill	53 31 10			53 31 9.75	
	Hanger-hill tower - -	55 53 44.3			55 53 44	
	Hundred Acres - -	70 35 6.75			70 35 6.25	
		180 0 1.05	1.18	— 0 13		
	Severndroog castle from { Hanger-hill tower -				— — —	84375
	Severndroog castle from { Hundred Acres - -				— — —	74076.2
VI.	Norwood - - -	107 53 37			107 53 35.75	
	Hanger-hill tower - -	26 12 22.5			26 12 23	
	Severndroog castle - -	45 54 1.5			45 54 1.25	
		180 0 1	0.44	+ 0.56		
	Norwood from { Hanger-hill tower - -				— — —	6 36721
	Norwood from { Severndroog castle - -				— — —	39154.4

No. of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excess.	Diff. or Error.	Angles corrected for Calculation.	Distances.
		° ′ ″	″	″	° ′ ″	Feet.
VII.	Norwood	88 5 58			88 5 58.07	
	Hanger-hill tower	29 41 20.75			29 41 21	
	Hundred-acres	— — —			62 12 40.93	
			0.53			
	Norwood from Hundred-acres				— — —	35647.5
VIII.	Transit room, Greenwich Observatory	111 56 50			111 56 50	
	Severndroog-castle	47 48 14			47 48 13	
	Norwood	20 14 58			20 14 57	
		180 0 2	0 1	+1.9		
	Greenwich Observatory from Severndroog-castle				— — —	14610.3
	Greenwich Observatory from Norwood				— — —	31273.9
IX.	Botley-hill	74 37 17.5			74 37 18	
	Hundred-acres	66 0 56.2			66 0 56	
	Severndroog castle	39 21 46.25			39 21 46	
		179 59 59.95	0.78	−0.83		
	Botley-hill from Hundred-acres				— — —	48725.8
	Botley-hill from Severndroog-castle				— — —	70193.4
X.	Wrotham-hill	54 25 1			54 25 1.25	
	Botley-hill	67 53 11			67 53 10.25	
	Severndroog-castle	57 41 49			57 41 48. 5	
		180 0 1	1.12	−01.2		
	Wrotham-hill from Botley-hill				— — —	72951.7
	Wrotham-hill from Severndroog-castle				— — —	79960.6
XI.	Frant	50 19 19			50 19 18	
	Botley-hill	57 15 11.25			57 15 11	
	Wrotham-hill	72 25 31.2			72 25 31	
		180 0 1.45	1.3	+0.15		
	Frant from Botley hill				— — —	90362.4
	Frant from Wrotham-hill				— — —	79722
XII.	Hollingborn-hill	— — —			47 18 59	
	Wrotham-hill	84 12 24.5			84 12 24.5	
	Frant	48 28 37.5			48 28 37.5	
			1.52			
	Hollingborn-hill from Wrotham-hill				— — —	81195
	Hollingborn-hill from Frant				— — —	107895.7
XIII.	Fairlight-down	48 25 53.5			48 25 55	
	Frant	79 23 3			79 23 2	
	Hollingborn-hill	— — —			52 11 3	
			2.85			
	Fairlight-down from Frant				— — —	113926
	Fairlight-down from Hollingborn-hill				— — —	141744.4

Triangles.	Names of the Stations.	Observed Angles.	Spherical Excefs.	Diff. or Error.	Angles corrected for Calculation.	Diftances.
		° ′ ″	″	″	° ′ ″	Feet.
XIV.	Goudhurſt - - -	35 26 32.5			35 26 34.5	
	Botley-hill - - -	40 4 42			40 4 42	
	Wrotham-hill - - -	104 28 44			104 28 43.5	
		179 59 58.5	1.35	−2.85		
	Goudhurſt from { Botley-hill - - -				— — —	121813.5
	Goudhurſt from { Wrotham-hill - - -				— — —	81000.2
XV.	Goudhurſt - - -	72 23 32.5			72 23 33.87	
	Frant - - - -	75 33 16			75 33 13.63	
	Wrotham-hill - -	32 3 12.8			32 3 12. 5	
		180 0 1.3	0.81	+0 49		
	Goudhurſt from Frant - - - -				— — —	44391.2
XVI.	Hollingborn-hill - -	63 46 44			63 46 47	
	Wrotham-hill - - -	52 9 11.5			52 9 11	
	Goudhurſt - - -	64 4 3.5			64 4 2	
		179 59 59	1.22	−2.22		
	Hollingborn-hill from Goudhurſt - - -				— — —	71298.5
XVII.	Tenterden - - -	67 7 55			67 7 56.46	
	Goudhurſt - - -	68 13 21			68 13 19.5	
	Hollingborn-hill - -	— — —			44 38 44.04	
			0.85			
	Tenterden from { Goudhurſt - -				— — —	54376.5
	Tenterden from { Hollingborn-hill - -				— — —	71887.5
XVIII.	Fairlight-down - -	— — —			35 20 58.42	
	Goudhurſt - - -	49 39 34			49 39 35.77	
	Tenterden - - -	94 59 26			94 59 25.81	
			0.91			
	Fairlight-down from { Goudhurſt - -				— — —	93629.2
	Fairlight-down from { Tenterden - -				— — —	71637.2
XIX.	Allington-knoll - -	48 24 38			48 24 39	
	Hollingborn-hill - -	— — —			40 0 58.96	
	Tenterden - - -	91 34 23			91 34 22.04	
			10.5			
	Allington-knoll from { Hollingborn-hill - -				— — —	96039 8
	Allington-knoll from { Tenterden - - -				— — —	61777.5
XX.	Lydd - - - -	— — —			63 14 9 82	
	Allington-knoll - -	73 0 27.5			73 0 27	
	Tenterden - - -	43 45 22			43 45 23.18	
			0.67			
	Lydd from { Allington-knoll - -				— — —	47850.9
	Lydd from { Tenterden - -				— — —	66169.2

No. of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excess.	Diff. or Error.	Angles corrected for Calculation.	Distances
		° ′ ″	″	″	° ′ ″	Feet.
XXI.	Fairlight-down	54 59 18.5			54 59 17.31	
	Lydd	— — —			62 27 50.18	
	Tenterden	62 32 53			62 32 52.51	
			0.99			
	Fairlight-down from Lydd				— — —	71692.2
XXII.	Allington-knoll	32 59 22.5			32 59 23	
	Lydd	125 42 0.25			125 42 0	
	Fairlight-down	— — —			21 18 37	
			0.33			
	Allington-knoll from Fairlight-down				— — —	106926.2
XXIII.	Lydd	43 20 48.25			43 20 48.5	
	Ruckinge	48 58 49.75			48 58 49.5	
	High-nook near Dym-church	87 40 21.75			87 40 22	
		179 59 59.75	0.21	— 0.26		
	Lydd from Ruckinge				— — —	41535.3
	Lydd from High-nook				— — —	31363 7
XXIV.	Allington-knoll	91 27 20			91 27 19.5	
	Ruckinge	54 19 17			54 19 18.5	
	High-nook	34 13 21			34 13 22	
		179 59 58	0.09	— 2.09		
	Allington-knoll from High-nook				— — —	23185.7
	Allington-knoll from Ruckinge				— — —	16053
XXV.	Folkstone-turnpike	24 17 6.25			24 17 6.25	
	Allington-knoll	76 1 54			76 1 53.25	
	High-nook	79 41 0.75			79 41 0.5	
		180 0 1	0.29	+ 0.71		
	Folkstone-turnpike from Allington-knoll				— — —	55463.6
	Folkstone-turnpike from High-nook				— — —	54708
XXVI.	Folkstone-turnpike	— — —			32 6 56.89	
	Allington-knoll	109 50 40			109 50 39.35	
	Lydd	38 2 24			38 2 23.76	
			0.59			
	Folkstone-turnpike from Lydd				— — —	84662.8
XXVII.	Padlesworth	108 9 34.5			108 9 34.5	
	High-nook	— — —			14 48 25.5	
	Folkstone-turnpike	57 2 0			57 2 0	
			0.16			
	Padlesworth from High-nook				— — —	48305.2
	Padlesworth from Folkstone-turnpike				— — —	14714.3

No of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excefs.	Diff. or Error.	Angles corrected for Calculation.	Diftances.
		° ′ ″	″	″	° ′ ″	Feet.
XXVIII	Padlefworth	105 29 40.5			105 29 40	
	Lydd	9 38 29			9 38 29.36	
	Folkftone-turnpike	— — —			64 51 50.64	
			0.27			
	Padlefworth from { Lydd				— — —	79536.1
	Padlefworth from { Folkftone-turnpike				— — —	14714.3
XXIX.	Padlefworth	12 16 3			12 16 2.65	
	Lydd	154 5 54.75			154 5 54.4	
	Fairlight-down	— — —			13 38 2.95	
			0.59			
	Padlefworth from Fairlight-down				— — —	147392
XXX.	Swingfield	48 38 15			48 38 15	
	Padlefworth	70 54 5.5			70 54 5 5	
	Folkftone-turnpike	60 27 39.5			60 27 39 5	
		180 0 0	0.06	—0.06		
	Swingfield from { Padlefworth				— — —	17056.6
	Swingfield from { Folkftone-turnpike				— — —	18525.8
XXXI.	Dover-caftle, north turret	34 39 26.5			34 39 26.5	
	Swingfield	75 36 40			75 36 40	
	Folkftone	69 43 53.5			69 43 53.5	
		180 0 0	0.13	—0.13		
	Dover caftle from { Swingfield				— — —	30560.4
	Dover caftle from { Folkftone-turnpike				— — —	31555.7
XXXII.	Dover-caftle	— — —			21 37 55.42	
	Padlefworth	152 15 25.5			152 15 25.15	
	Fairlight-down	— — —			6 6 39.43	
			0.69			
	Dover-caftle from Fairlight-down				— — —	186119
XXXIII.	Dover-caftle	— — —			37 30 29.58	
	Fairlight-down	— — —			43 19 58.52	
	Montlambert	— — —			49 9 31.9	
			7.4			
	Montlambert from { Dover-caftle				— — —	168827
	Montlambert from { Fairlight-down				— — —	245786
XXXIV.	Fairlight-down	— — —			25 33 55.02	
	Dover-caftle	— — —			110 55 29.83	
	Blancnez	— — —			43 30 35.15	
			4.78			
	Blancnez from { Fairlight-down				— — —	252505.6
	Blancnez from { Dover-caftle				— — —	116660

No. of Triangles.	Names of the Stations.	Obſerved Angles.	Spheri-cal Exceſs.	Diff. or Error.	Angles corrected for Calculation.	Diſtances.
		° ′ ″	″	″	° ′ ″	Feet.
XXXV.	Dover-caſtle - - -	23 25 0.25			23 25 0.25	
	Montlambert - - -	— — —			36 53 18.11	
	Blancnez - - - -	— — —			119 41 41.64	
			1.84			
	Blancnez from Montlambert -				— — —	77237.7
XXXVI.	Dover-caſtle - - -	12 46 33½	—	—	12 46 42	
	N. D. Calais - - -	— — —	—	—	47 27 6	
	Blancnez fig. - - -	— — —	—	—	119 46 12	
	Notre-Dame at Calais from Dover -				— — —	137455
XXXVII.	Calais from Dunkirk 123,727 feet.					
	N. D. Calais - - - - - - - -				139 17 30	
	Dover-caſtle } - - - - - computed				19 14 12	
	Dunkirk } - - - - - computed				21 28 18	
	Dover-caſtle from the tower of Dunkirk - - -				— — —	244916

TABLE, containing the Bearings of the Stations from the Parallels to the Meridian of Greenwich: alſo their Diſtances from the Meridian and its Perpendicular.

Stations.	Bearings.	Diſtances from Meridian.	Diſtances from Perpend.	Stations.	Bearings.	Diſtances from Meridian.	Diſtances from Perpend.
At Greenwich.	° ′ ″	Feet.	Feet.		° ′ ″	Feet.	Feet.
Severndroog-caſtle obſerved	73 49 34 SE	14032	4070	Fairlight-down -	23 15 17 SE	143312	218618
Norwood obſerved	38 7 16 SW	19306	24603	*At Tenterden.*			
At Norwood.				Lydd - - -	50 27 12 SE	209345	190701
Hundred-acres -	42 22 39 SW	43333	50937	Allington-knoll -	85 47 25 NE	219933	144036
Hanger-hill - -	49 31 23 NW	67739	16729	*At Allington-knoll.*			
At Hanger-hill.				Ruckinge - -	70 25 32 SW	204807	149414
Hampton Poor-houſe -	23 30 53 SW	83085	18537	High-nook - -	21 1 48 SE	228253	165678
St. Ann's-hill - -	48 34 42 SW	119402	28852	Folkſtone-turnpike -	82 56 19 NE	274976	137216
King's-arbour - -	65 33 27 SW	102263	1038	*At Folkſtone-turnpike.*			
At Severndroog-caſtle.				Padleſworth - -	64 18 47 NW	261715	130839
Botley-hill - - -	11 23 18 SW	172	72881	Swingfield - -	3 51 8 NE	273730	118734
Wrotham-hill - -	46 18 30 SE	71849	59305	Dover-caſtle -	65 52 46 NE	303775	124322
At Wrotham-hill.				*At Dover-caſtle.*			
Frant - - -	6 50 58 SW	62341	138458	Montlambert -	27 56 55 SE	382910	273458
Goudhurſt - - -	25 12 15 SE	106345	132596	Blancnez Signal -	51 21 55 SE	394904	197159
Hollingborn-hill -	77 21 26 SE	151082	77079	Calais Spire - -	54 8 37 SE	427470	184268
At Goudhurſt.				Tower of Dunkirk -	83 22 49 SE	547058	152556
Tenterden - - -	72 54 53 SE	158321	148571				

TABLE, containing the Bearings and direct Diſtances of the Stations from Greenwich Obſervatory.

Stations.	Bearings.	Diſtances.	Stations.	Bearings.	Diſtances.
	South-weſtward. ° ′ ″	Feet.		South-eaſtward. ° ′ ″	Feet.
Norwood - - - -	38 7 16	31274	Goudhurſt-ſteeple - -	38 43 49	169974
Hundred-acres - - -	40 23 18	66876	Hollingborn-hill - - -	62 58 13	169608
Hanger-hill tower - -	76 7 39	69774	Tenterden-ſteeple - -	46 49 11	217115
Hampton Poor-houſe - -	77 25 22	85128	Fairlight-down - - -	33 14 47	261404
St. Ann's-hill - - -	76 24 56	122836	Lydd-ſteeple - - -	47 40 6	283182
King's-arbour - - -	89 25 6	102268	Allington-knoll - - -	56 46 44	262901
	South-eaſtward.		Ruckinge - - - -	53 53 16	253517
			High-nook - - -	54 1 33	282044
Severndroog-caſtle - -	73 49 34	14610	Folkſtone-turnpike - -	63 28 49	307311
Botley-hill - - -	0 8 7	72881	Padleſworth - - -	63 26 17	292598
Wrotham-hill - - -	50 27 48	93163	Swingfield-ſteeple - -	66 33 2	298372
Frant-ſteeple - - -	24 14 23	151846	Dover-caſtle - - -	67 44 34	328231

TABLE, containing the Latitudes of the Stations; and their Longitudes from Greenwich.

	Lat.	Long.	In Time.
		West.	
	° ′ ″	° ′ ″	m s
Greenwich ob. -	51 28 40		
Norwood - -	51 24 37½	0 5 3	0 20 2
Hundred-acres -	51 20 17½	0 11 20	0 45·3
Hanger-hill tower	51 31 23½	0 17 48	1 11·2
Hampton Poor-houſe	51 25 35½	0 21 47	1 27·1
King's-arbour -	51 28 47½	0 26 50	1 47 3
St. Ann's-hill -	51 23 51½	0 31 17	2 5·1
		East.	
Botley-hill -	51 16 41½	0 0 3	0 0.2
Severndroog-caſtle on Shooter's-hill -	51 28 0	0 3 41	0 14 7
Frant-ſteeple -	51 5 54	0 16 13	1 4·9
Wrotham-hill	51 18 54	0 18 47	1 15·1
Goudhurſt-ſteeple	51 6 49½	0 27 40	1 50·7
Fairlight-down	51 52 39	0 37 7	2 28·5
Hollingborn-hill	51 15 53½	0 39 28	2 37·9
Tenterden-ſteeple	51 4 8	0 41 11	2 44·8
Ruckinge -	51 3 55	0 53 16	2 33·1
Lydd-ſteeple -	50 57 7½	0 54 19	3 37·9
Allington-knoll -	51 4 46	0 57 13	3 48·9
High-nook, near Dymchurch -	51 1 11½	0 59 18	3 57·2
Padleſworth -	51 6 50½	1 8 8	4 32·5
Swingfield-ſteeple	51 8 48	1 11 18	4 45·2
Folkſtone-turnpike	51 5 45½	1 11 33	4 46.2
Dover-caſtle, N. turret of the Keep -	51 7 47½	1 19 7	5 16.5
On the Coaſt of France.			
Montlambert near Boulogne -	50 43 2	1 38 51	6 35·2
Blancnez -	50 55 31½	1 42 24	6 49.6
N. D at Calais -	50 57 30½	1 50 56	7 23·7

The reſult, independent of theory, as far as relates to the immediate object of the undertaking, is, that the diſtance between the parallels of latitude of Greenwich and Paris is 160,659 fathoms, or 963.954 feet, which correſponds to an arc of 2° 38′ 26″, which gives the length of a degree of the meridian in the latitude 50° 10′, equal to 60,843 fathoms. The perpendicular diſtance of the tower of Dunkirk being 547,058, and Dunkirk 9080 feet eaſt of the meridian of Paris, the diſtance of the meridians of Greenwich and Paris, reckoned on the parallel (to the perpendicular) paſſing through Dunkirk, is 537,978 feet. With reſpect to the difference of longitude, ſome uncertainty ſtill exiſts, which it is not eaſy to remove. The French aſtronomers, calculating from a general hypotheſis of the figure of the earth, make it 9^m 21″ of time. But colonel Mudge, by aſſuming a partial hypotheſis, adapted to the intermediate country, and ſuch as reſults from actual meaſurement, makes the difference of longitude 9^m 19″.4: the latter determination certainly appears to us to be far the moſt probable; the truth is, perhaps, between both. Dr. Maſkelyne, from aſtronomical obſervation, eſtimates it 9^m 20″, and nearer than this it will probably never be known.

Meaſurement of a Degree perpendicular to the Meridian.

The object of Caſſini's memoir, relative to the junction of Greenwich and Paris, being thus accompliſhed, the further proſecution of the ſurvey was ſuſpended for a long time by the death of general Roy; but the duke of Richmond, then maſter of the ordnance, having, by an accidental circumſtance, obtained from Ramſden a new theodolite of the ſame dimentions as that above noticed, but with conſiderable improvements, and two new ſteel chains, by the ſame artiſt, his Grace availed himſelf of the influence his ſituation commanded, and procured the king's permiſſion for the recommencement of the ſurvey, which has ſince been extended to the remoteſt parts of the kingdom. On the death of general Roy, the care of conducting this great work was entruſted to colonel Mudge, who had already diſtinguiſhed himſelf by his ſuperior talents, and who has executed the arduous taſk committed to his charge in a manner that ſhews him to have been moſt eminently qualified for the undertaking.

He was for ſome time aſſiſted by Mr. Dalby, a mathematician of conſiderable reputation, who has contributed many valuable theorems relative to the object of their purſuit, but who was obliged by ill health to relinquiſh his employment.

The greater part of theſe operations we conſider as quite foreign to our preſent ſubject; but two objects which immediately relate to it, have been accompliſhed in the courſe of this ſurvey, Theſe are the direct meaſurement of an arc of the meridian, and of a degree of a great circle perpendicular to it.

The latter operation might be made the ſubject of a ſeparate article, but as it occurred firſt in order of time, and as the two meaſurements had the baſe and ſeveral triangles in common, we prefer making it the firſt ſubject of our conſideration.

The operations of 1791 began by a re-meaſurement of the baſe, with the ſteel chains, and, as we have already ſtated, a difference of only 2¾ inches was found between the two meaſures.

New ſtations were choſen to extend the ſurvey weſtward, and to unite Dunnoſe and Beachy-head with the former triangles. Theſe ſtations were choſen to meaſure the perpendicular degree, as they were nearly eaſt and weſt of each other, and were in favourable weather reciprocally viſible, though more than 60 miles diſtant. Some of the ſides of the former ſeries of triangles being common to the new, an opportunity occurred of judging of the accuracy of the two meaſurements; and the ſide of a triangle of near forty miles in length was not found to differ in the new ſurvey but 16 inches from the length computed in the former one.

A baſe of verification was meaſured on Saliſbury-plain, the length of which was reduced to the ſame level as that on Hounſlow-heath = 36,574.4 feet. One branch of this ſeries of triangles towards the weſt was conſtructed almoſt entirely for the purpoſe of connecting this new baſe with the original baſe of departure on Hounſlow-heath, and the length deduced by calculation did not differ an inch from the actual meaſurement.

Three other principal branches of the triangle ſerved to connect Dunnoſe and Beachy-head with the baſes, and with the former triangles of general Roy. So that the diſtance from Dunnoſe to Beachy-head was determined by four different computations, and appeared to be as follows:

339·394.6
339·395.0
339,399.2
339 401.5 } mean 339,397.6 = diſtance of Dunnoſe and Beachy-head.
= 64.28 miles.

The azimuthal angle at Dunnoſe was found by obſervations of the Pole Star to be - - - 81° 56′ 53″
and at Beachy-head - - - 96 55 58

Let

Let P G M (*Plate* VII. *fig.* 56.) be the meridian of Greenwich; then if M B be the parallel to the perpendicular at G, Greenwich, we have M B = 58,848 feet, and G M = 269.328 feet. Therefore, taking 60,851 fathoms for the length of the degree on the meridian, as derived from the difference of latitude between Greenwich and Paris, applied to the meaſured arc (ſuppoſing the latitude of Paris 48° 50′ 14″), we get G M = 44′ 15″.26, conſequently the latitude of the point M (that of Greenwich being 51° 28′ 40″) is 50° 44′ 24″.74, and the co-lat. P M = 39° 15′ 35″.26.

With reſpect to the arc M B, for the preſent purpoſe it is not of conſequence on what hypotheſis it be obtained. But if 61,173 fathoms be aſſumed for the length of a degree of a great circle, perpendicular to the meridian at M, then M B = 9′ 37″.19, and the latitude of B, Beachy-head, will be found 50° 44′ 23″.71.

Again (*fig.* 57.), let W B be the arc of a great circle perpendicular to the meridian of Beachy-head, at B, meeting that of Dunnoſe in W, and let D R be another arc of a great circle perpendicular to the meridian of Dunnoſe in D, meeting that of Beachy-head in R: then we ſhall have two ſmall ſpheroidical triangles W B D and R B D, having in each two angles given, namely, W D B = 81° 56′ 53″, and W B D = 6° 55′ 58″, in the triangle W B D; and D B R = 83° 4′ 2″ with B D R = 8° 3′ 7″, in the triangle D B R; and theſe reduced to the angles formed by the chords, give the following triangles for computation; namely,

In the triangle W B D	W B D =	6°	55′	57″.2
	W D B =	81	56	52.4
	D W B =	91	7	10.4
In the triangle B D R	B D R =	8°	3′	6
	D B R =	83	4	1
	D R B =	88	52	53

In which it muſt be noted, that the reduced angles are given to the neareſt $\frac{1}{4}$″.

Again, let B I and D E be the parallels of latitude of Beachy-head and Dunnoſe, meeting the meridians in L and E: then to find L W and E R, we have two ſmall triangles, that may be conſidered as plane ones, namely, L B W and E D R, in which the angles at W and R are given nearly.

Now the exceſs of the three angles above 180° in the triangle D B W, conſidered as a ſpherical one, is 3″ nearly. Therefore the angle D W B will be 91° 7′ 12″ nearly. Hence B W L = 88° 52′ 48″, conſequently B L W = 90° 33′ 36″, and L B W = 0° 33′ 36″. Therefore with the chord of the arc W B = 336,115.6 feet, we get W L = 3285.2 feet, which added to W D, as found above, gives 44,258.6 feet, for the diſtance between the parallels of Beachy-head and Dunnoſe. Again, in the triangle D B R, conſidered as a ſpherical one, the exceſs is about $3\frac{1}{2}$″.

Hence, from the two obſerved angles at D and B, namely, 8° 3′ 7″, and 83° 4′ 2″, we get the third angle B R D = 88° 52′ 54″.5, and taking the triangle E R D as a plane one, the other angles will be 0° 33′ 32″.75 (E D R), and 90° 33′ 32″75 (D E R); therefore with the chord of the arc D R = 336,980 feet, we get R E = 3288.2 feet, which taken from B R as found above, leaves 44,258 9 feet for the meridional arc or the diſtance between the parallels of Beachy-head and Dunnoſe, which is nearly the ſame as before.

This method of determining the diſtance between the parallels is ſufficiently correct. But the ſame concluſion may be deduced from a different principle, thus:—

Let the difference of longitude, or the angle at P, be found on any hypotheſis of the earth's figure, and likewiſe the latitudes of Beachy-head and Dunnoſe; with theſe compute the latitudes of the points R and W: then it will be found that the arc R E is $\frac{5}{1000}$″ greater than L W, and $\frac{1}{1000}$″ on the meridian is nearly a foot, R E is 5 feet more than L W. Hence $\frac{47547.1 - 5 + 40973 4}{2} = 44257.8$ is the diſtance between the parallels, which is very nearly the ſame as found by the other method. It ſeems, therefore, that whatever be the value of the arc between theſe parallels in parts of a degree, the diſtance between them is obtained ſufficiently near the truth. Therefore, taking 60 851 fathoms for the length of a degree on the meridian, we get the arc ſubtended by 44,258.7 feet = 7′ 16″.4, which ſubtracted from the latitude of Beachy-head, namely, 50° 44′ 23″.71, leaves 50° 37′ 7″.31 for the latitude of Dunnoſe. We have, therefore, for finding the length of the degree of a great circle perpendicular to the meridian at Beachy-head or Dunnoſe, the latitudes of the two ſtations, and the angles which theſe ſtations make with each other and the pole.

Since the ſum of the horizontal angles P D B + P B D (*Plate* VII. *fig.* 55.) is nearly the ſame as the ſum which would be found on a ſphere, we ſhall find the angles for ſpherical computation, as follows:—The co-latitudes of D and B, or the arcs D P and B P, are 39° 22′ 52″.69, and 39° 15′ 36″.29; therefore half their ſum is 39° 19′ 14″.49, and half their difference 3′ 38″.2. —Half the ſum of the angles P D B and P B D is 89° 26′ 25″.5; therefore as tang. 39° 19′ 14″.49 : tang. 3′ 38″.2 : : tang. 89° 26′ 25″.5 : tang. 7° 31′ 57″.71, or half the difference of the angles. Hence the angles for computation are 81° 54′ 27″.79 and 96° 58′ 23″.21, which with the co-latitudes of D and B give the difference of longitude between Beachy-head and Dunnoſe, or the angle D P B = 1° 26′ 47″.93. We have now two right angled triangles (*fig.* 57.), which may be conſidered ſpherical, namely, P B W and P D R, in which the angle at the pole, P, is given, and likewiſe the ſides P B and P D; therefore uſing theſe data, we find the arc B W = 54′ 56″.21, and the arc D R = 55′ 4″.74. The chords of the two perpendicular arcs are about $3\frac{1}{2}$ feet leſs than the arcs themſelves: therefore B W = 336,119.1 feet, and D R = 336,983.5 feet. And by proportioning theſe arcs to their reſpective values in fathoms, we get the length of the degree of the great circle perpendicular to the meridian in the middle point between W and B = 61,182.8 fathoms, and in the middle point between R and D = 61,181.8 fathoms. Therefore 61,182.3 fathoms is the length of a degree of the great circle perpendicular to the meridian, in latitude 50° 41′, which is nearly that of the middle point between Beachy-head and Dunnoſe.

Of the Meaſurement of an Arc of the Meridian between Dunnoſe in the Iſle of Wight, and Cliſton in Yorkſhire.

The account of this important part of the Engliſh ſurvey was drawn up by colonel Mudge, and read before the royal ſociety in June 1803.

The length of the meaſured arc was more than 196 Engliſh miles. The triangles extended along a line exactly north and ſouth. They were conſtructed, and obſerved in the ſame manner as in the former part of the ſurvey, and depending on the ſame baſes, namely, Hounſlow-heath and Salisbury-plain. But, to add greater ſecurity to the northern triangles, a baſe was meaſured on Miſterton Car, near the northern extremity of the baſe, with the ſame chains, and with equal care, as in the former operations. This was the fourth baſe that had been meaſured; and though it would not have been prudent to have omitted ſo eſſential a verification, yet, had all the calculations been

made

made from one alone, the difference in the results would hardly have been ſenſible. The length of the baſe on Miſterton Car was 26,342.7 feet.

Colonel Mudge thus ſtates his reaſons for ſelecting this arc in preference to any other.

"In a country, whoſe ſurface throughout its whole extent is equally diverſified with hilly ground, that particular part of it ſhould be choſen for carrying on a meridional meaſurement which comprehends the moſt extenſive arc.

"This ariſes from the neceſſary conſequence which attends an operation in a country ſo circumſtanced; as poſſibly no ſpot fixed on for a place could be ſuppoſed free from the effects of unequal attraction in the adjoining matter.

"In ſuch a country, therefore, a meaſurement upon the moſt extenſive arc muſt give the moſt accurate concluſion; for the errors ariſing from the cauſe here mentioned, like thoſe of obſervation, leſſen in their effects, on their application to arcs of greater magnitude.

"If Great Britain were a country thus diverſified, the moſt eligible part would be that where the meridian from Lyme in Dorſetſhire paſſes northward into Scotland.

"The difference of latitude between that place and Aberdeen, near to which that line cuts its parallel, is 4° 47′ nearly.

"But, however great the advantages attending ſuch a length of arc might be, under the general circumſtances of accurate terreſtrial meaſurement, and accurate obſervations at its extremities, no beneficial conſequences could be expected to attend the placing of the ſector at intermediate ſtations; as the arc would be found running, almoſt every where, through a country abounding with hills, conſiderable both in magnitude and number.

"Under this conſideration, I determined to meaſure a portion of the meridian which proceeds from Dunnoſe to the mouth of the Tees, becauſe, from inquiry, I had reaſon to ſuppoſe it the longeſt meridional arc in Britain, free from any apparent obſtruction. And I was led to ſelect Dunnoſe for one of its extremities, as obſervations made there, in conjunction with others at Greenwich, would enable me to make corrections of latitudes of places given in our former papers, if found neceſſary. By fixing on Dunnoſe, I had alſo the means of aſcertaining the diſtance of the royal obſervatory from the northern or ſouthern end of my line, and, conſequently of connecting it with the parallels of Dunkirk and Paris."

For determining the amplitude of the arc, a zenith ſector was conſtructed by Ramſden. This was the laſt work of that great artiſt, and on which he had exerted all his talents to render it the firſt of its kind. The radius of the ſector was upwards of eight feet, and the object-glaſs of the teleſcope four inches in diameter.

The greateſt part of the ſummer of 1802 was employed by colonel Mudge in making obſervations with this inſtrument. It was firſt erected at Greenwich, afterwards at Dunnoſe, Clifton, and Arbury-hill; and ſo many ſtars were obſerved at each of theſe ſtations, that there can hardly remain a doubt of the relative latitudes being determined to the neareſt ſecond. It is true, we have met with ſeveral inſtances in the courſe of this hiſtory, of obſervations made with zenith ſectors, which agreed apparently very well with each other; and yet were affected by ſome common error of conſiderable magnitude, from ſome undue poſition of the plane of the inſtrument, either with reſpect to the vertical or the meridian; but colonel Mudge has ſufficiently ſhewn how improbable it is that ſuch ſhould be the caſe here, conſidering all the means that were employed, both by the artiſt and the obſerver, to avoid the poſſibility of ſuch an accident.

The obſervatories of Greenwich and Blenheim were transferred upon the arc by means of triangles, obſerved in the former ſurvey; and thus the latitudes of five different points on it were obtained. The directions of the meridian with the ſides of the triangles were obſerved both at Clifton and Dunnoſe, by obſervations of the pole-ſtar, at its greateſt elongation, eaſt and weſt from the meridian. This method, which has uniformly been adopted throughout the Engliſh ſurvey, is the moſt accurate that can be deviſed. For this kind of obſervation, the repeating circle is much inferior to the theodolite.

The extreme ſtations were connected by twenty-two triangles as follows. (Vid. *Plate* VIII. *fig.* 69.)

Butſer-hill from Dunnoſe, 140.580.4 feet. Phil. Tranſ. for 1795, p. 501.

No. of Triangles.	Names of Stations.	Obſerved Angles.	Diff.	Spherical Exceſs.	Error.	Angles corrected for Calculation.	Diſtances
		° ′ ″	″	″	″	° ′ ″	Feet.
I.	Butſer-hill - -	76 12 22	−1.99			76 12 21.5	
	Dean-hill - -	48 4 32.25	−1.54			48 4 31.75	
	Dunnoſe - -	55 43 7	−1.53			55 43 6.75	
		180 0 1.25		5.0	−3.75		
	Dunnoſe from { Butſer-hill - -						140580.4
	Dunnoſe from { Dean-hill - -						183496.2
II.	Dean-hill - - -	62 22 48.75	−1.37			62 22 47	
	Butſer-hill - - -	48 28 41.5	−1.23			48 28 40	
	Highclere - -	69 8 35	−1.5			69 8 33	
		180 0 5.25		4.07	+1.18		
	Dean-hill from { Butſer-hill - -						156122.1
	Dean-hill from { Highclere - -						125084.9

No. of Triangles.	Names of Stations.	Observed Angles.	Diff.	Spherical Excefs.	Error.	Angles corrected for Calculation.	Diftances
		° ′ ″	″	″	″	° ′ ″	Feet.
III.	Butfer-hill - -	84 31 45.5	—1 2			84 31 44.5	
	Hind-head - -	66 15 54.5	—0.83			66 15 54.25	
	Highclere - -	29 12 22	—0.72			29 12 21.25	
		180 0 2		2.7	—0.7		
	Butfer-hill from { Hind-head - - -						78905.7
	Highclere - - -						148031 0
IV.	Highclere - -	34 46 15.75	—0.81			34 46 15	
	Hind-head - -	83 20 14.25	—1.36			83 20 14	
	Bagfhot-heath - -	34 46 15.75	—1.88			61 53 31	
		180 0 1.75		3.09	—1.34		
	Highclere from { Bagfhot-heath - - -						142952.6
	Hind-head - - -						160972.2
V.	Bagfhot-heath - -	55 32 26	—0 89			55 32 25.25	
	Highclere - -	46 10 18.25	—0.83			46 10 17.75	
	Nuffield - -	78 17 18.25	—1.20			78 17 17	
		180 0 2.5		2.94	0.43		
	Nuffield from { Bagfhot-heath - - -						105321.2
	Highclere - - -						120374
VI.	White-horfe-hill - -	63 7 53.25	—0.94			63 7 53.5	
	Highclere - -	63 18 16.75	—0.94			63 18 17	
	Nuffield - - -	53 33 49.5	—0.86			53 33 49.5	
		179 59 59.5		2.74	—3.24		
	White-horfe-hill { Nuffield - - -						120557.7
	Highclere - - -						108563.1
VII.	White-horfe-hill - -	38 48 13.25	—0.67			38 48 12.5	
	Nuffield - - -	86 4 16.25	—1.21			86 4 15	
	Brill - - - -	55 7 33.5	—0.71			55 7 32.5	
		180 0 3		2.6	+0.4		
	Brill from { White-horfe-hill - -						146603.2
	Nuffield - - - - -						92805.5
VIII.	Brill - - -	50 14 44.5	—1.18			50 14 45	
	White-horfe-hill -	64 45 43.75	—1.34			64 45 42.5	
	Stow on the Wold - -	64 59 32	—1.35			64 59 32.5	
		180 0 0.25		3.88	—3.63		
	Stow from { White-horfe-hill - -						124365.6
	Brill - - - -						146326.3
IX.	Brill - - -	32 34 43	—0.61			32 34 42.25	
	Stow on the Wold - -	60 56 6.25	—0.64			60 56 5.5	
	Epwell - - -	86 29 13.25	—0.11			86 29 12.25	
		180 0 2.75		2.37	+0.38		
	Epwell from { Stow - - - -						78938.2
	Brill - - - -						128140
X.	Brill - - -	34 23 58.5	—0.65			34 23 57.5	
	Epwell - -	85 0 18.5	—1.10			85 0 17.5	
	Arbury-hill - - -	60 35 45.5	—0.70			60 35 45	
		180 0 22.5		2.46	+0.04		
	Arbury-hill from { Epwell - - -						83098.4
	Brill - - - -						146530

No. of Triangles.	Names of Stations.	Observed Angles.	Diff.	Spherical Excess.	Error.	Angles corrected for Calculation.	Distances.
		° ′ ″	″	″	″	° ′ ″	Feet.
XI.	Arbury-hill	89 57 4.5	−1.14			89 57 5.5	
	Epwell	54 45 18.75	−0.57			54 45 18.25	
	Corley	35 17 36.75	−0.57			35 17 36.25	
		180 0 0		2.29	−2.29		
		Corley from { Arbury-hill					117463
		Corley from { Epwell					143827.8

Length of the Base on Misterton Carr, 26342.7 feet.

No. of Triangles	Names of Stations.	Observed Angles.	Diff.	Spherical Excess.	Error.	Angles corrected for Calculation.	Distances.
		° ′ ″	″	″	″	° ′ ″	Feet.
XII.	Beacon-hill	20 47 19.75				20 47 20	
	North end of Base	60 17 16.5				60 17 13	
	South end of Base	98 55 27.5				98 55 27	
		180 0 3.75					
		Beacon-hill from { North end of Base					64461.7
		Beacon-hill from { South end of Base					73321.9
XIII.	Beacon-hill	34 44 42.25				34 44 42	
	North end of Base	74 46 56.5				74 46 56	
	Gringley on the hill	70 28 22.25				70 28 22	
		180 0 1					
		Gringley from { North end of Base					44338.2
		Gringley from { Beacon-hill					75068.0
XIV.	Beacon-hill	13 57 24				13 57 23	
	Gringley	51 11 6.5				51 11 5	
	South end of Base	114 51 32.5				114 51 32	
		180 0 3					
		Gringley from Beacon-hill					75068.2
		Wherefore the mean distance from Gringley to Beacon-hill is 75068.1 feet.					
XV.	Heatherfedge	18 40 38.5	+0.29			18 40 38	
	Beacon-hill	138 9 16	−2.02			138 9 16	
	Gringley	23 10 6	+0.65			23 10 6	
		180 0 0.5		1.08	−0.58		
		Heatherfedge from { Beacon hill					92227.2
		Heatherfedge from { Gringley					156384.8
XVI.	Sutton-Ashfield	78 47 2	−1.01			78 47 1	
	Heatherfedge	54 52 37.5	−0.24			54 52 35	
	Gringley	46 20 24	−0.22			46 20 24	
		180 0 3.5		2.45	+1.10		
		Sutton-Ashfield from { Gringley					130399.7
		Sutton-Ashfield from { Heatherfedge					115339.9
XVII.	Orpit	80 28 57.25	−0.85			80 28 57	
	Heatherfedge	39 8 38.5	−0.12			39 8 38	
	Sutton-Ashfield	60 22 25.5	−1.00			60 22 25	
		180 0 1		2.03	−1.03		
		Orpit from { Heatherfedge					101660.3
		Orpit from { Sutton Ashfield					73826 6

No. of Triangles	Names of Stations.	Observed Angles.	Diff.	Spherical Excess.	Error.	Angles corrected for Calculation.	Distances.
		° ′ ″	″	″	″	° ′ ″	Feet.
XVIII.	Hollan-hill	44 43 32	−0.12			44 43 31	
	Sutton-Ashfield	113 49 9	−0.53			113 49 7	
	Orpit	21 27 20.5	−0.18			21 27 22	
		180 0 1.5		0.73	+0.77		
	Hollan-hill from { Sutton-Ashfield						38375.2
	Hollan-hill from { Orpit						95975.3
XIX.	Bardon-hill	42 58 59.5	−0.69			42 58 59	
	Hollan-hill	74 52 38	−1.03			74 52 37	
	Orpit	62 8 25	−1.21			62 8 24	
		180 0 2.5		2.75	−0.20		
	Bardon-hill from { Hollan-hill						124454.7
	Bardon-hill from { Orpit						135895.3
XX.	Castle-ring	55 32 44	−0.94			55 32 43	
	Bardon-hill	68 24 4.75	−1.02			68 24 3	
	Orpit	56 3 14.75	−0.90			56 3 14	
		180 0 3.5		2.85	+0.65		
	Castle-ring from { Orpit						153235.2
	Castle-ring from { Bardon-hill						136717.8
XXI.	Corley	72 32 46.5	−1.19			72 32 46	
	Castle-ring	47 54 42.25	−0.86			47 54 42	
	Bardon-hill	59 32 32.25	−0.94			59 32 32	
		180 0 1		2.93	−1.93		
	Corley from { Bardon-hill						106357.3
	Corley from { Castle-ring						123539.7
XXII.	Arbury-hill	34 14 33.5	−0.98			34 14 33	
	Corley	107 20 14.25	−1.99			107 20 14	
	Bardon-hill	38 25 13.25	−0.80			38 25 13	
		180 0 1		3.37	−2.37		
	Arbury-hill from { Bardon-hill						180426.0
	Arbury-hill from { Corley						117457.1

Calculation of the Meridional Distance between Dunnose and Clifton.

The bearings of certain sides from the parallels to the meridian of Dunnose, by observations of the pole-star at Dunnose.

	°	′	″	
Dunnose and Butser-hill -	20	58	39	N.E.
Butser-hill and Highclere -	34	20	17	N.E.
Highclere and Nuffield -	35	30	40	N.E.
Nuffield and Brill - -	4	51	15	N.W.
Brill and Arbury-hill -	12	30	17	N.W.
Arbury-hill and Bardon-hill	7	42	57	N.W.
Bardon-hill and Orpit -	21	21	9	N.W.
Orpit and Heatherfedge -	5	25	52	N.W.
Heatherfedge and Beacon-hill	61	52	17	N.E.

These bearings, and their respective sides, give the following distances on the meridian of Dunnose.

	Feet	Miles.
Dunnose and Butser-hill	131,263.0 =	24.86
Butser-hill and Highclere	122,232.7 =	23.15
Highclere and Nuffield	97,984.7 =	18.56
Nuffield and Brill -	91,755.3 =	17.38
Brill and Arbury-hill -	143,054.1 =	27.09
Arbury-hill and Bardon-hill	178,792.4 =	33.86
Bardon-hill and Orpit -	126.567.8 =	23.29
Orpit and Heatherfedge	101,203 7 =	19.17
Heatherfedge and Beacon-hill	43,480.7 =	8.23
	1,036,334 =	196.27,

the distance between Clifton and the perpendicular to the meridian of Dunnose, which may be taken for the true length of the arc itself, as the distance of the former station from the meridian of the latter is only 4770 feet.

Bearings of the ſame Sides, deduced from the Obſervations made at Clifton.

	°	′	″	
Beacon-hill and Heatherſedge	61	51	50	S.W.
Heatherſedge and Orpit -	5	26	19	S.E.
Orpit and Bardon-hill -	21	21	36	S.E.
Bardon-hill and Arbury-hill	7	43	26	S.E.
Arbury-hill and Brill -	12	31	0	S.E.
Brill and White-horſe-hill -	50	15	48	S.W.
White-horſe-hill and Highclere	27	48	6	S.E.
Highclere and Butſer-hill -	34	20	49	S.E.
Butſer-hill and Dunnoſe -	20	58	9	S.W.

Theſe bearings and ſides give the following párallels to the meridian of Clifton:

Beacon hill and Heatherſedge -	43,490.4
Heatherſedge and Orpit - -	101,202.6
Orpit and Bardon - - -	126,561.3
Bardon-hill and Arbury-hill - -	178,793.2
Arbury-hill and Brill - - -	143,047.4
Brill and White-horſe-hill - -	93,717.6
White-horſe-hill and Highclere -	96,031.4
Highclere and Butſer-hill - -	122,219.8
Butſer hill and Dunnoſe - -	131,270.2

The ſum 1,936,33.39 feet, is the diſtance between Dunnoſe and the perpendicular to the meridian of Clifton; or the length of the arc itſelf. There is therefore a difference of only half a foot between the two reſults. We may conſequently take 1,036,334 for the diſtance required.

The ſubtenſes in the heavens of the different parts of the terreſtrial arc are as follows:

	°	′	″
1. Dunnoſe and Clifton - -	2	50	23.38
2. Dunnoſe and Arbury-hill -	1	36	19.98
3. Arbury-hill and Clifton -	1	14	3.40
4. Dunnoſe and Greenwich -	0	51	31.39
5. Greenwich and Clifton -	1	58	51.59
6. Arbury-hill and Greenwich	0	44	48.19
7. Dunnoſe and Blenheim -	1	13	19.69
8. Blenheim and Clifton - -	1	37	3.69

The following terreſtrial arcs are thoſe uſed in conjunction with the preceding ones for computing the length of a degree:

Arcs	Feet.
1. Dunnoſe and Clifton - -	1,036,337
2. Dunnoſe and Arbury-hill -	586,320
3. Arbury-hill and Clifton - -	450.017
4. Dunnoſe and Greenwich -	313,696
5. Greenwich and Clifton - -	722,641
6. Arbury-hill and Greenwich -	272,624
7. Dunnoſe and Blenheim -	446.498
8. Blenheim and Clifton - -	589,839

And by ſimply dividing the terreſtrial arcs by their correſponding celeſtial ones, and afterwards multiplying the ſeveral quotients by 3600″, we ſhall get the length of the degrees as follows:

	Fathoms.
Middle point between Dunnoſe and Clifton	60,820
Dunnoſe and Arbury-hill	60,864
Arbury-hill and Clifton	60,766
Dunnoſe and Greenwich	60,884
Greenwich and Clifton	60,794
Arbury-hill and Greenwich	60,849
Middle point between Blenheim and Clifton	60,769
Blenheim and Dunnoſe	60,890

Taking the latitude of Greenwich at 51° 28′ 40″ from the ſeveral arcs now given, the latitudes of their middle points are eaſily found, and, with the lengths of the degrees, when properly arranged, will ſtand as follows:

	Lat. of middle Point.	Fath.
	° ′ ″	
Arbury-hill and Clifton -	52 50 29.8	60,766
Blenheim and Clifton - -	52 38 56.1	60,769
Greenwich and Clifton -	52 28 5.7	60,794
Dunnoſe and Clifton - -	52 2 19.8	60,820
Arbury-hill and Greenwich -	51 51 4.1	60,849
Dunnoſe and Arbury-hill -	51 35 18.2	60,864
Blenheim and Dunnoſe -	51 13 18.2	60,890
Dunnoſe and Greenwich -	51 2 54.2	60,884

Colonel Mudge thus concludes his account of this operation:

"From this meaſurement it appears, that the length of a degree on the meridian, in latitude 52° 2′ 20″, is 60,820 fathoms. This concluſion is deduced from the ſuppoſition of the whole arc ſubtending an angle of 2° 50′ 23″.38 in the heavens, and a diſtance of 1,036,337 feet on the ſurface of the earth.

"The length of the degree at the middle point (51° 35′ 18″) between the ſouthern extremity of the arc and Arbury-hill, is 60,864 fathoms; which is greater than the above, and exceeds it by 44 fathoms. But this degree, admitting the earth to be an ellipſoid, with the ratio of its axes as 229 to 230, ſhould be about 10 fathoms leſs. If the meaſurement of the terreſtrial arc be ſufficiently correct, and the earth of an elliptical form in theſe latitudes, either the arcs affording the deductions are incorrect, or ſome material deflection of the plumb-line has taken place, at one or two ſtations, from the effect of attraction.

"Without arrogating to myſelf any merit from the pains taken in the performance of this undertaking, I may ſay, I am ſo perfectly convinced of the general accuracy of the whole, that I cannot for a moment doubt the collective evidence of its ſufficiency. From an examination of my field books, and from the remeaſurement of the chains uſed in our baſe-line on Miſterton Carr, I think it is probable that an error in the whole diſtance, of 197 miles nearly, does not ſubſiſt to an amount of more than 100 feet, correſponding to 1″ in the amplitude of the whole arc, and I alſo think it probable it cannot amount to half that quantity. The ſuppoſition of the zenith diſtances of the ſtars being generally erroneous, at any one ſtation, cannot be admitted, unleſs it ſhould be imagined, that the plane of the ſector's limb was not got into that of the meridian. Such an idea, however, can ſcarcely be entertained, after a careful examination of the ſeveral obſervations, and a due attention to the means by which the inſtrument was made to aſſume its right poſition. Perhaps, alſo, I ſhould not fail to obſerve, in this place, that although the inſtrument was always brought into the plane of each meridian by means of the teleſcope attached to the ſide of the great tube, and the azimuth circle, yet, having two good chronometers in my poſſeſſion, I repeatedly verified the truth of the ſector's poſition, by obſerving the tranſits of two ſtars, north and ſouth of the zenith, at the greateſt diſtances my arc would admit of. But, to return, if there be an error in the amplitude of the total arc, from a deflection of the plumb-line at either of the ſtations,

tions, it is not probable that any ſuch deflection exiſted at Dunnoſe; as the deviation of it towards the north, from a deficiency of matter towards the channel, would tend to diminiſh the inequality between the lengths of the two degrees. This will be evident, on conſideration. I am therefore diſpoſed to believe that the plumb-line was drawn towards the ſouth, from the action of matter, both at the northern extremity of the arc and at Arbury-hill, but more particularly at the firſt-mentioned ſtation. If this were partly the caſe, and both Dunnoſe and Arbury-hill were free from any ſuch prevailing cauſe, the total arc muſt be too great, if taken at 2° 50′ 23″.38, by about 8″, nearly anſwering to 2″ on each degree. A deviation of 8″ from the true vertical is a large quantity; nor can the cauſe of it be aſſigned, unleſs it be alſo ſuppoſed, that the matter producing that deflection extends in a ſouthern direction *beyond* Arbury-hill. If the error, though not probable, as above obſerved, be ſuppoſed to exiſt at Dunnoſe, it muſt amount to more than 10″; and that too from the effects of attraction in a ſouthern direction, where the deficiency of matter would lead us to believe the reverſe would happen.

"I am perfectly aware that it is poſſible to ſtate a caſe, in which the plumb-line of a ſector would deviate from the true vertical by ſuch a quantity. Thus, for inſtance, in a chalky county, like the ſouthern part of the kingdom, if the inſtrument were ſet up adjoining the terminations of two ſtrata running eaſt and weſt, one of chalk, and the other of much denſer materials, the effect would be as we have found it. But, at Dunnoſe, this argument does not apply; nor is there reaſon to believe, from external appearances, that it will do ſo, with regard either to Arbury-hill, or the northern extremity of the meridional line.

"It was the diſcovery of the diſagreement between the ſubtenſe in the heavens, of the whole arc, and its correſponding terreſtrial one, with thoſe of its parts, which led me to apply to his grace the duke of Marlborough, for the obſervations made at Blenheim on γ Draconis, or ſome other ſtar. His lordſhip's compliance with my requeſt is ſhewn, from the table of the reſults, to be ſerviceable; as the arc contained between the obſervatory at Blenheim and Dunnoſe, deduced from his grace's obſervations, and thoſe made at the latter place, with the meridional diſtance 446,498 feet, give 60,890 fathoms, for the length of the degree on the meridian in latitude 51° 13″; which agrees nearly with the length of the degree at the middle point between Greenwich and Dunnoſe. However, under all conſiderations of the means by which the degree in 51° 13′ has been obtained, I am inclined to believe there is an uncertainty in it, of 6 or 7 fathoms, anſwering to about $\frac{1}{2}$″ in latitude.

"But, if the meaſured ſpace between his grace's obſervatory and Dunnoſe, with its amplitude, (1° 13′ 19″.69) be uſed in finding the meridional diſtance of the whole arc, (its correſponding amplitude,) we ſhall get 2° 50′ 11″.80 for its ſubtenſe; which argues a deflection from the vertical at Clifton = 11″.79. If the meridional diſtance between Dunnoſe and Greenwich be uſed, we ſhall, from the ſame mode of proceeding, make it = 10″.3. In ſhort, the general tenor of the obſervations ſeems to prove, that the plumb-line of the ſector has been drawn towards the ſouth at all the ſtations; and that by attractive forces, which increaſe as we proceed northward. On a further proſecution of this ſurvey, the zenith ſector will be taken forward in that direction, which will afford an opportunity of throwing further light on this intereſting ſubject. But meridional operations carried on in inſular countries, are not ſo likely to afford juſt concluſions with regard to the different lengths of the degrees, as the ſame operations conducted in places very remote from deep ſeas.

"From the late operations of the French academicians it appears, that the meridional diſtance between Dunkirk and Barcelona is 275.792.36 modules, the metre being 443.296 lines of the Peru toiſe = 0,256,537th part of the module, at the temperature of melting ice. This meridional diſtance, therefore, converted into Engliſh feet, is 3.527,921. The diſtance between Dunkirk and Paris is 133 758 feet, and the diſtance between Paris and Greenwich is = 963 954 feet; therefore, 830,196 feet is the diſtance between Greenwich and Dunkirk. The diſtance between Greenwich and Clifton is 722.641 feet; hence, 4,411.968 feet is the meridional diſtance between Clifton and Barcelona. The latitude of Barcelona is 41° 21′ 48″.8; the latitude of Greenwich is 51° 28′ 40″; and if to this latitude we add 1° 58′ 51″.59, the arc between Clifton and Greenwich, we ſhall get 53° 27′ 31″.59 for the latitude of Clifton: and ſhall then have the difference of latitude between Barcelona and Clifton = 12° 5′ 42″.79, ſomething more than the 30th part of the whole circumference of the earth. With this difference of latitude, and the above-mentioned diſtance, we ſhall get 60,795 fathoms, for the mean length of a degree on the earth's ſurface, in latitude 47° 24′. The latitude of Paris is 48° 50′ 15″; this, with that of Clifton, gives 4° 37′ 16″.59 for the difference between their parallels. The meridional diſtance is 1,686,595 feet; hence, 60,825 fathoms is the length of the degree in latitude 51° 9′."

Of the trigonometrical Operations in France, ſince 1790.

While this great work was carried on in England, a ſimilar one was undertaken in France, and on a larger ſcale, as the arc meaſured in that country began at Dunkirk, and extended beyond the frontiers to Barcelona in Spain. The immediate purpoſe of this operation was to obtain a ſtandard meaſure, which ſhould not be arbitrary, but founded on ſome permanent quantity afforded by nature. Many learned men were advocates for taking the length of the pendulum as a ſtandard; but after much deliberation, it was reſolved to adopt the ten millionth part of the quadrant of the meridian for the unit, which was to be called a metre, and from this all other meaſures were to be derived. See MEASURE.

To obtain this ſtandard it was requiſite to inſtitute a new ſeries of obſervations, to determine the magnitude and figure of the earth in a more ſatisfactory manner than had hitherto been done; and preparations were made for again repeating the whole proceſs for the meaſurement of an extenſive arc of the meridian.

The moſt remarkable difference in the mode of conducting the ſurveys in the two countries, was in the inſtruments employed for the meaſure of the angles. The only one uſed by the French aſtronomers was the repeating circle of Borda. We are fully inclined to give credit to all that is related of the extraordinary accuracy of this ingenious inſtrument; at the ſame time, we are diſpoſed to think the theodolite of Ramſden a preferable inſtrument for great national ſurveys, where circumſtances will permit its uſe. The ſuperiority of the theodolite conſiſts in its ſize, the great power of its teleſcope, and the facility with which all azimuthal angles are obſerved with it, without any correction; as it combines all the verifications of a tranſit inſtrument, the pole ſtar can be brought to the horizon without ſenſible error, and its azimuth ſerves to give the direction of the ſides of the triangles in a manner infinitely more exact than we believe can be done by any management of a repeating circle. On the other hand, the latter inſtrument ſupplies the place of a

zenith

zenith ſector; and from its being light and portable, admits of its being taken into ſituations inacceſſible to a larger inſtrument. Whoever peruſes the account of the French ſurvey, will at once perceive that ſo large an inſtrument as the theodolite of Ramſden would have been totally uſeleſs in that country. The repeating circle requires a great number of corrections, but theſe are rendered eaſy by the means of tables; and it muſt be obſerved, that many of the corrections uſed by the French aſtronomers do not depend on the nature of their inſtrument, but on its poſition, which was ſeldom or never that of the centre of the ſtation; the diſturbed ſtate of the country, and the want of ſufficient pecuniary aſſiſtance, prevented them from erecting ſignals at ſelect ſtations, as was practiſed in this country; on the contrary, they were obliged to ſelect ſuch ſteeples, towers, windmills, and other conſpicuous buildings as the country afforded, which were often very inconveniently diſpoſed for the reception of their inſtrument, ſmall and portable as it was.

The committee appointed by the ancient academy, conſiſting of Lagrange, Laplace, Monge, and Condorcet, publiſhed their report on this intended operation in the memoirs of the academy for 1788. It was propoſed, among a variety of other objects relative to the new meaſures, to meaſure an arc of the meridian from Dunkirk to Barcelona, exceeding $9^{\circ}\frac{1}{2}$. This arc had the advantage of being terminated at each extremity by the level of the ſea, and it was extended beyond the Pyrenées, that the influence of mountains on the plumb-line might be avoided.

Thoſe to whom the execution of this undertaking was committed were inſtructed to determine the latitude of Dunkirk and Barcelona, and other intermediate ſtations, to re-meaſure the ancient baſes, to verify again the former triangles, and to extend them to Barcelona. From the ſucceſsful trial that had been made of the repeating circle in 1787, it was again adopted, but of rather larger dimenſions; and four of them were conſtructed by Le Noir, from 14 to 18 inches diameter, to be employed in this occaſion. The execution of the whole was entruſted to Mechain and Delambre. The former undertook the ſouthern part, from Rodez to Barcelona; the latter the northern, from Rodez to Dunkirk.

One of the laſt acts of the unfortunate Louis XVI. was a proclamation to place theſe aſtronomers and their ſignals, inſtruments, &c. under the ſpecial protection of the adminiſtrative authorities; but the paſſports of this expiring government only rendered them objects of greater ſuſpicion, and increaſed their difficulties and dangers.

Mechain, after encountering ſeveral vexatious interruptions in the vicinity of Paris, at length was fortunate enough to arrive within the Spaniſh frontiers, where, in the neighbourhood of Barcelona, he completed ſeveral triangles; and, by the end of October 1792, had terminated the angles at fort Montjouy, the ſouthern extremity of the arc: here he reſolved to wait during the winter, and devote it to obſervations for determining the latitude and azimuth of this ſtation.

Delambre began his obſervations in the neighbourhood of Paris, in the ſummer of the year 1792, and on the memorable 10th Auguſt, ignorant of what was paſſing at Paris, he went after dark to his ſtation; but inſtead of ſeeing the ſignal lamp lighted on Montmartre for his obſervation, as had been previouſly agreed, he beheld the flames from the palace of the Thuilleries. It was in the dreadful period of alarm and diſmay which followed, that this indefatigable aſtronomer began to obſerve the ſeries of triangles to the north of Paris: at almoſt every village he was arreſted, and obliged to explain to the populace the uſe of his inſtruments and the nature of his miſſion; and in more than one inſtance, where this lecture did not ſuit the taſte of the mob, he very narrowly eſcaped deſtruction. It ſeems to have been deſtined that the great undertakings of the French, relative to the meaſurement of the earth, ſhould be accompliſhed under circumſtances peculiarly unpropitious. But the inclement froſts of the arctic circle, and the hurricanes of the Andes, which ſo much diſtreſſed their former aſtronomers, ſeem to have been mild and benignant agents of nature, when compared to the violence of a ferocious and exaſperated mob.

Yet, amidſt all theſe ſtorms, with a coolneſs and intrepidity truly admirable, had Delambre ſucceeded in completing a great number of triangles, when he was removed from his ſituation by a decree of the committee. This decree, after ſetting forth the importance to the amelioration of public opinion, *eſprit public*, that perſons concerned in theſe operations ſhould be diſtinguiſhed by their republican virtues, and hatred to kings, ordains that Borda, Lavoiſier, Laplace, Coulomb, Briſſon, and Delambre, ſhould ceaſe to belong to the commiſſion. This order is ſigned Barrere, Robeſpierre, Billaud-Varenne, Couthon, Collot d'Herbois, &c.

Mechain for a long time had not been heard of, and to this circumſtance he was indebted for not being included in the proſcribed liſt, as it was feared he might take refuge with his inſtruments in Spain. It is ſaid that very advantageous offers were made him to this effect, which, after the ſuppreſſion of the academies in France, he might without any great impropriety have liſtened to; but he was too much attached to the great work in which he was engaged to be influenced by any other views that were not directed to its accompliſhment. Notwithſtanding the war between the two countries, he continued his obſervations, but not without frequent interruptions; and before he had concluded his triangles, he was detained as a priſoner by the Spaniſh government, but permitted to chooſe his reſidence, which he fixed at Barcelona, that he might be as near as poſſible to the fort of Montjouy, which was the extreme ſtation of the arc, and whoſe latitude he had previouſly determined. Being denied acceſs to the fort, he employed himſelf in determining the obliquity of the ecliptic, by ſolſtitial altitudes of the ſun, taken with the repeating circle, and connected his obſervatory with the fort trigonometrically, an inſtructive example of the triumph of ſcience over ſuſpicious ignorance. The Spaniards probably thought that the determination of the latitude and longitude of a fort was a preliminary ſtep to the capture of it. Mechain continued here reduced to a very diſtreſſed condition; what remained of his finances was confiſcated as French property. After a conſiderable time, he at laſt was ſuffered to embark for Genoa.

After the death of Robeſpierre, and under the government of the executive directory, they were again, after an interruption of eighteen months, permitted to reſume their labours. This recommencement did not take place, however, under very auſpicious circumſtances; Delambre was once detained a month at a town for want of money to defray his expences, as he was only furniſhed with aſſignats, which were ſo much depreciated, that in ſome places nobody would take them at any diſcount. With theſe and a thouſand other difficulties, they ſucceſsfully ſtruggled and accompliſhed the taſk committed to them, with a preciſion, which, if it had been executed under every favourable circumſtance, would have deſerved our utmoſt admiration. Mechain carried his ſeries of triangles over the moſt inhoſpitable receſſes of the Pyrenées, till he finally united them with thoſe of Delambre in the ſouth of France.

He returned to Spain, and was arduouſly engaged in continuing

tinuing the meridian to the Balearic iſles, in the Mediterranean, when, overcame and exhauſted by the extreme fatigue he had endured, this excellent aſtronomer expired at Caſtellon de la Plana, in the kingdom of Valencia, in the autumn of the year 1805.

The baſe originally choſen by Picard, and ſo often remeaſured, was now abandoned, as ſeveral of the neighbouring ſteeples and ſignals had gone to decay. Two new baſes were choſen; one between Melun and Lieurſaint, the other near Perpignan. The firſt meaſured 6075.90 toiſes, the latter 6006.247 toiſes. They were meaſured with rods of platina, their ends being placed near each other, and the diſtance meaſured by a micrometer; inſtead of applying thermometers to the rods, a braſs ſcale with a vernier was affixed to each rod, ſo as to ſhew its relative ſtate of expanſion when compared to braſs during the operation. When the length of one of theſe baſes was inferred by computation from the other, it did not differ 12 inches from the meaſurement, though the diſtance between them was between four and five hundred miles.

The latitudes of three intermediate points were obtained in the courſe of the ſurvey, beſides the latitudes of Dunkirk and Montjouy. Theſe with the contained arcs expreſſed in modules were as follows:

					Modules.	Metres.
Dunkirk	51°	2′	10″			
				DP	62472.59	=243522.1
Pantheon, Paris	48	50	49.7			
				PE	76145.74	=296821.9
Evaux -	46	10	42			
				EC	84424.53	=329093.2
Carcaſſone	43	12	54			
				CM	52749.48	=205621.3
Montjouy	41	21	45			

Total Arc = 1075058.5

The degrees derived from theſe intermediate obſervations on different parts of the arc, varied almoſt as much as in the Engliſh ſurvey, and in a manner equally irregular, and contrary to every received hypotheſis of the earth's figure. The decreaſe of the degrees towards the northern extremity was at firſt very ſlow; beyond Evaux they decreaſed very rapidly; and beyond Carcaſſone they again diminiſhed more ſlowly. The ellipticity deduced from the meaſures in France, independent of thoſe obtained in other countries, is $\frac{1}{156}$, the ſame that was deduced from the meridional and perpendicular degree in the ſouth of England. As this reſult was ſuppoſed to intereſt equally all civilized nations, a commiſſion was appointed, conſiſting of the members of the Inſtitute, and a number of learned and ſcientific men from different parts of Europe. Before this commiſſion all the papers and documents of the reſpective obſervers were laid, with an account of the meaſurement of the baſes, and of all the corrections and computations that had been applied. The commiſſioners themſelves drew up the table of triangles, from which the arc of the meridian was ultimately to be computed.

The triangles are given by the French aſtronomers in a form ſomewhat different from thoſe in the Engliſh ſurvey. By referring to theſe it will be ſeen that general Roy, when he firſt took notice of the ſpherical exceſs of three angles above two right angles, applied the correction ariſing from it, in rather an incorrect manner (as will be fully explained hereafter). Colonel Mudge reduces his angles to chord lines, which method is likewiſe adopted by Delambre. But as there are three different ways in which a triangle on the ſurface of the earth may be computed, the French have given their triangles in three different forms, ſuited to the three modes of computation, which ſhould all give the ſame reſult, as they are all three rigorouſly exact, at leaſt in triangles of ſmall extent compared with the whole earth.

It would occupy more ſpace than we could allow to inſert the whole chain of triangles from Barcelona to Dunkirk, but we ſhall annex the 36 triangles which connect Paris and Dunkirk, which will complete the ſeries from Greenwich to Paris, and at the ſame time afford the mathematical reader a valuable ſpecimen of the moſt accurate methods of preparing theſe triangles for computation.

The final deduction that was obtained from this laborious inveſtigation, was as follows.

Ellipticity or compreſſion -		$\frac{1}{334}$.
Longer ſemi-axis of the earth		3271226 toiſes,
	or	6375737 metres,
		20918830 Engliſh feet.
Shorter ſemi-axis - -		3261432 toiſes,
		6356649 metres,
		20855922 Engliſh feet.

The quadrant of the meridian contained 5130740 toiſes, conſequently the metre was equal to 443,295,986 lines.

Table of thirty-ſix Triangles, which connect the Tower of Dunkirk with the Pantheon at Paris.

The firſt two columns of this table require no explanation.

The third contains the obſerved angles, ſuch as were decided by the commiſſion appointed to examine the obſervations.

The fourth contains, under the title ſpherical exceſs, the difference between the ſpherical angle of the arcs, and the rectilinear angle of the chords.

The fifth contains the ſpherical angles corrected for computation.

The ſixth contains the ſpherical angles diminiſhed by their ſpherical exceſs, and are the rectilinear angles formed by the chords.

The laſt column contains the mean angles or the ſpherical angles corrected each by one-third of the ſpherical exceſs: in this ſtate they may be calculated by the rules of plane trigonometry, as appears by a very curious theorem of Legendre. All theſe methods will be fully illuſtrated before we conclude this ſubject.

No. of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excefs.	Spherical Angles.	Angles of the Chords.	Mean Angles.
		° ′ ″	″	° ′ ″	′ ″	′ ″
I.	Dunkirk	42 6 9.34	−0.34	42 6 9.73	6 9.39	6 9.34
	Watten	74 28 44.88	−0.45	74 28 45.28	28 44.83	28 44.88
	Caffel	63 25 5.78	−0.39	63 25 6.17	25 5.78	25 5.78
		180 0 0.00	−1.18	180 0 1.18	0 0.00	0 0.00
	Sum of errors	−1.18				
II.	Dunkirk	46 52 0.32	−0.21	46 52 0.32	52 0 11	52 0.83
	Watten	45 33 44.65	−0.23	45 33 44.65	33 44 42	33 44.37
	*Gravelines	87 34 15.89	−0.42	87 34 15.89	34 15.47	34 15.60
		180 0 0.86	−0.86	180 0 0.86	0 0.00	0 0.00
III.	Watten	69 34 45 08	−0.54	69 34 45.38	34 44.84	34 44.82
	Caffel	79 48 35 05	−0.68	79 48 35.35	48 34.67	48 34.79
	Fiefs	30 36 40.64	−0.45	30 36 40.94	36 40 49	36 40.39
		180 0 0.77	−1.67	180 0 1.67	0 0.00	0 0.00
	Sum of errors	0.90				
IV.	Watten	74 39 23.20	−0.28	74 39 23.20	39 22.92	39 22.96
	Caffel	43 37 35.73	−0.21	43 37 35.73	37 35.52	37 35.50
	*Helfaut	61 43 1.78	−0.22	61 43 1.78	43 1.56	43 1.54
		180 0 0.00	−0.71	180 0 0.71	0 0.00	0 0.00
V.	Caffel	36 10 59.00	−0.11	36 10 59.00	10 58.89	10 58.63
	Fiefs	34 3 15.47	−0.12	34 3 15.47	3 15.35	3 15.10
	*Helfaut	109 45 46.64	−0.88	109 45 46.64	45 45.76	45 46.27
		180 0 1.11	−1.11	180 0 1.11	0 0.00	0 0.00
VI.	Caffel	29 50 27.59	−0.43	29 50 27.95	50 27.54	50 27.35
	Fiefs	91 11 19.04	−0.93	91 11 19.40	11 18.47	11 18.80
	Mefnil	58 58 14.09	−0.46	58 58 14.45	58 13.99	58 13.85
		180 0 0.72	−1.80	180 0 1.80	0 0.00	0 0.00
	Sum of errors	1.08				
VII.	Caffel	39 42 10.51	−0.51	39 42 10.51	42 10.00	42 9.91
	Bethune	78 39 44.58	−0.73	78 39 44.58	39 43.85	39 43.98
	*Fiefs	61 38 6.71	−0.56	61 38 6.71	38 6.15	38 6.11
		180 0 1.80	−1.80	180 0 1.80	0 0.00	0 0.00
VIII.	Bethune	62 55 40.04	−0.16	62 55 40.04	55 39.88	55 39.84
	Mefnil	87 31 2.11	−0.27	87 31 2.11	31 1 84	31 1.91
	*Fiefs	29 33 18.44	−0.16	29 33 18.44	33 18.28	33 18.25
		180 0 0.59	−0.59	180 0 0.59	0 0.00	0 0.00
IX.	Caffel	75 53 9.51	−0.64	75 53 9.51	53 8.87	53 8.96
	Bethune	37 29 18.86	−0 45	37 29 18.86	29 18.41	29 18.32
	*Helfaut	66 37 33 27	−0.55	66 37 33.27	37 32.72	37 32.72
		180 0 1.64	−1.64	180 0 1.64	0 0.00	0 0.00

The afterisk denotes a computed angle.

No. of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excefs.	Spherical Angles.	Angles of the Chords.	Mean Angles.
		° ′ ″	″	° ′ ″	′ ″	′ ″
X.	Helfaut	43 8 13.37	−0.28	43 8 13.37	8 13.09	8 12.94
	Bethune	41 10 25.44	−0.26	41 10 25.44	10 25.18	10 25.01
	Feifs	95 41 22.48	−0.75	95 41 22.48	41 21.73	41 22.5
		180 0 1.29	−1.29	180 0 1.29	0 0.0	0 0.0
XI.	Feifs	42 59 49.22	−0.22	42 59 49.63	59 49.41	59 49.22
	Meſnil	102 38 9 22	−0.80	102 38 9.63	38 8.83	38 9.22
	Sauti	34 22 1.56	−0.22	234 22 1.98	22 1.76	22 1.56
		180 0 0.00	−1.24	180 0 1.24	0 0.0	0 0.0
	Sum of errors	−1.24				
XII.	Fiefs	34 32 52.13	−0.34	34 34 51.42	32 51.08	32 50 93
	Sauti	54 45 9.38	−0.38	54 45 8.66	45 8.28	45 8.17
	Bonnieres	90 42 2.11	−0.75	90 42 1.39	42 0.64	42 0.90
		180 0 3.62	−1.47	180 0 1.47	0 0.0	0 0.0
	Sum of errors	+2.15				
XIII.	Bonnieres	51 56 48.69	−0.25	51 56 49.41	56 49.16	56 49 13
	Sauti	64 36 51.28	−0.29	64 36 51.99	36 51.70	36 51.72
	Beauquêne	63 26 18.71	−0.28	63 26 19.42	26 19.14	26 19.15
		179 59 58.68	−0.82	180 0 0.82	0 0.0	0 0.0
	Sum of errors	−2.14				
XIV.	Sauti	52 57 13 76	−0.18	52 57 13.04	57 12.86	57 12.85
	Beauquêne	59 3 28.53	−0.19	59 3 27.81	3 27.62	3 27.62
	Mailli	67 59 20.45	−0.21	67 59 19.73	59 19.52	59 19.53
		180 0 2.74	−0.58	180 0 0.58	0 0.0	0 0.0
	Sum of errors	+2.16				
XV.	Mailli	78 53 28.70	−0.38	78 53 28.70	53 28.32	53 28.39
	Villerſbreton	35 10 33.65	−0.25	35 10 33.65	10 33.40	10 33.35
	Beauquêne	65 55 58.56	−0.28	65 55 58.56	55 58.28	55 58.26
		180 0 0.91	−0.91	180 0 0.91	0 0.0	0 0.0
XVI.	Villerſbreton	35 4 56.87	−0.29	35 4 56.87	4 56.58	4 56 52
	Vignacourt	65 14 50.05	−0.33	65 14 50.05	14 49.72	14 49.70
	Beauquêne	79 40 14.14	−0.44	79 40 14.14	40 13.70	40 13.78
		180 0 1.06	−1.06	180 0 10.6	0 0.0	0 0.0
XVII.	Villerſbreton	99 5 50.45	−0.83	99 5 50 48	5 49.63	5 50.00
	Vignacourt	31 49 57.91	−0.30	31 49 57.92	49 57 62	49 57.47
	Sourdon	49 4 12.98	−0.23	49 4 12.98	4 12.75	4 12.53
		180 0 1.34	−1.36	180 0 1.36	0 0.0	0 0.0
	Sum of errors	+ 0.02				
XVIII.	Villerſbreton	60 20 43.63	−0.24	60 20 43.56	20 43.32	20 43 32
	Sourdon	52 0 56.06	−0.22	52 0 56.20	0 55.78	0 55.76
	Arvillers	67 38 21.22	−0.26	67 38 21.16	38 20.90	38 20.92
		180 0 0.90	−0.72	180 0 0.72	0 0.0	0 0.0
	Sum of errors	−0 18				

No. of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excess.	Spherical Angles.	Angles of the Chords.	Mean Angles.
		° ′ ″	″	° ′ ″	′ ″	′ ″
XIX.	Beauquêne	52 5 16.65	−0.19	52 5 17.43	5 17 24	5 17.13
	Mailli	98 8 54.40	−0.55	98 8 55.18	8 54.63	8 54.88
	Bayonvillers	29 45 47 51	−0.17	29 45 48.30	45 48.13	45 47.99
		179 59 58.56	−0.91	180 0 0.91	0 0.0	0 0.0
	Sum of errors	−2.35				
XX.	Mailli	19 15 25.70	−0.13	19 15 24.14	15 24.01	15 23.98
	Bayonvillers	79 54 17.65	−0.18	79 54 16.09	54 15.91	54 15.92
	Villersbreton	80 50 21.83	−0.18	80 50 20 26	50 20.08	50 20.10
		180 0 5.18	−0.49	180 0 0.49	0 0.0	0 0.0
	Sum of errors	+4.69				
XXI.	Bayonvillers	102 20 59 12	−0.15	102 20 57.90	20 57.75	20 57 81
	Villersbreton	49 27 36.45	−0.04	49 27 35.23	27 35.19	27 35.14
	Arvillers	28 11 28.35	−0.07	28 11 27.13	11 27 06	11 27.05
		180 0 3.92	−0.26	180 0 0.26	0 0.0	0 0.0
	Sum of errors	+3.66				
XXII.	Villersbreton	75 1 3.02	−0.30	75 1 3.02	1 2.72	1 2.76
	Sourdon	44 27 3.75	−0.22	44 27 3.75	27 3.53	27 3 50
	Amiens	60 31 54.00	−0.25	60 31 54.00	31 53.75	31 53.74
		180 0 0.77	−0.77	180 0 0.77	0 0.0	0 0.0
XXIII.	Villersbreton	24 4 47.59	+0.07	24 4 48.74	4 48.81	4 48.59
	Vignacourt	25 10 54.43	+0.06	25 10 55.58	10 55 64	10 55 43
	Amiens	130 44 14.98	−0.58	130 44 16.13	44 15 55	44 15.98
		179 59 57.00	−0 45	180 0 0.45	0 0.0	0 0.0
	Sum of errors	−3.45				
XXIV.	Arvillers	60 29 18.51	−0.31	60 29 18.89	29 18.58	29 18.59
	Sourdon	69 17 27.78	−0.33	69 17 28.16	17 27.83	17 27.85
	Coivrel	50 13 13.48	−0.27	50 13 13.86	13 13.59	13 13.56
		179 59 59.77	−0 91	180 0 0.91	0 0.0	0 0.0
	Sum of errors	−1.14				
XXV.	Sourdon	62 33 20.65	−0.33	62 33 21 29	33 20.96	33 20.98
	Coivrel	57 10 38.17	−0.30	57 10 38.82	10 38.52	10 38.51
	Noyers	60 16 0.18	−0.31	60 16 0.83	16 0.52	16 0.51
		179 59 59.00	−0.94	180 0 0.94	0 0.0	0 0.0
	Sum of errors	−1.94				
XXVI.	Coivrel	62 21 39.67	−0.35	62 21 38 68	21 38.33	21 38.34
	Noyers	59 57 16.30	−0.34	59 57 15.31	57 14.97	57 14.97
	Clermont	57 41 8.02	−0.34	57 41 7.04	41 6.70	41 6.69
		180 0 3.99	−1.03	180 0 1.03	0 0.0	0 0
	Sum of errors	+2.96				
XXVII.	Coivrel	62 59 9.84	−0.37	62 59 9.47	59 9.10	59 9.12
	Clermont	58 32 27.67	−0.35	58 32 27.30	32 26.95	32 26.95
	Jonquieres	58 28 24.65	−0.34	58 28 24.29	28 23 95	28 23.93
		180 0 2.16	−1.06	180 0 1.06	0 0.0	0 0.0
	Sum of errors	+1.10				

No. of Triangles.	Names of the Stations.	Observed Angles.	Spherical Excefs.	Spherical Angles.	Angles of the Chords.	Mean Angles.
		° ′ ″	″	° ′ ″	′ ″	′ ″
XXVIII.	Clermont	49 18 59.11	−0.25	49 18 58.93	18 58.68	18 58.65
	Jonquieres	53 5 26.10	−0.26	53 5 25.91	5 25.65	5 25.63
	St. Chriſtophe	77 35 36.19	−0.33	77 35 36.00	35 35.67	35 35.72
		180 0 1.40	−0.84	180 0 0.84	0 0.0	0 0.0
	Sum of errors	+0.56				
XXIX.	Coivrel	32 49 40.18	−0.13	32 49 39 79	49 39.66	49 39.46
	Clermont	107 51 26.78	−0.74	107 51 26.38	51 25.64	51 26.05
	St. Chriſtophe	39 18 55.21	−0.12	39 18 54.82	18 54.70	18 54.49
		180 0 2.17	−0.99	180 0 0.99	0 0.0	0 0.0
	Sum of errors	+1.18				
XXX.	Clermont	54 39 58.89	−0.33	54 39 57.66	39 57.33	39 57.26
	St. Chriſtophe	87 43 29.69	−0.56	87 43 28.46	43 27.90	43 28.06
	St. Martin	37 36 36.30	−0.30	37 36 35.07	36 34.77	36 34.68
		180 0 4.88	−1.19	180 0 1.19	0 0.0	0 0.0
	Sum of errors	+3.69				
XXXI.	St. Chriſtophe	62 36 58.79	−0.45	62 36 58.37	36 57.92	36 57.93
	St. Martin	56 20 9.41	−0.43	56 20 9. 0	20 8.57	20 8.56
	Dammartin	61 2 54.37	−0.45	61 2 53.96	2 53.51	2 53.51
		180 0 2.57	−1.33	180 0 1.33	0 0.0	0 0.0
	Sum of errors	+1.24				
XXXII.	Clermont	38 1 22.80	−0.43	38 1 22.43	1 22.0	1 21.79
	Dammartin	48 1 54.53	−0.48	48 1 54.16	1 53.68	1 53.52
	St. Martin	93 56 45.71	−1.01	93 56 45.33	52 44.32	56 44.69
		180 0 3.04	−1.92	180 0 1.92	0 0.0	0 0.0
	Sum of errors	+1.12				
XXXIII.	Clermont	65 57 33.39	−0.67	65 57 33.31	57 32.64	57 32.58
	Jonquieres	80 45 32.25	−0.91	80 45 32.16	45 31.25	45 31.44
	Dammartin	33 16 56.78	−0.59	33 16 56.70	16 56.11	16 55.98
		180 00 2.42	−2.17	180 0 02.17	00 0.0	00 0.0
	Sum of errors	+0.25				
XXXIV.	Jonquieres	36 15 48.57	−0.66	36 15 48.57	15 47.91	15 47.77
	Dammartin	81 18 52.89	−1.03	81 18 52.89	18 51.86	18 52 09
	St. Martin	62 25 20.94	−0.71	62 25 20.94	25 20.23	25 20.14
		180 0 2.40	−2.40	180 0 2.40	0 0.0	0 0.0
XXXV.	St. Martin	76 2 30.83	−0.72	76 2 31.25	2 30.53	2 30.66
	Dammartin	57 20 17.99	−0.57	57 20 18.42	20 17.85	20 17.82
	Pantheon	46 37 11.69	−0.50	46 37 12.12	37 11.62	37 11.52
		180 0 0.51	−1.79	180 0 1.79	0 0.0	0 0.0
	Sum of errors	−1.28				

Meaſure of a Degree in Sweden.

Mr. Swanberg's account of the trigonometrical operations in Lapland, for the purpoſe of determining the value of an arc of the meridian, is a work that would at any time have excited conſiderable attention from the importance of its object, and the correctneſs of the operations it details. But at preſent it derives additional intereſt from the difference between this degree, and that formerly meaſured in the ſame country by Maupertuis, Clairault, &c. and from its agreement with that which reſults from the late operations carried on in France and Spain.

The ſummer of the year 1801 was entirely employed by the Swediſh aſtronomers in the choice of ſtations, and the conſtruction of ſignals. They then returned to Stockholm, to await the arrival of the circle conſtructed for them by M. Lenoir, and the ſtandards of the double metre, and of the toiſe employed in Peru, which the members of the Inſtitute ſent to the academy at Stockholm.

The meaſure of the baſe was begun February the 22d, at Niemiſby, and finiſhed April 11th at Poiki Tornea. They were then obliged to wait for the ſummer to meaſure the angles. June, July, and Auguſt were employed in theſe operations. Mallorn is the moſt ſouthern, and Pahtavara the moſt northern point of theſe triangles, which amount to 31 in number, including ſome ſubſidiary triangles of verification. The new arc is 1° 37′ 19″.56, that of 1736 was 57′ 27″ or 30″: the difference is about 39′ 40″.

The Swediſh aſtronomers, in that part of the arc which coincided with the French, have employed the ſame ſtations for their ſignals, except the Finland church at Tornea, which they have ſubſtituted for the church of the town. The ſouthern points of the chain of triangles are in the iſlands of the gulf of Bothnia, and diverge but little from the meridian of Kittis, to which the French aſtronomers reduced all the ſides of their heptagon.

They commenced the aſtronomical obſervations the 7th of September, at Mallorn, by obſerving the zenith diſtance of the pole-ſtar. But they did not conſider theſe obſervations as correct, from ſome irregularity in the rate of the clock. Thoſe to be relied on do not commence till October the 5th, and terminated the 24th. The obſervations of the pole-ſtar at Pahtavara commenced the 10th of December, and continued the 11th, 18th, 23d, 24th, and 25th; on the 26th and 27th they obſerved the ſame ſtar below the pole, which they had not been able to do at Mallorn. The azimuthal obſervations were made at both extremities of the arc; but M. Swanberg has only calculated thoſe of Mallorn, becauſe at Pahtavara he had not aſcertained the rate of his clock accurately enough for a calculation, in which the hour angle is ſo important an element. He thought the obſervations at Mallorn more than ſufficient, conſidering the ſlight effect a ſmall error in the azimuth could produce on an arc of the meridian.

The baſe was meaſured with iron rods, or bars, rather more than ſix metres in length, covered at each extremity with two plates of ſilver, to prevent the effect which moiſture might have on the iron. Two lines were drawn on theſe plates, the interval between which was exactly ſix metres. The ends of theſe rods were placed ſide by ſide, during the meaſurement, ſo that theſe lines preciſely coincided. This meaſurement being performed in the middle of winter, they found the atmoſphere ſo much obſcured by continual fogs, that they could not from one end of the baſe ſee the ſignal placed at the other. This compelled them to trace the baſe by means of intermediate pickets. M. Swanberg computes the errors that might poſſibly ariſe from this method, and ſuppoſes the baſe to be a polygon inſcribed in a logarithmic ſpiral; the correction appears to be too ſmall a quantity to deſerve notice.

The planks which ſupported the iron rods being elevated half a metre from the ſurface of the ground, they made uſe of a braſs pendulum furniſhed with a level, to aſcertain the ſpot, where they left off, that they might recommence from the ſame place, as the winds which blew continually would have rendered a plumb-line of little or no uſe. When they quitted their labours in an evening to return home, they firſt made a heap of ſnow, which they rendered as compact as poſſible by preſſure; and on this placed a deal tablet, which was ſurrounded with ſnow to render it immoveable, and on which they marked the point where they quitted their operation. The bulb of the thermometer, which indicated the temperature of the rods, was in contact with the iron, and it was by no means an extraordinary phenomenon for the mercury to deſcend 30° below the freezing point.

M. Swanberg imagines that he began his baſe very nearly at the ſame ſpot with the French academicians. But it is the opinion of M. Delambre (who is in poſſeſſion of a work by M. Outhier, containing particulars that M. Swanberg was unacquainted with), that the new baſe is four feet ſhorter at this end than the old one. There is no rock at the northern extremity, and their reſearches to find ſome veſtiges of the old termination were totally uſeleſs; as M. Maupertuis has left no indication of this ſpot.

The abbé Outhier ſays, that the French baſe terminated in a ſignal at the northern extremity; and that the marks were croſſes, but made on the bark of four fir trees, two on each tree, one at the height of a man, the other near the ground. Theſe trees formed a quadrilateral figure, the interſection of the diagonals of which was the centre of the ſignal. It is poſſible that theſe trees might no longer exiſt: but one of them was remarkably ſituated; it ſtood near the bank of the river, and touched the incloſure of a field.

Now M. Swanberg's baſe terminated in a field, which he believes to be the ſame. It was divided between the peaſants of the villages of Sarkivara and Rahtola; and as there was no rock or ſtone on which he could mark his boundary, he ſtopped at the incloſure which ſeparated the poſſeſſions of theſe two villages, concluding that intereſt would induce them to repair this boundary, whenever it was injured. To preſerve the preciſe point at which the baſe terminated, he had a pit dug about a metre and a half in depth immediately below the incloſure. They then charred the ſurface of a thick trunk of a fir tree, to render it leſs liable to decay, and placed it in the pit, ſurrounded with gravel and pebbles, to render it immoveable. Its centre was pierced with a thick braſs wire, and it was covered with iron plates, on which a croſs was engraved, the centre of which correſponded to that of the trunk.

M. Delambre thinks, that if this incloſure was the ſame with that deſcribed by the abbé Outhier, the new baſe would be 10 or 12 toiſes ſhorter than that of 1736, ſuppoſing 11 toiſes, adding the 4 toiſes at the other end, we ſhould have about 12 toiſes, that the new baſe would be ſhorter than the old one. But M. Swanberg's is 7414.5 toiſes, the other only 7406.8 toiſes, which is, on the contrary, leſs by 8 toiſes.

M. Delambre ſuſpects that the new baſe was not ſo oblique to the river as the other; and concludes, after a very careful examination of the queſtion, that neither of the extremities of M. Swanberg's baſe coincided with that of M. Maupertuis. And it is his opinion that the difference between the degree of 1802 and that of 1736, does not ariſe from any error in the trigonometrical operations, but depends wholly

wholly on an error in the amplitude of the arc which he eſtimates at 10″ or 12″.

Theſe are the ſides common to both the operations.

		Swanberg.	Outhier.
Baſe		7414.5	7406.8
Northern extremity to	Avanſaxa	1186.0	1207.3
Southern extremity	- Avanſaxa	7240.0	7242.8
Cuitaperi	- Avanſaxa	8656 9	8660.0
Cuitaperi	- Horrilankero	13396.1	13432.0
Kakamavara	- Horrilankero	19066.5	19073.0
Kakamavara	- Niemiſby	25047.0	25053.0
Horrilankero	- Niemiſby	7028.4	7029.0
Horrilankero	- Avanſaxa	7447·9	7451.4
Pullingi	- Avanſaxa	14271.0	14277·3
Pullingi	- Horrilankero	11529.3	11558.5
Pullingi	- Niemiſby	8757.6	8768.8
Pullingi	- Kittis	10672.3	10676.0
Niemiſby	- Kittis	13449.1	13560.0

The obſervations which were made to determine the latitude of the extreme ſtations gave likewiſe, with the greateſt accuracy, the declination or polar diſtance of the pole-ſtar. Mr. Swanberg deduces it from his obſervations 1° 45′ 36″.2, for the beginning of year 1800; Delambre and Mechain, from the mean of ſome hundred obſervations, 1° 45′ 35″.4; by Mr. Pond's tables in Philoſophical Tranſactions inſerted under DECLINATION, it is 1° 45′ 36″; perhaps the poſition of no ſtar was ever ſo well known. The reſult of Mr. Swanberg's meaſurement and calculation is as follows.

The length of the baſe reduced to the level of the ſea, at the temperature of zero, was 7414.4919 toiſes, or 14,451.116 metres. The diſtance between the parallels of Pahtavara and Mallorn 92,767.981 toiſes or 180,827.68 metres.

The latitude of the centre of the ſignal at Mallorn was 65° 31′ 30″.26, and at Pahtavara 67° 8′ 49″.83. Therefore the latitude of the middle point was 66° 20′ 10″.04; the amplitude of the whole arc 1° 39′ 19″.56; and the value of the degree 57,196.159 toiſes. The moſt probable ellipticity deduced from comparing theſe determinations with thoſe made in Peru, the Eaſt Indies and France, is $\frac{1}{323.065}$, and the radius of the equator 3371452 toiſes.

The degree of Maupertuis exceeds that of Mr. Swanberg 224 toiſes. If the error had been the other way, and if at the ſame time the aſtronomers at Peru had committed an equal error in their determination, the polar axis would have appeared the longeſt.

The account which Mr. Swanberg has publiſhed of this operation is enriched with a number of valuable inveſtigations of various formulæ, for the computation and correction of ſpheroidical triangles, and of the different parts of a meridian line.—It is entitled "Expoſition des Operations faites en Laponie, pour la Determination d'un Arc du Meridien, en 1801, 1802, & 1803, par Meſſieurs Ofverbom, Swanberg, Holmquiſt, et Palander. Redigée par M. Swanberg."

The mathematical claſs of the national inſtitute, as a mark of reſpect to M. Swanberg, for the ſkill and analytical knowledge diſplayed in the above work, voted him the medal founded by M. De la Lande. *v.* Con. des Temps 1808, from which this account was chiefly taken.

Meaſurement of a meridional and perpendicular Arc in India.

In the Aſiatic reſearches, (vol. viii.) major Lambton has given a very circumſtantial account of the meaſurement of an arc of the meridian on the coaſt of Coromandel, in the latitude 12° 30′. This operation formed part of an extenſive ſurvey, which is intended to be carried acroſs the peninſula of India. It appears to have been conducted in a very intelligent and careful manner. The method the author has followed ſo exactly reſembles that of general Roy, and colonel Mudge, that it requires but little deſcription. The baſe was meaſured with a ſteel chain, made by Ramſden, and its rate of expanſion aſcertained by pyrometrical experiments.

It commenced at St. Thomas's mount, near fort St. George, and extended 40006.44 feet, in a direction nearly ſouth.

The angles were meaſured by a theodolite extremely ſimilar to that uſed in the Engliſh ſurvey; it was conſtructed by Mr. Cary, an artiſt who was brought up under Ramſden, and nothing inferior to him in the beauty and delicacy of his workmanſhip.

The triangles which connected the extreme ſtations were 32 in number; the obſervations of their angles ſeem to have been taken with great accuracy. The joint errors of the three angles in three inſtances amount to 5″; in general they are under 2″, ſo that the error of a ſingle angle never probably exceeded 2″, and was often within that quantity. The ſouthern extremity of the arc was at Trivandiporum, in lat. 11° 44′ 52″.6, near Pondicherry; the northern at Paudree, lat. 13° 19′ 49″.2.

The obſervations made to determine the amplitude of the arc were made with a zenith ſector, conſtructed by Ramſden. They conſiſt of zenith diſtances of Aldebaran, taken at each extremity. The coincidence of the obſervations that are publiſhed is ſatisfactory enough; but as ſome conſiderable previous diſagreement is alluded to, and as it is poſſible for a ſector to give obſervations which accord very well with each other, but affected with ſome common error, if there is any part of the proceſs on which we ſhould heſitate to place implicit reliance, it is this; but in making this remark we are very far from imputing the ſmalleſt inattention to the ingenious officer, who has conducted the whole of this operation in a manner that reflects great honour on himſelf and his profeſſion.

The direction of the meridian was determined by obſervations of the pole ſtar at its greateſt elongation, as practiſed ſo ſucceſsfully by general Roy; this method was likewiſe uſed to obtain the azimuthal angles for computing the value of a perpendicular degree. Theſe were taken at Carangooly hill, and Curnatighur, two ſtations nearly eaſt and weſt of each other, and diſtant about fifty-five miles.

In that part of the computation where it was neceſſary to aſſume ſome hypotheſis of the earth's figure, the author takes the ſpheroid reſulting from the meridional and perpendicular degree meaſured in England. This ſeems to have been injudicious; it would have been more ſtrictly correct to have taken, for a ſecond approximation, the ſpheroid derived from his own obſervations; but as he himſelf obſerves, the error ariſing from an erroneous ſuppoſition would be very ſmall. The final reſult which major Lambton obtains is, that the length of the meridional degree in latitude 12° 32′ is 60,495 fathoms, and perpendicular degree 61,061 fathoms.

We have now brought the hiſtorical part of our ſubject to a concluſion, and have enumerated every operation inſtituted for the meaſurement of the earth that is found upon record, from the earlieſt ages to the preſent day.

It is evident that the late attempts to inveſtigate the exact figure of the earth by actual meaſurement have not been attended with the ſucceſs that might be expected, when we conſider the exquiſite conſtruction of the inſtruments that have been contrived for this purpoſe, the intelligence that has

has been evinced in the uſe of them, and the ſcrupulous accuracy with which the obſervations have been computed. But notwithſtanding the ſanguine hopes that were entertained of removing every doubt on this queſtion, have been greatly diſappointed, yet the information we have obtained by theſe operations is by no means inconſiderable. The remaining uncertainty is now reſtricted within very narrow limits, and we may conclude with confidence that the errors of obſervation are no longer concerned in the anomalies that yet remain to be explained. Two cauſes are ſuggeſted as moſt likely to produce the diſcordance: either a great irregularity in the actual figure of the earth, or an extremely variable denſity of the materials that lie beneath its ſurface. Both theſe cauſes are probably concerned, but what preciſe ſhare is to be attributed to each, future obſervations alone can determine.

This ſubject will be again reſumed under *figure of the* EARTH, to which the reader is referred for an account of the other methods that have been employed in the ſolution of this problem.

The great improvements that have been made in the conſtruction of inſtruments deſigned for operations of this nature, have been the means of creating almoſt a new ſcience.

To derive all poſſible advantage from obſervations of ſuch extreme preciſion, it was requiſite to deviſe new formulæ, new modes of calculating the triangles, and many new corrections that were either imperfectly applied, or totally neglected by former obſervers. For theſe valuable additions to the ſcience of practical geometry, we are indebted to ſome of the firſt mathematicians of the age. They are to be found diſperſed in the tranſactions and memoirs of different learned ſocieties, and in the accounts of the ſurveys above enumerated.

Profeſſor Playfair has given a complete inveſtigation of the formulæ requiſite for calculating the different parts of a meridian line, and other circles on a ſpheroid. (See Edin. Phil. Tranſ. vol. v.) In the Engliſh ſurvey, a method entirely new, of calculating ſpheroidical triangles, is given by Mr. Dalby, and the account of this whole work begun by general Roy, and continued by colonel Mudge, is in itſelf a moſt complete treatiſe on the ſcience of trigonometrical ſurveying. The French method of obſervation neceſſarily required corrections of a more intricate nature than ours. And Delambre, with the account he has publiſhed of his own obſervations, has given a great number of practical rules, which, though derived from the moſt profound analyſis, he has reduced to ſuch a convenient form, that they may be employed by perſons who have acquired only a moderate ſhare of mathematical knowledge. La Place and Legendre have likewiſe both eſſentially contributed to the improvement of this ſcience.

We have hitherto entered but little into the mathematical part of this ſubject, not becauſe it was thought foreign to the plan of this work, but that the narrative might be given in as uninterrupted a form as poſſible. But as we are deſirous that nothing ſhould be omitted that relates either to the theory and practice of aſtronomy, or the ſciences connected with it, we propoſe to ſubjoin, by way of appendix to this article, a ſhort treatiſe on that part of geodetical trigonometry, that is more immediately applicable to the meaſurement of degrees, and other queſtions connected with the figure of the earth.

For the other methods of determining the figure of the earth, ſee PENDULUM, PARALLAX, &c.

On the Method of obſerving and correcting the Angles.

The angles may be obſerved either with a theodolite, or, what is nearly the ſame, a portable aſtronomical circle, or with the repeating circle of Borda.

A circular inſtrument, with two microſcopes to its azimuth circle, will give two meaſures of the angle required without changing the poſition of the whole inſtrument; namely, one by each microſcope, but with three verniers we obtain ſix meaſures of the ſame angle. Three verniers are therefore better than two microſcopes.

If this inſtrument be placed in the centre of the ſtation, no corrections will be required, except ſuch as relate to the ſpherical exceſs, or reduction to the chord, according to the mode of computation adopted, as will be explained hereafter; but if the inſtrument be placed out of the centre of the ſtation, a correction muſt be applied, as will be explained in the directions for the management of the repeating circle.

If the angles are taken with the repeating circle, ſeveral corrections will be required, ſome depending on the mechanical conſtruction of the inſtrument, and others on its poſition: the nature and method of application of theſe we ſhall endeavour to explain.

Under CIRCLE and DECLINATION, a full account has already been given of the mechanical conſtruction of this inſtrument, of the requiſite verifications, and mode of uſing it for aſtronomical purpoſes. It now only remains to deſcribe the method of employing it for geodetical obſervations.

The method of obſerving an angle between two objects with the repeating circle is as follows:

Firſt, bring the plane of the circle into the plane of the angle to be obſerved; if this is rightly performed, the interſection of the wires of the micrometer of the moveable teleſcope ſhould paſs over each object in its revolution round its centre. To effect this readily requires a little dexterity and practice. The plane of the inſtrument, when vertical, ſhould firſt be placed in a poſition nearly between the two objects, then inclined with the hand till the two objects ſeem to the eye equally diſtant from the plane of the circle. The inſtrument is then to be turned round its vertical axis, till one object is brought into the front, or upper teleſcope fixed at zero. The back or lower teleſcope ſhould be brought to the other. Then by the joint action of the feet ſcrews, and a ſmall motion, if requiſite, in azimuth, the two objects may be biſected by each of the micrometers. The upper teleſcope being brought, as above, to the left, and the lower to the right hand object, the firſt part of the operation will be accompliſhed. Then, without altering the relative poſition of the teleſcopes, the circle is to be turned towards the left by its general motion, till the under teleſcope is directed to the left hand object; the upper teleſcope is then to be releaſed, and turned round on the inſtrument, till it is directed to the right hand object. When each ſignal is accurately biſected at the ſame time, one obſervation is complete, and the verniers will ſhew the double of the meaſured angle. This is to be repeated till a ſufficient degree of certainty is obtained.

We ſhall give an example of an angle meaſured by an 18 inch circle, conſtructed by Mr. Troughton.

No. of Obſ.	Angle given by Inſt.	Angle deduced.
2	127° 7′ 45″	63° 33′ 52″.5
4	254 15 24	63 33 51
6	21 23 00	63 33 50
8	148 30 30	63 33 48.7
10	275 38 10	63 33 49.3
12	42 45 50	63 33 49.1
14	169 53 20	63 33 48.6
16	297 00 50	63 33 48.5
20	191 16 17	63 33 49

Correction

Correction for the Eccentricity of the lower Telescope.

When we begin the observation of an angle A C B, (*Pl.* VII. *fig.* 58.) the upper telescope is directed to the object A, to the left, in the direction C A. If the lower telescope was concentric, we should direct it towards C B, and the intercepted arc would give upon the limb the measure required. But, on account of the eccentricity, C D, the lower telescope, which is fixed in D, takes the direction D B. Afterwards, when we direct the lower telescope to A, the point D, by the movement of the instrument on its pivot, is transported to E, and the lower telescope takes the direction A E; so that the motion given to the instrument is equal to the ∠ D C F, and not to the ∠ A C B.

Now $DGE = ACE - ACD = ACE - BCD - BCA = ACE - BCD + BCA = (90° - A) - (90° - B) + BCA = 90° - A - 90 + B + BCA = BCA + B - A = BCA + \frac{CD}{CB} - \frac{CE}{CA}$; for the ∠'s A and B being very small, we may use the sines instead of the arcs. The upper telescope is thus turned to the left out of the ∠ A C B, a quantity $= BCA + \frac{CD}{CB} - \frac{CE}{CA}$; then, to bring it back to B, it must describe $ACB + \frac{CD}{CB} - \frac{CE}{CA} + ACB = 2ACB + \frac{CD}{CB} - \frac{CE}{CA}$; then, taking half the arc measured on the limb, we find $ACB + \frac{CD}{2CB} - \frac{CE}{2CA} = \frac{1}{2}$ (arc measured); then $ACB = \frac{1}{2}$ (arc measured) $+ \frac{CE}{2CA} - \frac{CD}{2CB}$. To find A C B, we must add $\frac{\frac{1}{2}\text{ eccentricity}}{G} - \frac{\frac{1}{2}\text{ eccentricity}}{D}$: D is the distance C B, from the object B, which is to the right, and G, the distance *e* A, from the object A, which is towards the left. In the figure, the eccentricity is to the left; if it had been to the right, it would have been negative, and the correction would have had contrary signs. The correction is always $= \frac{1}{2}$ the eccentricity, reduced to seconds, and divided by the distance of the object on the same side with the eccentricity, minus the $\frac{1}{2}$ eccentricity, divided by the distance from the other side, relatively to the eccentric telescope.

In circles constructed in this country by Mr. Troughton, the eccentricity of the lower telescope is one inch and four tenths, and $\frac{1.4\text{ inches}}{1\text{ fathom}} = \frac{1}{103}$: this quantity, reduced to seconds, will be $2002''.5 = \frac{206264.8}{103} = \frac{R''}{103}$; therefore, the correction will be $\frac{2002''.5}{G} - \frac{2002''.5}{D}$. The following table, which is calculated for the above-mentioned eccentricity, is of very easy application.

With the distance of the object, which is on the same side with the eccentric telescope, that is, the distance of the left-hand object in our instruments, enter the table, and take a correction, to which you will prefix the sign +. With the distance of the right-hand object, take a second correction, which is to have the sign —.

Example. Suppose the distance of the left-hand object to be 5000 fathoms, and the right-hand object to be distant 22,000 fathoms, and the eccentricity to the left, the distance of the object to the left = 5000 fathoms gives - - - + 0.40

Right 22,000 fathoms	-	— 0.09
Total correction	-	+ 0.31

If the two distances are equal, the terms destroy each other, and the correction becomes = 0.

The annexed table is calculated for an 18-inch circle of Mr. Troughton's construction.

He places his divisions from right to left; the observations, therefore, begins with the left-hand object.

Fathoms.	
1000	2″.00
2000	1.00
3000	0.67
4000	0.50
5000	0.40
6000	0.33
7000	0.30
8000	0.25
9000	0.22
10,000	0.20
11,000	0.18
12,000	0.16
13,000	0.14
14,000	0.13
15,000	0.13
16,000	0.12
17,000	0.12
18,000	0.11
19,000	0.10
20,000	0.10
21,000	.10
22,000	.09
23,000	.09
24,000	.08
25,000	0.08

It is a curious circumstance, first noticed by Legendre, that this correction for eccentricity, when applied to the three angles in a triangle, becomes zero.

For, if *a*, *b*, *e*, represent the sides of a triangle, we have the correction for the angle.

$$A = \frac{\frac{1}{2}e}{C} - \frac{\frac{1}{2}e}{b}$$

$$B = \frac{\frac{1}{2}e}{a} - \frac{\frac{1}{2}e}{c}$$

$$C = \frac{\frac{1}{2}e}{b} - \frac{\frac{1}{2}e}{a},$$

which together = 0.

Reduction of the observed Angle to the Horizon.

The repeating circle does not give directly the horizontal angle between two signals, but the oblique angle; it is necessary, therefore, to take the zenith distances of the observed objects, and then calculate the azimuthal angle by the resolution of a spherical triangle.

The reduction is as follows:

Let A = angle of position, or observed angle.
H = altitude of signal A.
b = altitude of signal B.

Let

Let $n = \text{fin.}^2 \frac{1}{2}(H + h)\ \text{tang.}\ \frac{1}{2}A - \text{fin.}^2 \frac{1}{2}(H - h)\ \text{cot.}\ \frac{1}{2}A$.

Then the cor. $x = n$, ſec. H, ſec. h.

If the zen. diſtances differ more than 2° or 3° from 90°, this formula may be employed.

$$\text{Sin.}\ \tfrac{1}{2}x = \sqrt{\frac{\text{fin.}\left(\frac{C+\delta+\delta'}{2}-\delta\right)\text{fin.}\left(\frac{C+\delta+\delta'}{2}-\delta'\right)}{\text{fin.}\ \delta - \text{fin.}\ \delta'}}$$

x being the angle reduced to the horizon, C the angle at the centre, δ and δ' the zen. diſtances of the ſignals.

To facilitate this reduction, we have added the tables calculated for this purpoſe by M. Delambre. By theſe tables we may at the ſame time reduce the horizontal angle to that formed by the chords.

The uſe of theſe tables will be eaſily underſtood by an example.

$H + h$ is the ſum of the zenith diſtances of the obſerved objects diminiſhed by 180°.

If the ſum ſhould be leſs than 180°, $H + h$ is the remainder required to complete 180°.

$H - h$ is always the difference between the two zenith diſtance.

$(H + h)$ and $(H - h)$ are always conſidered as poſitive numbers.

P + Q is the ſum of the diſtances in French toiſes between the obſerver and each of the ſignals.

P − Q is the difference between theſe diſtances; (P − Q) is always poſitive.

With (P + Q) and (P − Q) take in Tab. II., two numbers, to which you always muſt annex the ſign.

With the obſerved angle, take in Tab. IV. the number, *Tangent*, to which the ſign + muſt be always annexed, and which muſt be placed under the factor found by $H + h$.

With the ſame angle take in the adjoining column, *Cotangent*, to which annex ſign −, and place it under the factor found by $H - h$. Place theſe ſame numbers under the factors (P + Q) and (P − Q), as in the example. Make the four requiſite muliplications.

The difference of the two firſt products is the reduction to the horizon, to be applied according to its ſign.

The difference of the two laſt products is the reduction to the chords, to be applied with its proper ſign to the horizontal angle.

This laſt reduction is almoſt always ſubtractive, but it ſometimes becomes additive, by the fourth product exceeding the third.

In general, the fourth product is nothing, and the third always very ſmall; ſo that in calculating the reduction, which is indiſpenſable, it is very little more trouble to reduce the angle to the chords. Theſe tables are, in general, quite ſufficient for the reduction to the horizon; but, for greater exactneſs, Table III. is added. The difference of the products, as obtained above, may, by means of this table, be multiplied by ſec. H, ſec. h, as required by the formula. If greater preciſion be required, the whole calculation may be repeated with the corrected angle, inſtead of the obſerved angle.

Table V. is for calculating the ſpherical exceſs.

To make uſe of this table, it is neceſſary to have a plan of the triangles with a ſcale. The arguments are one ſide of the triangle as a baſe, and the height.

Example.

Obſerved Angle.	Zenith Diſtance.	Diſtance of Signals in Toiſes.
32° 20′ 15″.7	A = 89° 41′ 54″.6	A = 18283
	B = 88 49 15.6	B = 24423
	178 31 10.2	

$H + h = 1\ 28\ 49.8$
$H - h = 52\ 39$

	Tab. I.		Tab. II.	
Argument	H + h	H − h	P + Q	P − Q
Factors	+ 1.669	+ 0.587	− 0.112	− 0.003
Tab. IV.	+ 5.99	− 7.106	+ 5.99	− 7.106
	15021	3522	− 0.67	+ 0.2
	15021	0587	+ 0.02	
	8345	4109		
	+ 9.99731	−41.71222	− 0.65 = reduction to the chords.	

Obſerved angle	32° 20′ 15″.7
Reduction to horizon	31.7
Horizontal angle	= 32 19 44.0
Reduction to the chords	− 0.65
Angle of the chords	32 19 43.45

When the depreſſions are ſmall, we may, inſtead of the tables, uſe this formula.

$$x = \left\{\left(90° - \frac{\delta+\delta'}{2}\right)\text{tang.}\ \tfrac{1}{2}C - \left(\frac{\delta-\delta'}{2}\right)^2 \text{cot.}\ \tfrac{1}{2}C\right\} \text{fin. } 1''.$$

Example by the Formula.

$\delta = 89°\ 41'\ 54''.6$
$\delta' = 88\ 49\ 15.6$

$\delta + \delta' = 178\ 31\ 10.2$ $\quad \delta - \delta' = 0°\ 52'\ 39''$

$90° - \frac{\delta+\delta'}{2} = 0\ 44\ 24.9$ $\quad \frac{\delta-\delta'}{2} = 0\ 26\ 19.5$

$= 2664''.9 = p$ $\quad = 2579''.5 = q$

Sin. 1″	4.68557		4.68557
Log. p^2	6.85136	Log. q^2	6.39704
Tang. $\frac{1}{2}$C	9.46228	Cot. $\frac{1}{2}$C	0.53764
	+ 0.99921 = 9″.98		− 1.62025 = 41″.71
	− 41.71		
	− 31.73 = Reduction required.		
	32° 20′ 15.70		
Reduced angle =	32 19 43.97 the ſame as above.		

Reduction of the obſerved Angle to the Centre of the Station.

It frequently happens in trigonometrical ſurveys, that the obſervation cannot be taken in the centre of the ſtation; in this caſe, a correction becomes neceſſary.

(*Plate* VII. *fig.* 59.) Let C be the centre of the ſtation, O the place of the obſerver.

Then $ACB = AIB - CBO$
$= AOB + OAC - CBO$
or $C = O + A - B$

$$\text{Sin. A} = \text{ſin. OAC} = \frac{OC\ \text{ſin. AOC}}{AC} = \frac{r\ \text{ſin. (O + BOC)}}{D}$$

$$\text{hence } C = O + \frac{r\ \text{ſin. } (O + y)}{D\ \text{ſin. } 1''} - \frac{r\ \text{ſin. } y}{G\ \text{ſin. } 1''}$$

This formula is general, and ſuffers no exception.

C is the angle required at the centre; O, the obſerved angle;

angle; y is the angle between the left-hand object and the centre of the ſtation; r is the diſtance between the centre of the circle and the centre of the ſtation.

D, the diſtance of the object to the right.

G, the diſtance of the object to the left.

If $(O + y)$ exceed 180°, the firſt term is ſubtractive.

If the angle y exceeds 180°, the ſecond term becomes additive.

When the obſervation of the $\angle$ O is terminated, the upper teleſcope is always directed towards the left-hand object B, and the inferior towards the right-hand object A.—To obſerve the $\angle y$, the obſerver ſhould continue to keep the lower teleſcope on the object A, and let the upper one revolve from the right towards the left, till it points to the centre C.

This correction will be reduced to a ſingle term, when the diſtance of one object becomes infinite with reſpect to the other; as when one object is the ſun, or a ſtar, as is the caſe in obſervations for determining the azimuths of ſtations.

But this correction may become nothing without either of the diſtances becoming infinite; by which means it is ſometimes poſſible for the obſerver ſo to place his inſtrument as to reduce the correction to zero. This will be the caſe if it be on the circle which circumſcribes the given triangle A B C.

For then $\frac{\text{ſin. } y}{(\text{ſi}\ldots(O + y)} = \frac{G}{D}$;

and in the triangle A B C

$$\frac{\text{ſin. A}}{\text{ſin. B}} = \frac{\text{ſin. A}}{\text{ſin.(A + C)}} = \frac{G}{D}\text{; and ſince C} = O$$

$$\frac{\text{ſin. } y}{\text{ſin. C} + y} = \frac{\text{ſin. A}}{\text{ſin.(A + C)}}$$

Expanding the denominators

$$\frac{\text{ſin. } y}{\text{ſin. C cof. } y + \text{cof. C ſin. } y} = \frac{\text{ſin. A}}{\text{ſin. A cof. C} + \text{cof. A ſin. C}}$$

$$\text{or } \frac{1}{\text{ſin. C cof. } y \text{ cof. C}} = \frac{1}{\text{cof. C} + \text{cof. A ſin. C}}$$

and tang. y = tang. A = tang. 180° + A.

From this it appears, that if the obſerver has his choice of ſituation, he may place himſelf in ſuch a manner as to render any reduction unneceſſary; and to do this, he muſt be on the circumſcribing circle, or its tangent, at the point C, ſo that the angle y may be equal to A, or its ſupplement.

It however generally happens that the circumſtances which exclude the obſerver from the centre of the ſtation, at the ſame time prevent him from chooſing the exact point as determined above; but as the correction depends on the ſine of a certain angle, it is adviſable to render it as ſmall as poſſible, by ſelecting the moſt favourable poſition, particularly, if any difficulty ſhould occur in meaſuring the diſtance from the centre of the inſtrument to the centre of the ſtation.

If the diviſions are numbered from right to left, then *right* muſt be ſubſtituted for *left*, and *vice verſâ* in the preceding reaſoning.

It has been ſhewn, how, by having the oblique angle of two objects, A and B, as ſeen from a point C, we can obtain the horizontal or azimuthal angle; but it is neceſſary, for the truth of our concluſion, that the point C remain the ſame for the zenith diſtance obſervations as for the oblique angles. If we examine the conſtruction of the repeating circle, we ſhall find that its centre C is lower in the vertical than in the horizontal poſition: this circumſtance ſeems to have been overlooked by the French aſtronomers; or they have probably included it in the requiſite correction employed for the difference of height of the ſignal above the centre of the circle. To apply this correction, we are to conſider what would be the zenith diſtance of an object if the centre of the inſtrument were elevated or depreſſed a given quantity.

The correction is as follows:

Let dH be the difference of altitude of the two poſitions, D the diſtance of the obſerved ſignal, δ the zenith diſtance required to be corrected; then the corrected diſtance will be

$$\delta + \left(\frac{\delta\,\text{H}}{\text{D}}\right)\frac{\text{ſin. } \delta}{\text{ſin. } 1''}.$$

If the inſtrument is advanced before the ſignal, the diſtance corrected $= \delta + \left(\frac{r}{\text{D}}\right)\frac{\text{cof. } \delta}{\text{ſin. } 1''}$; r being the diſtance of the centre.

In Mr. Troughton's circles the centre of the circle is 5.4, or 5.5 inches lower in the vertical than in the horizontal poſition.

When the Signal is unequally illuminated.

When the ſignal is unequally illuminated by the ſun, the obſerved point is neither in the axis, nor in the direction of the axis. For example, *fig.* 63. let *a b c d* be a ſection of a ſignal of four ſides, if *a b* or *a c* only is ſufficiently enlighténed to be viſible, the obſerver will direct the optic axis of his teleſcope to A or B inſtead of the centre M. and the angle obſerved will require a correction equal to A O M or B O M. Let P = perpendicular M A, A = angle A M O, D equal the diſtance O M; the correction c will then be $c = \frac{\text{P ſin. A}}{\text{D ſin. } 1''}$.

This correction is ſubtractive, if the obſerved point is to the $\left\{\begin{matrix}\text{right}\\\text{left}\end{matrix}\right\}$ of the centre in the object to the $\left\{\begin{matrix}\text{right}\\\text{left}\end{matrix}\right\}$. It is additive, if the obſerved point is to the $\left\{\begin{matrix}\text{left}\\\text{right}\end{matrix}\right\}$ of the centre in the object on the $\left\{\begin{matrix}\text{right}\\\text{left}\end{matrix}\right\}$.

If the ſignal be a round tower or maſt of ſenſible diameter, the calculation is ſomething longer, becauſe the azimuth of the ſun influences the quantity of the correction.

Let an obſerver in O be ſituated ſo far from the round tower (*fig.* 62.) A P S P, as to be unable to ſee the part not illuminated by the ſun; he will direct his view to the middle of the illuminated part, inſtead of the centre of the whole.

Let N M be the meridian line, M C S the azimuth of the ⊙, the ſemicircle A S B will be illuminated by the ſun to the extremity A, of the enlightened part, draw O A, and on the other ſide the viſual ray O E, tangent to the tower; the viſible part A P S E will be unequally divided by O G. If x be the azimuth of the obſerver, z the azimuth of the ſun, d = C E, and D = O C, the correction will be $\text{C} = \frac{d\,\text{ſin.}^2\,\frac{1}{2}(x - z)}{\text{D ſin. } 1''}$.

$x - z$ may be either calculated or obſerved. By calculation:

$$\text{Cof. } z = \text{ſin. L cof. H} - \frac{\text{cof. L tang. B}}{\text{ſin. H}}$$: L being the lat., B the declination of the ſun, and H the hour angle.

To obſerve $x - z$, take the horizontal angle between the

the ſun and tower by the azimuth circle, which will always be exact enough for this correction.

On the Calculation of the Triangles.

When the obſerved angles are reduced to the horizon by the method above ſtated, the triangles may be either conſidered as rectilinear, ſpherical, or ſpheroidical: the firſt caſe ſuppoſes the angles reduced to their chords, and that the ſides of the triangles become the edges of an irregular polyhedron inſcribed within the terreſtrial ſpheroid; the baſe in like manner ſhould be reduced to a chord line, by ſubducting from its meaſured length the exceſs of the arc above the chord.

But the ſpherical computation is rendered very eaſy by a theorem firſt inveſtigated by Legendre, by which it appears that a ſpherical triangle, whoſe ſides are very ſmall, may be calculated without ſenſible error by the rules of plane trigonometry, provided a ſmall correction be firſt made in the obſerved angles.

When the Engliſh ſurvey was firſt began, this theorem was unknown; and general Roy, who was the firſt perſon that had taken the ſpherical exceſs into his calculations, corrected his triangles in a more arbitrary manner than he would have done, had he been aware of the curious property abovementioned. By this theorem is derived a more accurate method of correcting the angles for computation. One third of the ſpherical exceſs, as found by obſervation, ſhould be ſubtracted from each angle, and the ſides calculated as if they were rectilinear. For the demonſtration of this theorem, ſee Legendre's Treatiſe on Geometry. Colonel Mudge and Delambre prefer reducing the angles to chord lines; this method, when the three angles are all obſerved, is perfectly accurate; but when one angle only is obſerved and the reſt inferred, as in calculating diſtances from the meridian and its perpendicular, the method of Legendre ſeems to be the moſt eaſy and leaſt liable to error.

General Principles of the Method of tracing and calculating a Meridian Line.

If we imagine a plane paſſing through the axis of the earth and the zenith of any place; this plane, extended to the limits of the celeſtial ſphere, will there trace a great circle, which will be the meridian of that place: and if a line be drawn through all the points of the ſurface of the globe, which have their zenith in this circle, it will form the correſponding terreſtrial meridian. From the immenſe length of the radius of the heavens, the verticals of all theſe points may be conſidered as parallel to the plane of the celeſtial meridian: ſo that the terreſtrial meridian may be defined a curve paſſing through and connecting thoſe points, in which all the verticals parallel to the plane of the celeſtial meridian interſect the ſurface of the earth. This curve will deviate from the above plane, if the earth be an irregular ſpheroid, and be a curve of double curvature; but, on the contrary, will lie entirely in it, if it be a ſphere, or any regular figure of revolution.

If in any given point, we fix a ſignal, and by means of the optic axis of a teleſcope, directed exactly north or ſouth of that ſignal, we place others in this axis, and by removing the teleſcope continue, in the ſame manner, to place other ſignals in the ſame direction, we ſhould trace a meridian line. But as this method would be inconvenient, if not impoſſible in practice, we follow, as has been ſeen above, another method which leads us to the ſame reſult.

Let A B C D E, *Plate* VII. *fig.* 60, be a chain of triangles extended in the direction of the meridian, and whoſe ſides may be conſidered as arcs of the terreſtrial ſpheroid. Suppoſe, by an obſervation of the azimuth, the inclination or direction of the ſide A C with the firſt ſide of the meridian A M be known. The point M, where this curve cuts B C, may be found by trigonometry. The points A, B, C, being in the ſame horizontal plane, A M will likewiſe be in the ſame plane; but from the curvature of the earth the continuation of this line, M M′, will be above the ſurface of the next triangle B C D: if then, without changing the angle C M M′, the line M M′ be bent down to the plane of the triangle B C D, by ſuppoſing it to turn round B C as an axis, the point M′ will deſcribe a ſmall arc of a circle which may be conſidered as a ſtraight line perpendicular to the plane B C D.

From this it follows, that the operation conſiſts in bending down this line in the direction of a vertical, and in calculating the diſtance M M′, to find the point M′.

By carrying on the meridian line in this manner through the whole ſeries of triangles, we may by trigonometrical calculation find the direction and length of this meridian from one extremity to the other.

If the earth be of an irregular figure, this line differs a little from the terreſtrial meridian; but it always has this property, that it is the ſhorteſt line that can be drawn between its two extremities, over the ſurface of the earth.

Now, if we imagine a great circle perpendicular to the celeſtial meridian, paſſing through the zenith of the place of the obſerver, this circle will repreſent the prime vertical of that place. A curve connecting all the points on the ſurface of the earth, which have their zenith in this circle, will form the perpendicular to the meridian, which may be traced in the ſame manner as the meridian itſelf.

In the ſphere theſe perpendiculars are great circles which cut each other on the equator. But on the ellipſoid, and ſtill more if that be irregular, theſe perpendiculars will be curves of double curvature.

Whatever be the nature of the terreſtrial ſpheroid, the parallels to the equator are curves in which all the points have the ſame latitude.

The ſituation of a place is determined when the perpendicular to the meridian or its parallel is known, and alſo the ſituation of the place on this perpendicular or parallel.

When, therefore, a ſeries of triangles and their direction have been calculated according to the principles already explained, we obtain the poſition of the ſummits of all their angles, by means of their co-ordinates, or diſtances from the perpendicular, and from the meridian of the principal ſtation.

Suppoſe the triangles A B C, B C D, to make part of a chain of other triangles whoſe ſides are arcs of great circles of a ſphere, having for its radius the diſtance of the centre of the earth to the ſurface of the ſea, and that the angle C A X, which meaſures the azimuth Z of the ſide A C, or its inclination to the meridian, has been determined by obſervation; we muſt firſt calculate the ſpherical exceſs ε in the right angled triangle A c C, and then reſolve it by the two following proportions:

Sin. $(90° - \frac{1}{3}\varepsilon)$: cof. $(z - \frac{1}{3}\varepsilon)$: : A C : A $c = x$.

Sin. $(90° - \frac{1}{3}\varepsilon)$: ſin. $(z - \frac{1}{3}\varepsilon)$: : A C : C $c = y$.

The azimuth of A B is known, becauſe $\angle$ B A X = $\angle$ C A B − C A X; and by calculating the ſpherical exceſs of the triangle A B M′, we have A M′ B = 90° − M′ A B − A B M′ + ε.

To determine the ſides A M′, B M′, we muſt deduct $\frac{1}{3}$ of the ſpherical exceſs, $\frac{1}{3}\varepsilon$, from each of the angles of the triangle A B M′, to obtain theſe proportions.

Sin. $(90° - A - B + \frac{2}{3}\varepsilon)$: ſin. $(B - \frac{1}{3}\varepsilon)$: : A B : A M′.

Sin. $(90° - A - B + \frac{2}{3}\varepsilon)$: ſin. $(A - \frac{1}{3}\varepsilon)$: : A B : B M′.

In

In each of the right angled triangles, A *b* B, M′ *d* D, two angles and the hypothenuſe are known, and thus the ſides A *b*, *b* B, M′ *d*, *d* D, may be found. Therefore the diſtances of the points, B, D, from the meridian and its perpendicular are known.

Proceeding in this manner in the triangle A C N or M′ D N, to obtain A N and D N, the continuation of C D, and in the triangle D N F to get the ſide N F, and the angles D N F, D F N, we ſhall be able to determine the co-ordinates.

The diſtance *f* F, and the angles D F N, N F *f*, being known, we have *f* F P = 90° — E F D — D F N — N F *f*; ſince all the horizontal angles about a given ſtation are together equal to four right angles.

Since two angles and a ſide are known in the right angled triangle *f* F P, we may calculate the ſpherical exceſs and the angle F P *f* and the other ſides *f* P, F P. Then by reſolving the right angled triangle *e* E P, the co-ordinates of E with reſpect to the meridian A X, and its perpendicular A Y, may be found. It is adviſable to make a ſcale of the obſerved chain of triangles, to ſee if any ſuch as A C N, M′ E P, which have been formed to facilitate the calculation, may not be too obtuſe or too acute to be employed with ſafety.

This method may be very properly employed for determining the length of an arc of the meridian, when the triangles do not deviate from the meridian line; and as the azimuths of a great number of ſides are found, theſe may be verified by direct obſervation.

In a memoir of Legendre, of which the following is an extract, he ſhews a method of calculating a meridian line, without drawing perpendiculars from the ſeveral ſtations.

When all the angles of the triangles are reduced to the horizon, and the correction neceſſary to reduce the ſum of the angles to 180 + the ſmall exceſs due to the area applied to the angles, and calculated *à priori*, the inequality of the heights of the ſtations need no longer be regarded, and the whole chain of triangles may be regarded as projected on a ſpherical or ſpheroidical ſurface, which may be conſidered as an extenſion of the ſurface of the ſea.

In this hypotheſis, which ſeems the moſt proper for ſimplifying the calculation, the triangles become ſpherical or ſpheroidical. The ſides are, or ought to be, conſidered as arcs of a circle, and the baſe, which is equally an arc of a circle, may be eaſily deduced from the meaſured baſe, by applying to it a correction calculated from the known height of the two extreme points above the level of the ſea. This being granted, we may employ the theorem given in the memoirs of the academy for the year 1787, to calculate the different ſides of the projected chain of triangles. Conſequently, if in the propoſed triangle the ſum of the angles is 180 + w, we muſt take away $\frac{1}{3}$ w from each angle to reduce the ſum to 180. This ſubtraction being made, we may proceed as if the given triangle was rectilinear. That is to ſay, we may deduce this proportion: the ſine of an angle oppoſite to a given ſide is to that ſide as the ſine of another angle is to its oppoſite ſide. The fourth term will be the length of the ſide of the ſpherical triangle we wiſh to reſolve; and which can thus be found with as much facility, as if the chain of triangles was ſituated entirely in the ſame plane. It has been propoſed to calculate the ſame ſpherical triangles by means of rectilinear triangles formed by reducing the ſides to their chords. But for this method we muſt determine the difference between each angle of the ſpherical triangle, and the correſponding angle of the rectilinear triangle, by a ſeparate operation. It is evident that this method muſt be leſs ſimple, and more ſubject to error than the one we have mentioned.

Let A, B, C, D, E, F, &c. (*Pl.* VII. *fig.* 61.) be a chain of triangles, a little diſtant from the meridian, and traced upon a curved ſurface, repreſenting the level of the ſea. We ſuppoſe the angles and ſides of the triangles known, by the operation already deſcribed. We may know by obſervation the angle, C A M, which meaſures the azimuth of the ſide, A C, or its inclination relative to the meridian. It is required to find the length of the meridian, A X, prolonged till it meets the perpendicular, L X, let fall from the laſt point of the chain. For this purpoſe we ſhall follow the ſame principles, as in the reſolution of the triangles. But we may, according to circumſtances, find means to abbreviate, and to avoid the calculation of as many parts of the meridian as there are triangles

In the figure propoſed, having prolonged C D to M, the triangle A C M muſt be reſolved, in which the ſide, A C, and the two adjacent angles, C A M, and A C M, are known. The value of the ſpherical exceſs, w, in this triangle, muſt then be calculated to get the repreſentative of C M A. By means of theſe three angles, and the known ſide, A C, we may determine the two ſides, A M, and C M, by the ſame proportion as if the triangle was rectilinear. The value of M O is obtained by reſolving the quadrilateral figure, D M O F, in which the angles M, D, F, and the ſides D M, D F, are known. Let the diagonal, M F, be drawn, the triangle, D M F, muſt then be computed, in which the ſides, D M, D F, and the included angle, D, are known. For this purpoſe we may proceed as if the triangle D M F was rectilinear, recollecting previouſly to ſubtract one-third of the ſpherical exceſs due to the area of the triangle from the angle, M D F. By theſe means we ſhall find the ſide, M F, and the two angles, D M F, D F M, to each of which we muſt add $\frac{1}{3}$ w. Proceeding then to the triangle M F O, the ſide, M F, and the two adjacent angles are known; the ſides, M O, F O, and the angle, M O F, may be found in the uſual manner. In the triangle, O P H, having given the ſide, O H, and the two adjacent angles, O P, P H, and the angle O P H, may be determined. The remainder of the meridian, P X, may now be found by the reſolution of the triangles, P H K, P Q K, and Q L X. But it is a more ſimple method to prolong the arc J L, and to determine P X, by the triangles, P J Z, and L X Z: in this laſt the hypothenuſe, L Z, the angle Z, and the right angle, X, are known. Then after having determined the valve of w, proper for this triangle, it may be reſolved by the following proportion:

Sine (90 — $\frac{1}{3}$ w) : L Z : : (Cof. Z — $\frac{1}{3}$ w) : X Z.

All the caſes that can occur in this operation are collected in the figure given as an example, and no farther difficulty can exiſt in the application of this method. In general the very ſmall quantity, w, varies from one triangle to another, and ſhould be determined *à priori*, for each of the triangles to be reſolved. One-third of this quantity ſhould be ſubtracted from each angle of the ſpherical triangle, to enable us to employ the rules of rectilinear trigonometry. But the reſult being found, we ſhould add one $\frac{1}{3}$ w to every angle. We have given an example of the reſolution of a quadrilateral figure, D M F O, in which two ſides and three angles are known. As this calculation is a little more difficult than ordinary ones, it might be avoided by prolonging the two ſides E D, E F, and reſolving the triangles, R D M, R E N, and F N O. But here are three triangles to be calculated inſtead of two, ſo that the firſt method ſeems preferable. By this operation the azimuths of many ſides of the chain are found at the ſame time, that is, the angles which theſe ſides make with the meridian. If then theſe azimuths have been pre-

viouſly determined in two different places, as is uſually done, at the two extremities of the chain, we ſhall have a very ſimple method of verification, ſince the calculated and obſerved azimuths ought to agree.

It muſt finally be obſerved, that the point X has rather greater latitude than the point L. Let λ be the latitude of the point L, r the radius of curvature of the meridian towards L, y the diſtance L X, R the number of ſeconds, compriſed in the radius of the tables, we ſhall find that the latitude of the point X is $\lambda + \frac{1}{2} R \left(\frac{y}{r}\right)^2$ tang. λ, where the correction will be expreſſed in ſeconds.

Though the different portions of a meridian line may be calculated by either of theſe methods, yet the problem in its more extended ſignification uſually embraces many other conſiderations. Having given the latitude of an extreme point of a terreſtrial arc, and the inclination of one ſide of the triangles to the meridian, it is required to determine by calculation the latitudes of all the ſtations, their azimuths with regard to each other, and their difference of longitude from the point of departure, the diſtance between the parallels of any two ſtations, and laſtly the arc of the meridian intercepted by the extreme ſtations. When the triangles are large, and diverge conſiderably from the meridian, the computation to be correctly made ſhould be founded on ſome hypotheſis of the figure of the earth; that is to ſay, the triangles ſhould be conſidered not as ſpherical but ſpheroidical. A very uſeful theorem is given in the Engliſh ſurvey, for the calculation of theſe triangles; and we ſhall extract from Puiſſant's "Traité de Geodeſie" an inveſtigation of the formulæ, which form the baſis of the practical rules given by Delambre and Legendre.

The principal object of theſe formulæ is to obtain algebraical expreſſions for computing the value of the following quantities:

The radius of a circle parallel to the equator in any latitude;—the normal, or radius of curvature of a great circle perpendicular to the meridian;—the radius of the earth, or the line drawn from its centre to any point where latitude is known;—the radius of curvature to any part of the arc of the meridian;—the quarter of the meridian in terms of a meaſured arc, and of the latitude of its extremities;—the compreſſion, or ellipticity of the terreſtrial ſpheroid, deduced from a meaſure of two arcs;—the eccentricity;—the length of a ſtandard meaſure as the French metre, which is aſſumed equal to the $\frac{1}{10000000}^{th}$ part of the meridian.

Inveſtigation of Formulæ for expreſſing in Terms of the Latitude different Parts of the Meridian, the Earth being ſuppoſed an ellipſoid of Revolution.

Let CE be radius of the equator (*fig.* 64.): P the pole.

If from the point A a tangent AT be drawn to the elliptic arc BAE; MA will be the normal to the point A, and $\angle$ALT $=$ $\angle$FAT $=$ latitude of the point A.

The equation to the ellipſe is $a^2 y^2 + b^2 x^2 = a^2 b^2$; and for the point A, whoſe co-ordinates are x', y', we have $a^2 y'^2 + b^2 x'^2 = a^2 b^2$. At the ſame point A the equation to the normal AL is $y - y' = \frac{a^2 y'}{b^2 x'} \cdot (x - x')$; if $y = o$, then CL or $x = \frac{a^2 - b^2}{a^2} x'$; from which it is eaſy to conclude that the normal $AL = n = \frac{b}{a}\left(b^2 + \frac{a^2 - b^2}{b'^2} y'^2\right)^{\frac{1}{2}}$.

Let ALF $=$ L, then $y' = n$ ſin. L; and conſequently $y'^2 = \frac{b^2}{a^2}\left[b^2 + \frac{a^2 - b^2}{b^2} y'^2\right]$ ſin.^{2} L; hence $y'^2 = \frac{b^4 \text{ ſin.}^2 \text{ L}}{a^2 - (a^2 - b^2) \text{ ſin.}^2 \text{ L}}$. (1).

And $n = \frac{b^2}{a}\left[1 - \frac{a^2 - b^2}{a^2} \text{ ſin.}^2 \text{ L}\right]^{-\frac{1}{2}}$. (2).

If in this equation we put $a = 1$ and $\frac{b}{a}$ and b' we ſhall have $\frac{a^2 - b^2}{a^2} = e^2$; or $1 - b'^2 = e^2$, e expreſſing the eccentricity: then $n = (1 - e^2)(1 - e^2 \text{ ſin.}^2 \text{ L})^{-\frac{1}{2}}$ $\frac{1 - e^2}{(1 - e^2 \text{ ſin.}^2 \text{ L})^{\frac{1}{2}}}$. (3).

And the equation (1) will become $AF = y' = \frac{(1 - e^2) \text{ ſin. L}}{(1 - e^2 \text{ ſin.}^2 \text{ L})^{\frac{1}{2}}}$. (4).

In the ſame hypotheſis the equation of the ellipſe is changed into $y'^2 = (1 - e^2)(1 - x'^2)$ and by the preceding equation $CF = x' = \frac{\text{coſ. L}}{(1 - e^2 \text{ ſin.}^2 \text{ L})^{\frac{1}{2}}}$. (5).

This is the value of the radius of a parallel of latitude to the point A.

In the ſame manner, the value of CL, found as above, may be changed into $CL = e^2 x'$; but x' is given in equation (5); therefore $CL = \frac{e^2 \text{ coſ. L}}{(1 - e^2 \text{ ſin.}^2 \text{ L})^{\frac{1}{2}}}$. (6).

All the values thus obtained, are relative to the greater axis taken as the line of x.

The ſame mode of calculation will lead us to the values of AM and CM, &c.

Let $a^2 x^2 + b^2 y^2 = a^2 b^2$, and let the values of x be now taken on the leſſer axis. Let the normal $AM = n'$, we ſhall have for the point A; $y^2 = n'^2$ coſ.^{2} L; but if in equation (2) a be changed into b and *vice verſâ*, and ſine for coſine $AM = n' = \frac{a^2}{b}\left(1 - \left(\frac{b^2 - a^2}{b^2}\right) \text{ coſ.}^2 \text{ L}\right)^{\frac{1}{2}}$, and ſince $b = b'$ when $a = 1$,

$$n' = \frac{1}{(1 - e^2)^{\frac{1}{2}}\left[1 + \frac{e^2}{1 - e^2}(1 - \text{ſin.}^2 \text{ L})\right]^{\frac{1}{2}}} = \frac{1}{(1 - e^2 \text{ ſin.}^2 \text{ L})^{\frac{1}{2}}}. \quad (7).$$

Since $y^2 = n'^2$ coſ.^{2} L $y^2 = \frac{\text{coſ.}^2 \text{ L}}{1 - e^2 \text{ ſin.}^2 \text{ L}}$.

By the equation of the ellipſe $y^2 = \frac{(1 - e^2) - x^2}{1 - e^2}$ from whence we may deduce $x^2 = \frac{(1 - e^2)^2 \text{ ſin.}^2 \text{ L}}{1 - e^2 \text{ ſin.}^2 \text{ L}}$.

As we have found above $CL = \frac{a^2 - b^2}{a^2} x'$; we ſhall in the preſent caſe have $CM = \frac{b^2 - a^2}{b^2} x = \frac{-e^2}{1 - e} x$; ſubſtituting for x its value in the preceding equation, we obtain $CM = \frac{-e^2 \text{ ſin. L}}{(1 - e \text{ ſin.}^2 \text{ L})^{\frac{1}{2}}} = -e^2 n' \text{ ſin. L}$. (8).

As to the value of AC, it is evidently repreſented by $\sqrt{x^2 + y^2}$, ſo that whether we take the above values of x^2,

x'', y'', or have recourſe to the equations (4) and (5), we have equally $AC = r = \left[\frac{e^2 (1 - e^2) \text{ fin.}^2 L}{1 - e^2 \text{ fin.}^2 L}\right]$. (9).

This formula is ſuſceptible of a more commodious form: Imagine a ſphere circumſcribing the ellipſoid, which has for its radius that of the equator, the angle $C\,a\,E = F\,a\,T = \lambda$ will be the latitude of the point a on the ſphere; but the points A, a, have the ſame abſciſſe C F; therefore if we take $AF = y'$ and $aF = y''$, the equations of the circle and ellipſe will be reſpectively $\left\{\begin{matrix} y'^2 = 1 - x^2 \\ y'^2 = b'^2 (1 - x^2) \end{matrix}\right\}$ eliminating x^2; $y'^2 = b'^2 y''^2$.

But a F is the ſine of λ, ſince $aC = 1$, therefore ſine $^2\lambda = \frac{(1 - e^2) \text{ fin.}^2 L}{1 - e^2 \text{ fin.}^2 L}$ and the equation (9) becomes $AC = (1 - e^2 \text{ fin. } ^2\lambda)^{\frac{1}{2}}$. (10).

Now to find the value of λ, divide in the preceding equations of the two curves one by the other, and $\frac{y'}{y''} = b'$.

By inſpection of the figure it will be ſeen that $\frac{y'}{FT} = \frac{1}{\text{tang. L}}$ and $\frac{y''}{FT} = \frac{1}{\text{tang. } \lambda}$ therefore $\frac{y'}{y''} = \frac{\text{tang. } \lambda}{\text{tang. L}}$.

From theſe two values of $\frac{y'}{y''}$ it reſults that tang. $\lambda = b'$ tang. L.

If B be taken ſuch that cof. $B = b'$, then $1 - b' = 1 - \text{fin. } ^2\frac{1}{2}B$, cof. B. $= 2 \text{ fin.}^2 \frac{1}{2}B$, tang. λ = cof. B tang. L, and 2 cof.$^2 \frac{1}{2}B = 2 - 2 \text{ fin.}^2 \frac{1}{2}B = 1 + b'$, therefore tang.$^2 \frac{1}{2}B = \frac{1 - b}{1 + b'}$, and by the expanſion of a trigonometrical formula, $L - \lambda = \text{tang.}^2 \frac{1}{2} B \text{ fin. } 2L - \frac{1}{2} \text{tang.}^4 \frac{1}{2} B \text{ fin. } 4L + \frac{1}{2} \text{tang.}^6 \frac{1}{2} B \text{ fin. } 6L$, &c.

$$L - \lambda = \left(\frac{1 - b'}{1 + b'}\right) \text{fin. } 2L - \frac{1}{2}\left(\frac{1 - b'}{1 + b'}\right)^2 \text{fin. } 4L + \frac{1}{3}\left(\frac{1 - b'}{1 + b'}\right)^3 \text{fin. } 6L.$$

This ſeries is rendered very converging by introducing the ratio of the axis of the ellipſe $m : n$, for $b' = \frac{n}{m}$ and $\frac{1 - b'}{1 + b'} = \frac{m - n}{m + n} = \frac{1}{m + n}$ for m, n generally differ but one unit from each other: thus $L - \lambda = \left(\frac{1}{m + n}\right) \text{fin. } 2L - \frac{1}{2}\left(\frac{1}{m + n}\right)^2 \text{fin. } 4L + \frac{1}{3}\left(\frac{1}{m + n}\right)^3 \text{fin. } 6L$, ſince $m = 334$, $n = 333$ nearly. The firſt term of this ſeries is ſufficient.

Thus, to find AC; in the expreſſion of its value $(1 - e^2 \text{ fin.}^2 \lambda)^{\frac{1}{2}}$, ſubſtitute for λ its equal as found above.

To find an expreſſion for the radius of curvature of the meridian, it ſhould be remembered that in curves of the ſecond order it is always equal to the cube of the normal divided by one quarter the ſquare of the parameter.

Therefore for the lat. L

$$R = \frac{n^3}{\frac{1}{4}p^2} = \frac{(1 - e)^3 (1 - e^2 \text{ fin. } ^2L)^{-\frac{3}{2}}}{\frac{1}{4}p^2};$$

but $\frac{1}{4}p^2 = \frac{b^4}{a^2} = (1 - e^2)^2$, hence $R = (1 - e^2)^2 (1 - e^2 \text{ fin.}^2 L)^{-\frac{3}{2}}$. (11).

If this value be required in terms of the ellipticity of the earth, the longer or equatorial axis being taken as unity, let $\frac{a - b}{a} = \alpha$, and becauſe $1 - b'^2 = e^2$ and $b' = 1 - \alpha$

$$e^2 = 1 - (1 - \alpha)^2 = 2\alpha - \alpha^2,$$

hence $R = (1 - 2\alpha + \alpha^2)(1 - (2\alpha - \alpha^2) \text{ fin.}^2 L)^{-\frac{3}{2}}$.

Expanding this negative power, and rejecting the ſecond powers and thoſe above, we have

$$R = 1 - \alpha (2 - 3 \text{ fin.}^2 L). \quad (12).$$

We may proceed now to the rectification of the curve or arc of the meridian.

Let S = arc between the equator and the point whoſe latitude is L its differential.

$$dS = \sqrt{dx'^2 + dy'^2} = dx' \sqrt{\frac{1 - e^2 x'^2}{1 - x'^2}};$$ (vid. La-croix cal. diff.) Since $x' = \frac{\text{cof. L}}{\sqrt{1 - e^2 \text{ fin.}^2 L}}$ (equal 5.)

$$dx' = \left\{ \frac{d \text{ cof. L}}{\sqrt{1 - e^2 \text{ fin.}^2 L}} - \frac{1}{2} \frac{\text{cof. L } d(1 - e^2 \text{ fin.}^2 L)}{(1 - e^2 \text{ fin.}^2 L)^{\frac{3}{2}}} \right.$$

But when x' increaſes, L diminiſhes; therefore

$$dx' = -dL \text{ fin. L} \left(\frac{-1}{(1 - e^2 \text{ fin.}^2 L)^{\frac{1}{2}}} + \frac{e^2 \text{ cof.}^2 L}{(1 - e^2 \text{ fin.}^2 L)^{\frac{3}{2}}}\right)$$
$$= \frac{(1 - e^2) \text{ fin. L } dL}{(1 - e^2 \text{ fin.}^2 L)^{\frac{3}{2}}}$$

In the expreſſion for dS, for x' and dx', ſubſtitute their values as above; and

$dS = (1 - e^2)(1 - e^2 \text{ fin.}^2 L)^{-\frac{3}{2}} dL -$, and by the binomial theorem.

$$\frac{dS}{1 - e^2} = \left\{ 1 + \tfrac{3}{2} e^2 \text{ fin.}^2 L + \tfrac{3}{2} \cdot \tfrac{5}{4} e^4 \text{ fin. } ^4L + \tfrac{3}{2} \cdot \tfrac{5}{4} \cdot \tfrac{7}{6} e^6 \right.$$
$$\left. \text{fin. } ^6L + \right\} dL;$$

then, by changing the powers of the ſines and coſines of the multiple arcs (vid. La Croix's Diff. Cal. N° 199.)

$$\frac{dS}{(1 - e^2)} = \left\{ 1 + \frac{3}{2} \cdot \frac{2}{1.2^2} e^2 + \frac{3 \cdot 5}{2 \cdot 4} \cdot \frac{4 \cdot 3}{1 \cdot 2 \cdot 2^2} e^4 + \frac{3 \cdot 5 \cdot 7}{2 \cdot 4 \cdot 6} \cdot \right.$$
$$\left. \frac{6 \cdot 5}{1 \cdot 2 \cdot 3 \cdot 2^6} \cdot \frac{4}{} e^6 + \right\} dL$$
$$- \left\{ \frac{3}{2} \cdot \frac{1}{2} e^2 + \frac{3 \cdot 5}{2 \cdot 4} \cdot \frac{4}{2^3} e^4 + \frac{3 \cdot 5 \cdot 7}{2 \cdot 4 \cdot 6} \cdot \frac{6 \cdot 5}{1 \cdot 2 \cdot 2^5} \right.$$
$$\left. e^6 \right\} dL \text{ cof. } 2L$$
$$+ \left\{ \frac{3 \cdot 5}{2 \cdot 4} \cdot \frac{1}{2^3} e^4 + \frac{3 \cdot 5 \cdot 7}{2 \cdot 4 \cdot 6} \cdot \frac{6}{1 \cdot 2^5} e^6 \right\} dL \text{ cof. } 4L$$
$$- \left\{ \frac{3 \cdot 5 \cdot 7}{2 \cdot 4 \cdot 6} \cdot \frac{1}{2^5} e^6 + \right\} dL \text{ cof. } 6L:$$

Or, for conciſeneſs,

$$\frac{dS}{(1 - e^2)} = m\,dL - n\,dL \text{ cof. } 2L + p\,dL \text{ cof. } 4L - q\,dL \text{ cof. } 6L;$$ and by integration,

$$\frac{S}{1 - e^2} = m L - \frac{1}{2} n \text{ fin. } 2L + \frac{1}{4} p \text{ fin. } 4L - \frac{1}{8} q \text{ fin. } 6L + (13).$$

Here the integral is complete, ſince the arc S vaniſhing at the ſame time as L, the conſtant quantity neceſſarily becomes nothing.

It is evident that for another arc S, terminating in the latitude L'

1 =

$\frac{S'}{1-e^2} = m\,L' - \frac{1}{2}n \sin. 2\,L' + \frac{1}{4}p \sin. 4\,L' - \frac{1}{8}q \sin. 6\,L +$ &c.; consequently the arc $S - S'$ compriſed between the latitudes L and L′ will be given by the equation.

$$\frac{S-S}{1-e^2} = m\,(L - L') - \frac{1}{2}n\,(\sin. 2\,L - \sin. 2\,L') + \frac{1}{4}p\,(\sin. 4\,L - 4\,L') - \frac{1}{8}q\,(\sin. 6\,L - 6\,L') +$$
$$= m\,(L - L) - n \sin. (L - E) \cos. (L + L) + \frac{1}{2}p \sin. 2\,(L - L') \cos. 2\,(L + L') - \frac{1}{4}q \sin. 3\,(L - L') \cos. 3\,(L + L'.) \quad (14).$$

If Q repreſent a quarter of the meridian, L will be equal 90°; and equation (13) gives

$$\frac{Q}{1-e^2} = m\,90°.$$

Dividing this by the preceding

$$\frac{Q}{S-S'} = \frac{90°}{(L-L') - \frac{m}{n} \sin. (L-L') \cos. (L+L') + \frac{1}{2}\frac{p}{m} \times \sin. 2\,(L-L') \cos. (L+L') - \frac{1}{4}\frac{q}{m} \sin. 3\,(L-L') \over \cos. 3\,(L+L'.)}$$

But, (rejecting the terms above e^4,)

$$m = 1 + \frac{3}{4}e^2 + \frac{45}{64}e^4$$
$$\frac{n}{2} = \frac{3}{8}e^2 + \frac{15}{32}e^4$$
$$\frac{1}{4}p = \frac{15}{256}e^4$$
$$\frac{n}{m} = \frac{3}{4}e^2 + \frac{3}{8}e^4$$
$$\frac{1}{2}\frac{p}{m} = \frac{15}{128}e^4$$

$$Q = \frac{(S-S')\,90°}{L-L'}\left(1 + \frac{3}{4}e^2 + \frac{3}{8}e^4\right)\frac{\sin. (L-L') \cos. (L+L')}{L-L'} - \frac{15}{128}e^4 \frac{\sin. 2\,(L-L') \cos. 2\,(L-L')}{L-L'} \quad (15).$$

To employ this formula, which gives Q in the ſame meaſure as the arc $S - S'$ (and in which the two terms of the fraction $\frac{90°}{L-L'}$ ought to be of the ſame kind) $L - L$ ſhould be reduced into parts of the radius, and $\frac{1}{2}\pi$ (or 1.5707963267) ſubſtituted for 90°.

When $L + L' = 90°$; $\cos. (L + L')^4 = 0$, and then without ſenſible error $Q = \frac{(S-S')\,90°}{L-L'}$; that is to ſay, that the value of the quarter of the meridian is independent of the ellipticity, and that the degree at 45° is very nearly the 90th part of the quadrant.

In the ſame circumſtance the equation (14) gives $S - S' = (1 - e^2)\,m\,L - L'$.

And $Q = m\,(1 - e^2)\,\frac{1}{2}\pi$

Exterminating m; the radius of the equator being repreſented by unity

$$Q = \frac{1}{4}\pi\left(1 - \frac{1}{4}e^2 - \frac{3}{64}e^4 - \frac{5}{256}e^6\right) \quad (16).$$

The ſame as may be obtained by formulæ (13), by making $L = 90°$.

To uſe the above formulæ, it is neceſſary previouſly to determine the elements they contain; theſe are, the eccentricity, e, or the compreſſion, α: and as theſe formulæ are relative to an ellipſe whoſe greater axis is 1, they muſt be multiplied by the equatorial radius expreſſed in ſome ſtandard meaſure, as feet or metres, &c. whenever we apply them to the terreſtrial meridian.

And firſt to find the compreſſion α.

Let g, g' be the meaſured value of two degrees, let L, L′ expreſs the angles which the reſpective normals paſſing through the centres of theſe degrees make with the greater axis $= \pi$ the circumference of a circle whoſe radius $= 1$. R, R′, the radii of curvature we have by formula (12).

$$R = a(1 - \alpha\,(2 - 3 \sin.^2 L')$$
$$R' = a(1 - \alpha\,(2 - 3 \sin.^2 L')$$

The ſemi-circumference of which R is the radius $= \pi R$, and it intercepts 180°, conſequently,

$$g = \frac{\pi R}{180}\,g' = \frac{\pi R'}{180} \text{ ſo that}$$
$$\frac{g'}{g} = \frac{1 - \alpha\,(2 - 3 \sin.^2 L)}{1 - \alpha\,(2 - 3 \sin.^2 L')}$$

Reducing this fraction, and neglecting the terms α^2, &c.

$$\frac{g'}{g} = 1 - 3\,\alpha\,(\sin.^2 L - \sin.^2 L')$$

From whence the value of α is found.

$$\alpha = \frac{g - g'}{3g\,(\sin.^2 L - \sin.^2 L'.)}$$

The equation $\alpha = \frac{g' - 3}{3\,g \sin.^2 L''}$, gives $g'' = g\,(1 + 3\,\alpha \sin.^2)L''$, if we take $L'' = 45°$; $\sin.^2 L'' = \frac{1}{2}$; then $g'' = g\left(1 + 3\,\frac{\alpha}{2}\right)$; and this degree multiplied by 90 will give the value of a quarter of the meridian. From theſe equations it appears that the increaſe of the degree from the equator to the poles is very nearly proportional to the ſquares of the ſine of the latitude.

If the degree meaſured in Peru be employed with that meaſured in France by Mechain and Delambre in the above formulæ, the compreſſion α will be $\frac{1}{334}$ and $b' = 1 - \frac{333}{334}$ and $1 - b'^2 = e^2$.

Therefore $e^2 = 1 - \left(\frac{333}{334}\right)^2 = 0.005979058$, which quantity has for its log. 7.7766329.

The equatorial degree is here ſuppoſed = 51077.7 = 56753 (Toiſes. Decim. Sexag.)
And the degree at 45° = 51307.4 = 57008

For the equation $\alpha = \frac{g'' - g}{3\,g \sin.^2 L''}$ gives $g'' = g\,(1 + 3\,\alpha \sin.^2 L'')$ and when $L'' = 45°$ $\sin.^2 L'' = \frac{1}{2}$ $\therefore g'' = 51307.4$ decimal = 57008 toiſes ſexageſimal.

From equat. (14), if $Q = 10000000$ metres; $a = \frac{10000000}{\frac{1}{2}\pi}\left(1 + \frac{1}{4}e^2 + \frac{7}{64}e^4 + \frac{15}{256}e^6\right)$, and ſince $e^2 = 2\,\alpha - \alpha^2$, it follows that a expreſſed in metres

$$a = \frac{10000000}{\frac{1}{2}\pi}\left(1 + \frac{1}{2}\alpha + \frac{3}{16}\alpha^2 + \frac{1}{32}\alpha^3\right)$$ from which log. $a = 6.8045305$, &c. &c.

If with the value of the degree at the equator we deduce its radius of curvature R, we may, by ſubſtituting its value in equation (12), find the equatorial ſemidiameter, a, as likewiſe b. With the above data theſe appear to be

a = 32271226	toiſes	Log.	6.5147105
= 6375737	metres	Log.	6.8045304
= 20918230	Engliſh feet	Log.	7.3205255
b = 3261432	toiſes	Log.	6.5134083
= 6356649	metres	Log.	6.8032283
= 20855922	Engliſh feet	Log.	7.3192234

If

If in the expreſſion $\alpha = \frac{g'-g}{3g \text{ fin.}^2 L}$ we take $g' = 60820$ fathoms for the lat. 52° 2′ 20″, as found by the meaſurement of the arc between Clifton and Dunnoſe, the ellipticity, α, will be found $= \frac{1}{336.5}$

For $60820 - 60484.8 = 335.2 = g' - g$

$$\text{Log. } \frac{335.2}{3 \times 60484.8 \text{ fin.}^2 52.2.20} = 7.4730119 = \frac{1}{336\,5.}$$

Method of M. Legendre for calculating the Latitude, Longitude, and Azimuths of the Stations on a Meridian Line.

Let P (*fig.* 65.) be the pole of the earth, P A, P B two elliptic meridians, let L be the known latitude of the point A, it is required to find that of the point B, ſituated on the arc B A, perpendicular to P A, its longitude, and the azimuth of A as ſeen from B.

Suppoſe A M, B N to be verticals to the points A and B; make A B$=y$, M A$=r$, N B$=r'$.

The ſmall arc y, having r for its radius of curvature, it follows that a ſimilar arc φ, whoſe radius $=1$, will have for its value $\frac{y}{r}$.

If from the point M as a centre, and with the radius M $b=1$, the arcs $a\,b$, $a\,p$, $p\,b$, be deſcribed, a ſpherical triangle will be formed, in which the ſide $p\,a = 90° - L$ will be known, as alſo the ſide $a\,b = \varphi$, and the contained right angle $p\,a\,b$; then by trigonometry,

$$\text{cof. } (p\,b) = \text{fin. L cof. } \varphi,$$

$$\text{tang. P} = \frac{\text{tang. } \varphi}{\text{cof. L}}$$

$$\text{tang. } b = \frac{\text{cof. L}}{\text{fin. } \varphi}$$

$$p\,b = 90° - L + \tfrac{1}{2}\varphi^2 \text{ tang. L}$$

$$P = \frac{\varphi}{\text{cof. L}} - \tfrac{1}{3}\varphi^3 \frac{\text{fin.}^2 L}{\text{cof.}^3 L},$$

$$b = 90° - \varphi \text{ tang. L} + \tfrac{1}{3}\varphi^3 \text{ tang. L } (\tfrac{1}{2} + \text{tang.}^2 \text{L}).$$

From the value $p\,b$ may be deduced the approximate value of the latitude B.

$$90° - p\,b = L - \tfrac{1}{2}\varphi^2 \text{ tang. L.}$$

The angle P is the difference of longitude between A and B, and the angle b the required azimuth P B A.

To have more exactly the latitude of the point B, it may be remarked that it is equal to the complement of the angle P N B, or of the angle P M B + N B M $= p\,b +$ N B M. But as the angle N A M is very nearly equal to the angle N B M, we ſhall have N B M $= \frac{\text{M N cof. L}}{r} = \downarrow$.

M N may be obtained by the formula (8), for if we take $n' = r$, then C M$=e^2 r$ fin. L, in the ſame manner for the point B, whoſe latitude is L′ − C N$=e^2 r$ fin. L′; thus very nearly we have

$$\text{M N} = e^2 r \text{ (fin. L} - \text{fin. L}').$$

It is eaſy to ſee that this value is always poſitive, that is to ſay, C M $>$ C N, for the latitude of A being evidently greater than that of B, the ſine of L is greater than L′. To decompoſe into factors the quantity fin. L − fin. L′, we may take the trigonometrical formula.

Sin. L − ſin. L′ $= 2$ fin. $\left(\frac{L-L'}{2}\right)$ cof. $\left(\frac{L+L'}{2}\right)$; hence

$$\text{M N} = 2e^2 r \text{ fin.} \left(\frac{L-L'}{2}\right) \text{ cof.} \left(\frac{L+L'}{2}\right),$$

Upon the ſuppoſition that L − L′ is very ſmall, the arc may be taken for its ſine, and cof. L for cof. $\left(\frac{L-L'}{2}\right)$; then M N$=e^2 r$ (L − L′) cof. L.

But the approximate latitude of B or L′ $=$ L $-\frac{1}{2}\varphi^2$ tang. L; hence M N$=\frac{1}{2}e^2 r \varphi^2$ tang. L cof. L$=\frac{1}{2}e^2 r \varphi^2$ ſin. L.

It may be deſirable to have a more exact expreſſion for M N and $\downarrow$, which may be obtained thus: ſince $r = \frac{1}{(1 - e^2 \text{ fin.}^2 L)}$; r may be taken without ſenſible error $= 1$; then calling L − L′$=d$L, L + L′$=2$L $-d$L, and the equation M N$=2e^2 r$ fin. $\frac{L-L'}{2}$ cof. $\frac{L+L'}{2}$ will become M N$=2e^2$ fin. $\frac{1}{2}d$L cof. (L $-\frac{1}{2}d$L).

Expanding the factor cof. $-d$L being ſuppoſed very ſmall, M N$=2e^2$ fin. dL cof. L$+\frac{1}{2}e^2$ fin.^{2} dL fin. L.

But when the arc A is very ſmall, fin. A$=2$ fin. $\left(\frac{A}{2}\right)$, and M N$=e^2$ fin. dL cof. L$+\frac{1}{2}e^2$ fin. dL, cof. L.

Since fin. N B M$=$ fin. $\downarrow = \frac{\text{M N fin. B N M}}{\text{M B}} = \frac{\text{M N cof. L}'}{r}$, we ſhall have from the preceding values of M N and r', fin. $\downarrow = e^2$ fin. dL cof. L cof. L′$+\frac{1}{2}e^2$ fin.^{2} dL fin. L cof. L′.

But cof. L′$=$cof. L$+$ſin. L fin. dL;

Hence $\downarrow = e^2 d$L cof.^{2} L$+\frac{3}{2}e^2 d$L fin. dL fin. L cof. L.

Hence it follows that the angle N B M$=\frac{1}{2}\varphi^2 e^2$ fin. L cof. L, and conſequently the true latitude of B$=90° -$ $(p\,b) - \downarrow$, or L′$=$L$-\frac{1}{2}\varphi^2$ tang. L$-\frac{1}{2}e^2 \varphi^2$ fin. L cof. L.

If L be the latitude of the point A, L′ the latitude of B, y the perpendicular diſtance of B from the meridian of A, and r the radius of the earth, or normal of the point A; taking R″ to expreſs the number of ſeconds in this radius, we ſhall obtain the following equations:

$$L' = L - \tfrac{1}{2}R''\left(\frac{y^2}{r^2}\right)\text{tang. L} - \tfrac{1}{2}R'' e^2 \left(\frac{y^2}{r^2}\right) \text{ fin. L cof. L } (a).$$

reciprocally $L = L' + \frac{1}{2}R\left(\frac{y^2}{r^2}\right)$ tang. L$-\frac{1}{2}$R″ $e^2\left(\frac{y^2}{r^2}\right)$ fin. L′ cof. L′. (b).

It is evident that e repreſenting the eccentricity, the ſecond term, in moſt caſes may be rejected. The difference of longitude of A and B $=$ P $= \frac{R''y}{r \text{ cof. L}}\left(1 - \frac{1}{3}\frac{y^2}{r^2}\text{ tang.}^2 \text{L}\right)$. ($c$).

And the azimuth of the arc B A or angle P B A$= z' =$ $90° - \frac{R''y}{r}$ tang. L$+\frac{1}{3}$R″ $\frac{y^3}{r^3}$ tang L $(\frac{1}{2} +$ tang.^{2} L). (d).

If L′ be only known, the laſt equation may, by a trigonometrical formula, be changed into $z' = 90° - R''\frac{y}{r}$ tang. L′ $-\frac{1}{3}R\frac{y^3}{r'^3}$ tang. L′ $(1 + \frac{1}{2}$ tang.^{2} L′). (e).

Theſe formulæ are not difficult in their application, and do not require a great many logarithms, as they have many elements in common, as will be ſeen in the examples.

It

It will ſometimes happen that the latitude of A is not directly given, but the diſtance x, of the perpendicular from the principal ſtation is known, and may be converted into degrees, by taking the radius of curvature of its middle point, recurring to the general expreſſion $\varphi = \frac{x\,R''}{\text{rad. of curv.}}$.

This method, which ſuppoſes the latitude of A known by approximation, is exact enough for every poſſible practical purpoſe.

The following expreſſion is ſtill more accurate; let l = latitude of the known ſtation.

L = latitude required of a point on the ſame meridian, then

$$L = l + \left(\frac{d\,l}{d\,x}\right)x + \tfrac{1}{2}\left(\frac{d^2\,l}{d\,x^2}\right)x^2 + ,$$

which will hereafter be ſhewn to be equal to $\frac{R''x}{r} - \frac{3}{4}R'' \left(\frac{e^2}{1-e^2}\right)$ ſin. $2L\,\frac{x^2}{r\,r}$:

r'' being = normal.
r = radius of curvature to the latitude l.

And if the value of $\varphi = \frac{y\,R''}{r}$ be known at any central point as a principal ſtation, its value at any diſtance x from that ſtation is equal $\varphi = R''\frac{y}{r}\left(1 - \frac{1}{2}\frac{r''^2}{\rho^2}e^2 \text{ ſin. } 2l\frac{x}{r}\right)$.

Example I.

Let B (*Pl.* VII. *fig.* 66.) be the tower of Dunkirk, A A′ the meridian of Greenwich; let the latitude of A be ſuppoſed 51° 3′ 37″. Let A A′ = x = 152550 Log. = 5.1834122
A′ B = y = 547058 Log. = 5.7380334
required the latitude of B?

Firſt, find the log. of normal = $n = \rho\,(1 + \frac{1}{2}e^2 \text{ ſin.}^2 \text{ L.})$

Log. ſin.² L	-	9.7817370
Log. 0.5	-	9.6989700
Log. e^2	- -	7.7766329
		1.0000000
		7.2573399 = 0.0018085
Log. $(1 + \frac{1}{2}e^2 \text{ ſin.}^2 \text{ L})$		0.0007844 = 1.0018085
Log. ρ	-	7.3205367
Log. n or normal	-	7.3213211 Log n^2 - = 4.6426422
		Co. log. n^2 = 5.3573577

Log. 0.5	-	9.6989700
y^2	-	1.4760668
R″	-	5.3144251
Co. log. n^2	-	5.3573577
Tang. L	-	0.0925566
Log. of firſt corrⁿ.		1.9393762 = 86″.97

Log. $\frac{1}{2}\frac{R''\,y^2}{n^2}$		1.84683
Sin. L cof. L		9.68918
ρ^2	-	7.77663
Log. of 2d corrⁿ.		9.31264 = 0.205
Diff. of latitude required		87.175
which taken from the latitude of A	-	51° 3′ 37″
leaves for the latitude of Dunkirk	-	51 2 9.83

Example II.

Let the latitude of A (Greenwich) = 51° 28′ 40″.
A A′ = x = 124322 - Log. = 5.0945480
A′ B = y = 303775 - Log. = 5.4825500
Required the latitude of B, Dover-caſtle?

Firſt, find A′ B′, or difference of latitude between A′ and B.

Log. 0.5	-	9.69897
R″	-	5.314432
y^2	-	0.96510
Co. log. n^2	-	5.35735
Tang. L	-	0.09376
		1.42960 = 26″.89 = 1ſt corr.
$\frac{1}{2}\frac{R''\,y^2}{n^2}$	-	1.33584
ρ^2	-	7.77663
Sin. L cof. L		9.68918
		8.80165 = 0.06 = 2d corr.
A′ B′	- -	= 26.95

The latitude of A′ may be deduced from the value of x by the formula $x'' = \frac{R''\,x}{r}$; r denoting the radius of curvature to the meridian, at the middle point of x, which may be obtained from this equation.

$r = (1 - \alpha\,(2 - 3 \text{ ſin.}^2 \text{ L})$ Log. r = 7.32031
from whence x = 1226″.5 = 20′ 26″.5 = A A′
26.95 = A′ B′

Difference of latitude	-	20 53.45
		51 28 40
Latitude of Dover-caſtle		51 7 46.55

To find the difference of longitude P.

$$P = \frac{R''\,y}{n \text{ cof. L}}\left(1 - \tfrac{1}{3}\frac{y^2}{n^2}\text{ tang.}^2 \text{ L.}\right)$$

Log. $\frac{1}{3}$	- - -	9.52288	
Log. $\frac{y^2}{n^2}$	- -	6.32247	
Tang.² L	- -	0.18510	
			1.000000
		6.03045 - -	0.000107
Log. $(1 - \frac{1}{3}\frac{y^2}{n^2}\text{ tang.}^2 \text{ L})$		9.9999522 - -	0.999893
Log. R″	- -	5.3144251	
Log. $\frac{y}{n}$	- -	8.1612280	
Comp. cof. L	-	0.2023792	
		3.6779845 = 4764″ = 1° 19′ 24″	

Example III. *by the Tables.*

Given lat. A. 51° 28′ 40″
x = 124322 = 5.0945480
y = 303775 = 5.4825500
Required lat. B Dover caſtle.

$$A - A' = \frac{R'' x}{n}$$

In Table VI. with middlelat. A A′ = 51° 18′, take 7.9941215
Log. x = 5.0945480

$A - A' = 1226.5 = 3.0886695$
$= 20' 26''.5$

	1st.	2d.
In Table III. with lat. A′ take	0.3707524	7.83569
Add log. y^2	0.9651000	0.96510
Tang. L	0.0936983	
1st. corr. = 26″.88 =	1.4295507	0″ 06 = 8.80079

A A′ = 20′ 26″.5
Sum of 1 and 2 = 26.94

20 53.44 = diff. of lat. between A and B.
51 28 40

51 7 46.56 Latitude of Dover-castle.

Example IV.

In A. Dunnose lat. 50° 37′ 8″ ∠ A′A B = z = 81° 56′ 53″.
x = 47540 = 4.6770600
y = 336052 = 5.5264065

Required the latitude and longitude of B, Beachy-head?

In Table VI. with lat. 50° 40′, take 7.99415
Log. x 4.67706

469″.08 = 2.67121
= 7′ 49″.08
which added to 50° 37 8

gives the lat. of A′ 50 44 57.08

In Table III. with lat. A′, take 0.3707679
Log. y^2 1.0528130
Tang. L. 0.0877597

1st. corr. - - −32″.46 = 1.5113406

In Table III. 2d. part with lat. A′, 7.83759
Log. y^2 1.05281

2d. corr. - - + 0.077 = 8.89040

The total correction 32″.38 taken from the lat. A′, leaves the lat. B = 50° 44′ 24″.74.

To find the Difference of Longitude = $\frac{R'' y}{r \text{ col. L}} \left(1 - \frac{1}{3}\frac{y^2}{r^2} \text{ tang. } {}^2\text{L.}\right)$

Log. $\frac{1}{3}$ = 9.52288
$\frac{y^2}{n^2}$ = 6.41016
Tang. L − 0.35104

6.28408 = 0.000192

9.99996 = 0.999808

Brought over 9.99996
R″ = 5.31442
$\frac{y}{n}$ = 8.20508
Co. cof. L = 0.19871

1° 27′ 5″.8 = 5225.8 = 3.71817

To find the Difference of Azimuth.

$z' = 90° - \frac{R'' y}{n} \text{ tang. L} + \frac{1}{2} R'' \frac{y^3}{n^3} \text{ tang. L } (\frac{1}{2} + \text{tang.}^2 \text{ L.})$

$\frac{R'' y}{n}$ = 3.5195179 Tang.² L = 0.17552 = 1.49
+.5

Tang. L = 0.0877471 Log. 0.30059 = 1.99

4049″.3 = 3.6073650
Log. $\frac{1}{3}$ = 9.52288
R″ = 5.31442
$\frac{y^3}{n^3}$ = 4.61524
Tang. L = 0.08775

9.54029
Log. (tang. L + $\frac{1}{4}$) 0.30059

0″.69 = 9.84088

If in this example the normal n be taken from actual observation, log. n = 7.32288, the difference of longitude will then be found 1° 26′ 47″, very nearly the same as in the trigonometrical survey.

Note. To the log. of normal in feet, add the constant log. 7.4637260, and it will give the number of fathoms in the degree.

And to the log. of number of fathoms add the constant log. 2.5362738, and it will give the log. of the normal.

Example V.

Let the latitude of A, Dunnose = 50° 37′ 7″.3
x = 27861
y = 313072 = 5.4956443

Required the latitude and longitude of Blackdown? (Vid. Trigon. Survey. vol. ii. p. 91. Faden's edit.)

The latitude of A′ by the general hypothesis is 50° 41′ 41″.5
But by the measured degree of 60850 feet 50 41 42.1

Tang. L	0.0869004	- 50 41 42.1
Lat. A′,A, Table III.	0.3707715	- 28.1
Log. y^2	0.9912886	

28.11 = 1.4489605 Lat. B = 50 41 14

To find the Difference of Longitude.

Log. $\frac{1}{3}$ = 9.52288
$\frac{y^2}{n^2}$ = 0.99129
$\frac{y^2}{n^2}$ = 5.35737
Tang. ²L = 0.17380

Log. $\left(1 - \left(\frac{1}{3}\frac{y^2}{n^2} \text{ tan.}^2 \text{ L}\right)\right)$ = 6.04534 = 0.000111

Log. $1 - \frac{1}{3}\frac{y^2}{n^2}$ tan.² L = 9.99995 = 9.999889

Brought over 9.99995
$R'' = 5.31442$
$\frac{y}{n}\left\{\begin{array}{l} = 5.49564 \\ = 2.67869 \end{array}\right.$
0.19828

$4863''.9 = 3.68698$

$= 1^\circ\ 21'\ 3''.9$

This method of Legendre admits of being ſimplified, when the ſecond correction is conſiderable, by a more judicious uſe of the formula; $\downarrow = e^2 d\,L \text{ cof.}^2 L$.

For, having found $d\,L$ by the preceding rules, the ſecond correction is obtained by multiplying it by $e^2 \text{ cof.}^2 L$.

Example. To find the Latitude of Dunkirk. Vid. Example I.

$y^2 = 1.4760768$

$\frac{1}{2}\frac{R''}{n^2}$ Tab. III. $= 0.3707755$

Tang. $L = 0.0925526$

$d\,L = 1.9394049 = 86.977$

Tab. VIII. $e^2 \text{ cof.}^2 L = 7.37272$

$9.31212 = 0.205$

$L - L' = 87''.182$

This formula may be verified by the following trigonometrical expreſſion, which is perfectly accurate.

Let L be the latitude of the point A, L′ the lat. of B, P the difference of longitude.

$$\text{Tang. } P = \frac{\text{tang. } \varphi}{\text{cof. } L}$$

$$\text{Sin. } L - L' = \text{ſin. } L \text{ ſin. } \varphi \text{ tang. } \frac{P}{2}(1 + e^2 \text{ cof.}^2 L)$$

$$\text{Sin. } L - L' = \text{ſin. } L' \text{ tang. } \varphi \text{ tang. } \frac{P}{2}(1 + e^2 \text{ cof.}^2 L.)$$

Example.—Greenwich and Dunkirk. See Example I.

$\varphi = \frac{R'' y}{n} = 3.7311373 = 5384''.4 = 1^\circ\ 29'\ 44''.4$

Tang. $\varphi = 8.4168110$
Cof. $L = 9.9983070$

$P = 2^\circ\ 22'\ 44'' = 8.6185040$
Sin $L' = 51^\circ\ 2'\ 10'' = 9.8907241$
Tang. $\varphi =$ - - 8.4168110
Tang. $\frac{P}{2} = 1^\circ\ 11'\ 22'' = 8.3172839$
$1 + e^2 \text{ cof.}^2 L$ - - 0.0010194

3in $L - L' = 87''.16 = 6.6258384$

The method of M. Delambre is quite independent of the diſtances from the perpendicular and meridian; inſtead of conſidering the diſtance of two points, as meaſured on a great circle paſſing through their verticals, he takes in preference the chords of the arcs.

The obſerved angles are reduced to thoſe of the chords; the baſe muſt likewiſe be reduced to a chord, if the utmoſt preciſion is required.

If B be the length of an arc, its exceſs above its chord Σ is thus found, ρ being the radius of the earth, $\Sigma' = \frac{1}{24}\frac{B^3}{\rho^2}$.

In this method, there is no occaſion for a figure, and the diſtance between the parallels may be found without calculating the diſtances to the meridian. There is one inconvenience which, as the author obſerves himſelf, is not inconſiderable, that the latitudes of the ſtations muſt be calculated previouſly to the diſtance between the parallels: but, as the latitudes of the ſtations are generally required, this cannot be conſidered as a ſerious objection.

Let us ſuppoſe at firſt the earth to be ſpherical, and the triangle P A B to be no longer rectangular. Then,
Cof. P B = cof. A ſin. P A ſin. A B + cof. P A cof. A B; and agreeable to the above notation,

Sin. $L' = \text{cof. A cof. L. ſin } \varphi + \text{ſin. L cof. } \varphi$:

Hence, ſin. L − ſin. L′ = ſin. L − ſin. L cof. φ − ſin. φ cof. A cof. L
$= (1 - \text{cof. } \varphi) \text{ ſin. L} - \text{ſin. } \varphi \text{ cof. A cof. L}$
$= 2 \text{ ſin.}^2 \frac{1}{2}\varphi \text{ ſin. L} - \text{ſin. } \varphi \text{ cof. A cof. L.}$

But if A be taken exteriorly, that is, if, inſtead of the cof. A, we ſubſtitute its value taken from the equation A = 180° − Z − cof. A = cof. Z:
then, ſin. L. − ſin. L′ = ſin. φ cof. Z. cof. L + 2 ſin.$^2 \frac{1}{2}\varphi$ ſin. L:

$$\text{or, } 2 \text{ ſin. } \tfrac{1}{2}(L - L') = \frac{\text{ſin. } \varphi \text{ cof. Z cof. L} + 2 \text{ ſin.}^2 \frac{1}{2}\varphi \text{ ſin. L}}{\text{cof. } \frac{1}{2}(L - L')}:$$

conſequently,

$$2 \text{ ſin. } \tfrac{1}{2} d\,L = \frac{\text{ſin. } \varphi \text{ cof. Z cof. L} + 2 \text{ ſin.}^2 \frac{1}{2}\varphi \text{ ſin. L}}{\text{cof. } (L - \frac{1}{2} d\,L}$$

$$= \frac{\text{ſin. } \varphi \text{ cof. Z cof. L} + 2 \text{ ſin.}^2 \frac{1}{2}\varphi \text{ ſin. L}}{\text{cof. } \frac{1}{2} d\,L \text{ (cof. L} + \text{ſin. L tang } \frac{1}{2} d\,L)}.$$

Now, very nearly 2 ſin. $\frac{1}{2} d\,L = \text{ſin. } d\,L$, and cof. $\frac{1}{2} d\,L = 1$; hence dividing by the cof. L ſin. $d\,L =$ $\frac{\text{ſin. } \varphi \text{ cof. Z} + 2 \text{ ſin.}^2 \frac{1}{2}\varphi \text{ tang. L}}{1 + \text{tang. L tang. } \frac{1}{2} d\,L}$: this expanded by the binomial formula

ſin. $d\,L = (\text{ſin. } \varphi \text{ cof. Z} + 2 \text{ ſin.}^2 \frac{1}{2}\varphi \text{ tang. L})(1 - \text{tang. L tang. } \frac{1}{2} d\,L \ldots.)$

Since $d\,L$ is very ſmall, the tang. $d\,L$ may, without ſenſible error, be taken = ſin. $\frac{1}{2} d\,L = \frac{1}{2}$ ſin. $d\,L$: then the preceding formula becomes

tang. $\frac{1}{2} d\,L = (\frac{1}{2} \text{ſin. } \varphi \text{ cof. Z} + \text{ſin.}^2 \frac{1}{2}\varphi \text{ tang. L})(1 - \text{tang. L tang. } \frac{1}{2} d\,L + \text{tang.}^2 \text{L tang.}^2 \frac{1}{2} d\,L)$. (1).

Multiplying and rejecting the terms of the third order,

tang. $\frac{1}{2} d\,L = \frac{1}{2}$ ſin. φ cof. Z + ſin.$^2 \frac{1}{2}\varphi$ tang. L − $\frac{1}{2}$ ſin. φ cof. Z tang. $\frac{1}{2} d\,L$ tang. L ....)

Subſtitute for tang. $\frac{1}{2} d\,L$ its approximate value $\frac{1}{2}$ ſin. φ cof. Z: then,

tang. $\frac{1}{2} d\,L = \frac{1}{2}$ ſin. φ cof. Z + ſin.$^2 \frac{1}{2}\varphi$ tang. L − $\frac{1}{4}$ ſin.$^2 \varphi$ cof.^{2} Z tang. L.

But ſince cof. 2 Z = 1 − ſin.^{2} Z;

Tang. $\frac{1}{2} d\,L = \frac{1}{2}$ ſin. φ cof. Z + ſin.$^2 \frac{1}{2}\varphi$ tang. L − $\frac{1}{4}$ ſin.^{2} φ tang. L − $\frac{1}{4}$ ſin.$^2 \varphi$ cof.^{2} Z tang. L.

But $\frac{1}{4}$ ſin.$^2 \varphi =$ ſin.$^2 \frac{1}{2}\varphi$, nearly: hence,

Tang. $d\,L = \frac{1}{2}$ ſin. φ cof. Z. + $\frac{1}{4}$ ſin.$^2 \varphi$ ſin.^{2} Z tang. L; (2)

hence, tang. $d\,L$ or $d\,L = \text{ſin. } \varphi \text{ cof. Z} + \frac{1}{2}\text{ſin.}^2 \varphi \text{ ſin.}^2 \text{Z tang. L}$
$= \varphi \text{ cof. Z} + \frac{1}{2}\varphi \text{ ſin. } \varphi \text{ ſin.}^2 \text{Z tang. L.}$

$d\,L$ expreſſes the difference of the parallels paſſing through the two extremities of the arc φ; for a more exact value, we may in the expanſion of equation (1) preſerve the terms of tang.^{2} L. We ſhall find ſin. $d\,L = \text{ſin. } \varphi \text{ cof. Z} + \frac{1}{2}$ ſin.$^2 \varphi$ ſin.^{2} Z tang. L $- \frac{1}{2}$ ſin.$^3 \varphi$ cof. Z − ſin.^{2} Z tang.^{2} L.

But by the reſolution of the triangles, the chord of φ is given: ſo that,

ſin. $d\,L = \text{K cof. } \frac{1}{2}\varphi \text{ cof. Z } (1 + \text{tang. } \frac{1}{2}\varphi \text{ ſin. Z tang. Z tang. L} - 2 \text{ ſin. } \frac{1}{2}\varphi \text{ ſin.}^2 \text{Z tang.}^2 \text{L}).$

This is the value of ſin. $d\,L$ expreſſed in terms of the ſame meaſure as the chord K: for to have $d\,L$ itſelf, to this expreſſion muſt be added the exceſs of the arc above the ſign, or,

$$\tfrac{1}{6} \text{ſin.}^3 d\,L = \tfrac{1}{6}\left(\frac{(\text{K cof. } \frac{1}{2}\varphi \text{ cof. Z})^3}{\rho^2}\right);$$

ρ being the radius of the earth in toiſes, fathoms, or metres.

Alſo $\frac{1}{6}$ fin.^{3} d L $=$ $\frac{3}{2}$ (K fin.^{2} $\frac{1}{2}\varphi$ cof.^{2} $\frac{1}{2}\varphi$ cof.^{3} Z).
Hence,
d L $=$ K cof. $\frac{1}{2}\varphi$ cof. Z (1 + tang. $\frac{1}{2}\varphi$ fin. Z tang. Z tang. L $-$ 2 fin. $\frac{1}{2}\varphi$ tang. $\frac{1}{2}\varphi$ fin.^{2} Z tang.^{2} L $+$ $\frac{2}{3}$ fin.^{2} $\frac{1}{2}\varphi$ cof.^{2} Z).

And finally,
L$'$ $=$ L $-$ d L $=$ L $-$ (φ cof. Z $+$ $\frac{1}{2}\varphi$ fin. φ fin.^{2} Z tang. L)
Such is the approximate value of the latitude of the point B. Now to take into conſideration the eccentricity, we muſt recollect that the exact latitude of B $=$ 90° $-$ P C B; but ſince PCB $=$ PMB $-$ NBM, and PMP $=$ 90° $-$ L$'$ $-$ (L $-$ d L), it follows that the exact latitude B $=$ L $-$ d L $-$ $\downarrow$.

Subſtitute for d L its value found above, and for $\downarrow$ its value as alſo above determined.

Then denoting the exact latitude by L$'$, we ſhall have L$'$ $=$ L $-$ (φ cof. Z $+$ $\frac{1}{2}\varphi$ fin. φ fin.^{2} Z tang. L) (1 $+$ e^2 cof.^{2} L $+$ $\frac{3}{2}$ e^2 fin. d L fin. L cof. L).

In this formula the term $\frac{3}{2}$ e', &c. may be neglected; then the factor of d L will be reduced to (1 $+$ e^2 cof.^{2} L). As to the quantity φ, it ſhould be expreſſed in ſeconds, and it has already been ſhewn that if K repreſent the chord of an arc, φ will be equal to $\frac{\text{K R}''}{\text{normal}}$.

Proceeding to find the azimuth Z$'$, or that of the point A on the horizon of B, the triangle P A B gives this equation:

$$\text{Tang. } \tfrac{1}{2}(\text{B} + \text{A}) = \frac{\text{cot. } \frac{1}{2}\text{P cof. } \frac{1}{2}(\text{P B} - \text{P A})}{\text{cof. } \frac{1}{2}(\text{P B} + \text{P A})} = \frac{\text{cot. } \frac{1}{2}\text{P cof. } \frac{1}{2}(\text{L} - \text{L}')}{\text{cof. } (180° - (\text{L} + \text{L}'))} = \frac{\text{cot. } \frac{1}{2}\text{ P cof. } \frac{1}{2}(\text{L} - \text{L}')}{\text{fin. } \frac{1}{2}(\text{L} + \text{L}')}$$

and ſince cot. $= \frac{1}{\text{tang.}}$.

Cot. $\frac{1}{2}$(B + A) $=$ tang. (90° $-$ $\frac{1}{2}$(B + A)) $=$ $\frac{\text{tang. } \frac{1}{2}\text{P fin. } \frac{1}{2}(\text{L} + \text{L}')}{\text{cof. } \frac{1}{2}\text{ L} - \text{L}}$.

As 90° $-$ $\frac{1}{2}$(B + A) and P are always very ſmall angles:

$$90° - \tfrac{1}{2}(\text{B} + \text{A}) = \frac{\frac{1}{2}\text{P fin. } \frac{1}{2}(\text{L} + \text{L}')}{\text{cof. } \frac{1}{2}(\text{L} - \text{L})}:$$

$$\text{and, B} = (180 - \text{A}) - \frac{\text{P fin. } \frac{1}{2}(\text{L} + \text{L}')}{\text{cof } \frac{1}{2}(\text{L} - \text{L}')} = \text{Z} - \frac{\text{P fin. } \frac{1}{2}(\text{L} + \text{L}')}{\text{col. } \frac{1}{2}(\text{L} - \text{L}')}.$$

This formula gives the direction B A reckoned north; if it be ſouth of the weſt, we muſt add 180°, and then,

$$\text{Z}' = 180° + \text{Z} - \frac{\text{P fin. } \frac{1}{2}(\text{L}' + \text{L})}{\text{cof. } \frac{1}{2}(\text{L} - \text{L}')}.$$

The ſame triangle gives,

$$\text{fin. P} = \frac{\text{fin. A B fin. A}}{\text{cof. L}'} = \frac{\text{fin. } \varphi \text{ fin. Z}}{\text{cof. L}} \quad (3).$$

From whence may be deduced,

$$\text{Z}' = 180° + \text{Z} - \frac{\text{fin. } \varphi \text{ fin Z fin } \frac{1}{2}\text{L} + \text{L}'}{\text{cof. } \frac{1}{2}(\text{L} - \text{L}') \text{ cof. L}'}$$

$$= 180° + \text{Z} - \frac{\varphi \text{ fin. Z } \frac{1}{2}(2\text{L}' + d\text{ L})}{\text{cof. L}' \text{ cof. } \frac{1}{2} d\text{ L}}$$

$$= 180° + \text{Z} - \frac{\varphi \text{ fin. Z}}{\text{cof. } \frac{1}{2} d\text{L}} \left(\frac{\text{fin. L}' \text{cof. } \frac{1}{2} d\text{L} + \text{fin. } \frac{1}{2} d\text{L cof. L}'}{\text{cof. L}'} \right)$$

$$= 180° + \text{Z} - \varphi \text{ fin. Z tang. L}' - \varphi \text{ fin. Z tang. } \tfrac{1}{2} d\text{ L}:$$

for d L ſubſtitute its value (2), we ſhall have (rejecting the terms of the third order) ſince 2 fin. Z cof. Z $=$ fin. 2 Z,
Z$'$ $=$ 180 $+$ Z $-$ φ fin. Z tang. L$'$ $-$ $\frac{1}{4}$ φ fin. φ fin. 2 Z.

This is the azimuth of A, ſeen on the horizon of B, to which there is nothing to add for the ellipticity of the earth, the effect of which is inſenſible.

As to the longitude M$'$ of the point B, it is clear that it reſults from equation (3); for if M $=$ longitude of A; P $=$ M$'$ $-$ M.

And fin. P, or fin. (M$'$ $-$ M) $=$ $\frac{\text{fin. } \varphi \text{ fin. Z}}{\text{cof. L}'}$,

or nearly exact M$'$ $=$ M $+$ $\frac{\varphi \text{ fin. Z}}{\text{cof. L}'}$.

If in this expreſſion for L$'$ we ſubſtitute its approximate value L $-$ φ cof. Z

$$\text{M}' = \text{M} + \frac{\varphi \text{ fin. Z}}{\text{cof. (L} - \varphi \text{ cof. Z)}}.$$

Expanding the denominator, and conſidering φ cof. Z as a ſmall arc,

$$\text{M}' = \text{M} + \frac{\varphi \text{ fin Z}}{\text{cof. L (1} + \varphi \text{ cof. Z tang. L}} = \text{M} + \frac{\varphi \text{ fin Z}}{\text{cof. L}} (1 - \varphi \text{ cof. Z tang. L}).$$

And, finally, M$'$ $=$ M $+$ $\frac{\varphi \text{ fin. Z}}{\text{cof. L}}$ $-$ $\frac{1}{2}\varphi^2$ fin. 2 Z $\frac{\text{tang. L}}{\text{cof. L}}$.

To recapitulate the preceding reſults;
let ρ $=$ radius of the equator,
e $=$ eccentricity,
φ $=$ the arc expreſſed in ſeconds, correſponding with the chord K of a terreſtrial arc, which is one ſide of the triangle,
L $=$ the latitude known of one extremity of the chord K,
L$'$ $=$ the latitude ſought of the other,
M $=$ the longitude known, } reckoned from the ſouth to
M$'$ $=$ the longitude ſought, } the weſt, from 0 to 360,
Z $=$ the azimuth known, }
Z$'$ $=$ the azimuth ſought, } reckoned the ſame.

$$\varphi = \frac{\text{K}}{\rho \text{ fin. } 1''} (1 - \tfrac{1}{2} e^2 \text{ fin.}^2 \text{ L}). \quad (a)$$

$$\text{L}' = \text{L} - (\varphi \text{ cof. Z} + \tfrac{1}{2} \varphi \text{ fin. } \varphi \text{ fin.}^2 \text{ Z tang. L}) (1 + e^2 \text{ cof.}^2 \text{ L}). \quad (b)$$

$$\text{Z}' = 180 + \text{Z} - \varphi \text{ fin. Z tang. L}' - \tfrac{1}{4} \varphi \text{ fin. } \varphi \text{ fin. 2 Z}. \quad (c)$$

$$\text{M}' = \text{M} + \varphi \frac{\text{fin. Z}}{\text{cof. L}'} = \text{M} + \frac{\varphi \text{ fin. Z}}{\text{cof. Z}} - \tfrac{1}{2}\varphi^2 \text{fin.}^2 \text{Z} \frac{\text{tang. L}}{\text{col. L}}. \quad (d)$$

d L, or difference of the parallels in terms of the ſtandard meaſure, as toiſes, fathoms, or metres.

d L $=$ (K cof. $\frac{1}{2}\varphi$ cof. Z) $+$ (K cof. $\frac{1}{2}\varphi$ cof. Z) (tang. $\frac{1}{2}\varphi$ fin. Z tang. Z tang. L) $-$ 2 (K cof. $\frac{1}{2}\varphi$ cof. Z) (fin. $\frac{1}{2}\varphi$ tang. $\frac{1}{2}\varphi$ fin.^{2} L tang.^{2} L) $+$
$\frac{\text{(ſum of the three firſt terms)}^3 (1 - e^2 \text{ fin. L})}{6\rho^2}$.

The fourth term of this expreſſion is the exceſs of the arc above the ſine, or $\frac{1}{6}$ $\frac{\text{fin.}^3 d\text{ L}}{r^3}$; here the radius r is that of the earth ſuppoſed ſpherical, if for greater exactneſs we employ the radius of curvature of the arc A B, or $r = \frac{\rho}{(1 - e^2 \text{ fin.}^2 \text{ L})^{\frac{1}{2}}}$, and inſtead of d L, its value found as above, we ſhall have the term in queſtion.

Example I.

Let the latitude of A be equal 48° 50′ 49″.7; log. of AB (79095.6 feet) $=$ 4.8981525 $=$ K; Z the azimuth of AB, or angle A $=$ 13° 3′ 27″, required the latitude of B?

$$\varphi = \frac{\text{K R}''}{\rho} (1 - \tfrac{1}{2} e^2 \text{ fin. }^2\text{L}) \text{ or } = \frac{\text{K R}''}{\rho (1 + e^2 \text{ fin. }^2\text{L.})}$$

Sin.^{2} L	-	-	9.7535410	
e^2	-	-	7.7766329	
0.5	-	-	9.6989700	
			7.2291439	= 0.0010949
			9.992653	= 0.9983051

Brought over	9.9992653	= 0.9985051
K - -	4.8981525	
R″ - -	5.3144251	
Co. log. ρ -	2.6754633	
Log φ -	2.8913042	
Cof. z - -	9.9886204	
758″.446 -	2.8799246	
φ fin. φ { Log. φ²	5.78260	
φ fin. φ { Sin. 1″	4.68557	
Sin.² z -	8.70794	
Tang. L -	0.05850	
0″.17 -	9.23461	

Its $\frac{1}{2}$ = 0.08 + 758″.446 = 758″.52, which multiplied by 1.0026 = (1 + e^2 cof.² L) is the whole difference of latitude = 760″.4 = 12′ 40″.49; and this difference ſubtracted from 48° 50′ 49″.7 (the latitude of A) leaves the latitude of B = 48° 38′ 9″.2.

Example II.

Let AB, the direct diſtance of Dover-caſtle from Greenwich, be 328231, its azimuth (z) 67° 44′ 34″ S. E.; required the latitude of Dover caſtle?

Firſt find $\varphi = \frac{K R''}{\text{normal}}$.

Log. K = - - -	5.5161823
R″ = - - -	5.3144251
Co. log. n = (ρ (1 + $\frac{1}{2}$ e^2 ſin.² L))	2.6786812
Log. φ - - - -	3.5092886
Cof. z - - - -	9.5783707
φ cof. z. = 1223″.64 - -	3.0876593
Log. φ - - -	3.5092886
φ ſin. φ { φ² - - -	7.0185772
φ ſin. φ { Sin. 1″ - -	4.6855749
Sin.² z - - -	9.9327456
Tang. L - -	0.0990500
Log. 0.5 - - -	9.6989700
$\frac{1}{2}$ φ ſin. φ ſin.² z tang. L = 27.″22 =	1.4349177
1223″.64 + 27″.22 = 1250.86 its log = - - -	3.0972089
Log. 1 + e^2 cof.² L = 1.002319, (Table IX.) = - -	0.0010054
Difference of latitude 20′ 53″.73 = 1253.73 = - -	3.0982143

Which taken from the latitude of Greenwich, leaves 51° 7′ 46″.27.

In a very large triangle, as in this example, the ſecond part of the formula of Delambre is not ſufficiently exact. Inſtead of tang. L, we ſhould ſubſtitute tang. L′, or tang. of the point A′; and for greater exactneſs, the ſum of the two corrections ſhould be multiplied by the whole expreſſion (1 + e^2 cof.² L + $\frac{3}{2}$ e^2 ſin. d L, ſin. L, cof. L). See Table IX.

If the tang. L′ be taken, the ſum of the two corrections is 1223″.64 + 26″.89 = 1250″.53.

Log. 1250.53 - - -	3.0970941
.002319 = e^2 cof.² L, Tab. VII	7.3701428
.000026 = $\frac{3}{2}$ ſin. d L, Tab. IX	
.002345	
Cor. 2″.93 - =	0.4672369

This is to be added to 1250″.53
2 93

1253.46 = 20′ 53″.46 = the difference of latitude required.

Example III.

Given latitude A, (Dunnoſe) = 50° 37′ 8″
A B = K = 140580 = 5.1479235,
Z = 20° 58′ 39″ N. E.
Required latitude B, (Butſer-hill)?

Log. φ = $\frac{K R''}{n}$ - =	3.1410338
Cof. z - - =	9 9702169
1291″.97 =	3.1112507
Log. φ² - - =	6 2820676
Sin. 1″ - - =	4.6855749
Sin.² Z - - =	9.1077694
Tang. L - - =	0 0912864
Log. 0.5 - - =	9.6989700
0″.733 =	9.8656683
1291″.97 + 0″.73 = 1291″.24	3.1110070
e^2 cof.² L, &c. Tab. VII. and IX.	7.3861421
Correction - 3″141 =	0.4971491

Which added to 1291.24, gives the difference of latitude required - - 1294″.38
= 21′ 34″.38

Example IV.

Let A, latitude of Dunnoſe = 50° 37′ 8″.
Z = 81° 56′ 53″.
A B = 339398.
Required the latitude of B, Beachy-head?

Log. K - =	5.5307092
$\frac{R''}{n}$ - - =	7.9931255
Log. φ - =	3.5238347
Cof. Z - -	9.1463479
467.93 =	2.6701826

Log.

Log. φ^2	-	7.0476694
Sine 1″	-	4.6855749
Sin.² Z	-	9.9913940
Tang. L′	-	0.0875019
Log. 0.5	-	9.6989700
Cor.	32″.44	1.5111102

467″.93 − 32″.44 = 435″.49 = 2.6389782
e^2 col.² L - - 7.3845326

Cor. - 1″.105 = 0.0235108

Difference of latitude = 435″.49 + 1″.10 = 436.6.

To find Z′ or azimuth of Dunnose, as seen from Beachy-head.

$Z' = 180 + Z\ \varphi$ fin. Z. tang. L $- \frac{1}{3}\varphi$ fin. φ, fin.² Z.

φ	3.5238228	Log. $\frac{1}{4}$	9.39794
Sin. Z	9.9956970	φ^2 -	7.04764
Tang. L′	0.0876046	Sin. 1″	4.68557
		Sin.² Z	9.44351
4046.9	= 3.6071244		0.57466
		− 3″.75	

4046″.9 − 3.7 = 4043″.2 = 1° 7′ 23″.2.

If Z = 98° 3′ 7″, − Z′ = 96° 55′ 43″.8, which is 14″.2 less than the observed azimuth. See Trigon. Survey.

If we suppose the observed azimuth to be correct, namely, 96° 55′ 58″, it would follow, that we have made an erroneous supposition of the value of the normal. The above formula should correct this error, and give the true value.

For φ fin. Z, tang. L′ is equal to 4032.7 instead of 4046.9; hence log. φ = 3.5222943.

But $\varphi \frac{R'' K}{\text{normal}}$ ∴ normal = $\frac{K R''}{\varphi}$

K	-	= 5.5307092
R″	-	= 5.3144251
Co. log. φ		= 6.4777057
Log. n	-	= 7.3228400
$\frac{R''}{3600}$	-	= 1.7581226

Feet. Fathoms.
5.5647174 = 367043 = 61174 = the length of a degree perpendicular to the meridian.

A difference of 5″ in the value of Z′ will produce an error of 47 fathoms in the length of the perpendicular degree.

Example V.

Given AB = K = 140580.4.
Z = 20° 58′ 39″.
L = 50 37 8 = Lat. of A.

Required the distance between the parallels of A and B, Dunnose and Butser-hill.

Log. K = 5.1479235
R″ × co. log. norm. = 7.9931145
3.1410380 = 23′ 3″.6
$\frac{1}{2}\varphi$ = 11 31.8

Cof. $\frac{1}{2}\varphi$	-	= 9.9999982
K	-	= 5.1479235
Cof. Z	-	= 9.9702169
I.	- -	131259 = 5.1181386

Tang. $\frac{1}{2}\varphi$	-	= 7.5256826
Sin. Z	-	= 9.5538847
Tang. Z	-	= 9.5836737
Tang. L	-	= 0.0857325
		6.7489735
		5.1181306
II.	- -	73.64 = 1.8671041

Sin. $\frac{1}{2}\varphi$	-	= 7.5256801
Tang. $\frac{1}{2}\varphi$	-	= 7.5256826
Sin.² L	-	= 9.7763016
Tang.² L	-	= 0.1714650
		4.9991293
Log. 2	-	= 0.3010300
Log. K $\frac{1}{2}\varphi$ cof. Z		5.1181306
III.	- -	2.619 = 0.4182899

Log. 3. first terms = 5.1186154

× 3	- -	= 5.3558462
Co log. 6	-	= 9.2218487
Co log. Rad.²		= 5.3594627
IV.	- - -	0.86 = 9.9371576

I.	- -	131259
II.	- −	73.6
III.	- +	2.62
IV.	- +	0.86
		131188.9

Example VI.

To find the difference between the parallels of Beachy-head and Dunnose.

I. (K cof. $\frac{1}{2}\varphi$ cof. Z).
II. + (K cof. $\frac{1}{2}\varphi$ cof. Z) tang. $\frac{1}{2}\varphi$ fin. Z tang. Z tang. L.
III. − 2 (K cof. $\frac{1}{2}\varphi$ cof. Z) fin. $\frac{1}{2}\varphi$ tang. $\frac{1}{2}\varphi$ fin.² L tang.² L.
IV. + $\frac{(\text{Sum of 3 first terms})^3}{6 R^2}$.

Log. φ = 3.5238228 = 3340.6 = 55′ 40″.6 = φ = $\frac{K R''}{\text{norm.}}$
$\frac{1}{2}\varphi$ = 27 50.3

K	-	= 5.5307092
Cof. Z	-	= 9.1463479
Cof. $\frac{1}{2}\varphi$	-	= 9.9999858
I.	- -	47538.3 = 4.6770429

Tang. $\frac{1}{2}\varphi$		= 7.9043008
Sin. Z	-	= 9.9956970
Tang. Z	-	= 0.8493490
Tang. L	-	= 0.0877597
		8.8411065
Log. (K. cof. $\frac{1}{2}\varphi$ cof. Z)		= 4.6770429
II.	- -	+ 3297.2 = 3.5181494

Sin.

Sin. $\frac{1}{2}\phi$	-	$=7.90828$
Tang. $\frac{1}{2}\phi$		$=7.90830$
Sin.^{2} L	-	$=9.77630$
Tang.^{2} L		$=0.17552$
		5.76840
Log. 2	-	$=0.30103$
		4.67704
III.	- -	$-5.579=0.74647$
Log. 44246		$=4.6458740$
		$\times 3=3.9376220$
Co. Log. 6	-	9.2218487
Co. Log. R^3	-	5.3594627
IV.	- -	$0.033=8.5189334$
I.	- -	47538.3
II.	-	$-$ 3297.2
III.	-	+ 5.6
IV.	-	+ 0.
		44246.6

If ϕ be calculated by the normal, as deduced from actual meaſurement, the term II. will be found = 3287.3, and the total ſum = 44256.5.

Example VII.

Given the latitude of Blackdown, 50° 41′ 14″.

Z = 85 57 37.25.

Diſtance between { Blackdown and Dunnoſe } K = 314307.5

and the log. of the normal 7.3228977, as deduced from the meaſured perpendicular degree 61182 fathoms;

Required the diſtance between the parallels?

K	- -	$=5.4973541$
R″	- -	$=5.3144251$
Co log. r	-	$=2.6771022$
$\phi=3082.4$		$=3.4888814$
$\frac{1}{2}\phi=1542.2$		
25′ 41″.2.		
K	- -	$=5.4973541$
Cof. z	-	$=8.8478695$
Cof. $\frac{1}{2}\phi$	-	$=9.9999879$
I.	- -	$22141.7=4.3452115$
Tang. $\frac{1}{2}\phi$	-	$=7.8733848$
Sin. z	-	$=9.9989198$
Tang. z	-	$=1.1510505$
Tang. L.	-	$=0.0867896$
		9.1101447
		4.3452115
II.	- -	$2853.3=3.4553562$

Sin. $\frac{1}{2}$	-	$=7.87337$
Tang. $\frac{1}{2}\phi$	-	$=7.87338$
Sin.^{2} L	-	$=9.77714$
Tang.^{2} L	-	$=0.17358$
		5.69747
Log. 2		$=0.30103$
		4.34321
III.	- -	$2.20=0.34371$
I.	-	22141.7
II.	-	+ 2853.3
III.	-	$-$ 2.2
		24992.8

To find the difference of longitude $= \phi \frac{\text{fin. Z}}{\text{cof. L}'}$.

ϕ	-	$=3.4888814$
Sin. Z	-	$=9.9989198$
Co-cof. L′		$=0.1975851$
4847.7	-	$=36853863$
$=1^\circ\ 20'\ 47''.7$		

To find the azimuth of Blackdown, as ſeen from Dunnoſe. $Z' = Z - \phi \text{ fin. } Z \text{ tang. } L' - \frac{1}{4}\phi \text{ fin. } \phi \text{ fin. } 2Z$.

ϕ	-	$=3.4888814$
Sin. Z	-	$=9.9989198$
Tang. L′		$=0.0857319$
-3745.7	-	$=3.5735331$
$\frac{1}{4}$	- -	$=9.39794$
ϕ^2	- -	$=6.97776$
1″	- -	$=4.68557$
Sin. 2 Z	-	$=9.14781$
+ 1.61	-	$=0.20908$

Total difference = 3744″.1 = 1° 2′ 24″.1

which taken from - 85 57 37.2

84 55 13.1

Example VIII.

Given lat. A, Dunnoſe, 50° 37′ 8″

Z - 84 54 53

A B = K - 314307.5, as in the laſt example: Required the diſtance between the parallels?

K	$=5.4973541$
Cof. Z	$=8.9476719$
Cof. $\frac{1}{2}\phi$	$=9.9999879$
27862.1	$=4.4450139$
Tang. $\frac{1}{2}\phi$	$=7.8733848$
Sin. Z	$=9.9982871$
Tang. Z	$=1.0506653$
Tang. L	$=0.0857319$
	9.0080691

Brought

Brought over	9.0080691
	4.4450139
$-2838.4 =$	3.4530830
Tang. $\frac{1}{2}\phi =$	7.8733848
Sin. $\frac{1}{2}\phi =$	7.8733735
Tang.^{2} L $=$	0.1704638
Sin.^{2} L $=$	9.7762948
	5.69351
Log. 2 $-$	0.30103
	4.44501
$+ 2.75 =$	0.43955

I	-	27862.1
II	$-$	2838.4
III	$+$	2.75
		25026.4

Example IX.

Let Z in the laft example be fuppofed 84° 55′ 13″, as it is found by example VI.

K	$=$ 5.4973541
Cof. Z	$=$ 8 9471485
Cof. $\frac{1}{2}\phi$	$=$ 9.9999879
27829	$=$ 4.4444905
Tang. $\frac{1}{2}\phi =$	7.8733848
Sin, Z	$=$ 9.9982909
Tang. Z	$=$ 1.0511425

Brought over	1.0511425
Tang. L	$=$ 0.0857319
	9.0085501
	4.4444905
$- 2838.3 =$	34530406
$+$	2.7 as in laft example
	2835.6
	27829.9
	24993.4

Theſe formulæ, though only approximative, are, nevertheleſs, capable of extreme accuracy. They are, in fact, both identical, only differing in their mode of application. They both imply the reſolution of two right-angled ſpheroidical triangles. In the firſt method, the triangle A A′ B (*fig.* 66.) is ſuppoſed previouſly reſolved; and the formula only relates to the ſecondary triangle B′ A′ B, in which the ſide A′ B′ is found ſubject to a certain correction, ariſing from having computed it with too long a radius; and, therefore, it has been made a part of too large a ſphere, and, of courſe, its proportionate part in minutes or ſeconds too ſmall; its correction is ($e^2\, d$ L, cof.^{2} L $+ \frac{3}{2}\, e^2\, d$ L, ſin. d L); but in ſo ſmall an arc as A′ B′, the firſt term is quite ſufficient. In the ſecond method, we reſolve each triangle ſeparately, and find the arcs A A′ and A′ B′, each ſubject to the error above-mentioned, which may be very conſiderable in the firſt triangle, if it be of great extent; and, therefore, the ſecond part of the correction (for which we have calculated Table IX.) ſhould be applied.

The following example ſhews the analogy between the two formulæ.

Given lat. A $= 51° 28' 40''$
Z $= 67\ 44\ 34$

	Feet.	
$x =$	124322	Log. 5.0945480
$y =$	303775	5.4825500
A B $=$	328231	5.5161773

Required latitude B (Dover-caſtle.)

Log. x	-	5.0945480	-	K	$=$	5.5161773
Table VI. $\frac{R''}{r}$	$=$	7.9941230	-	Table II.	$=$	7.9931065
		3.0886710 $= 1226''.5$	-	ϕ	$=$	3.5092838
			-	Cof. Z	$=$	9.5783704
				3.0876532	$=$	1223″.64
				e^2 cof.^{2} L $=$		7.37014
				0.45779	$=$	2.87
						1226.51

Log. y^2	-	0.9651000	-	ϕ^2	$=$	7.0185676
Tab. III.	-	0.3707725	-	Sin. 1″	$=$	4.6855749
Tang. L.	-	0.0937600	-	Sin.^{2} Z	$=$	9.9327456
			-	Tang. L	$=$	0.0937600
		1.4296325 $= 26.892$	-	Log. 0.5	$=$	9.6989700
Table VIII.	-	7.37162 $= e^2$ cof.^{2} L				
			-			1 4296181 $=$ 26″.892
		8.80125 $= 0.06$	-	e^2 Cof.^{2} L $=$		7.37162
						8.80125 $=$ 0″.06

1ſt Cor-

1ſt Cor.	1226.5	= A A′		1ſt Cor.	1223″.64	= A A′
2d Cor.	26.89	= A′B′		2d Cor.	2.87	
3d Cor.	0.06			3d Cor.	26.89	= A′ B′
				4th Cor.	0.06	
	1253.45	= 20′ 53″.45			1253″.46	= 20′ 53″.46

Uſe of the Formula.

$$R'' \frac{x}{r} - \tfrac{1}{4} R'' \left(\frac{e^2}{1-e^2}\right) \text{ſin. } 2l \frac{x^2}{rn} = l - L'.$$

If, in the above example, we wiſh to find the value A A′ by the above formula, it is eaſy to compute it for one central ſituation, as Greenwich. The following rule will be the reſult. To the log. of the number of feet in

A A′ - - - - -	=	5.0945480
Add. conſtant. log. $\left(\frac{R''}{r}\right)$ -	=	7.9941110
Which gives Part I. = 1226″.47	=	3.0886590
To double the log. x -	=	0.1890960
Add. conſt. log. - -	=	8.3158923
Which gives Part II. = + 0.032	=	8.5049883

If A′ is ſouth, Part II. is additive.

A′ is north, Part II. is ſubtractive.

In this caſe, A A′ = 1226.47 + 0.03 = 1226.5, as found above in the laſt example. This method, though founded on a complex formula, is very eaſy and convenient in practice. The conſtant log. is thus found:

Log. $\frac{3}{4}$ - - -	=	9.8750612
$\frac{e^2}{1-e^2}$ - - -	=	7.7792374
R″ - - -	=	5.3144251
Co.-log. n - -	=	2.6786810
Co.-log. r - -	=	2.6796860
$l = 51° 28' 40'' = \text{Sin. } 2l$	=	9.9888016
		8.3158923

If the radius of curvature be required to an arc making an angle V′ with the meridian, it may be found thus:

Rad. of curv. $R = \frac{r+n}{2} - \frac{n-r}{2}$ cof. 2 V′, r being the rad. of curvature to the meridian, and n the normal; or, more exactly,

$$R = \frac{m\frac{r+n}{2} + \frac{n-r}{2} \text{ cof. } 2V'}{(r+n)^2}$$

V′ being the angle which the required arc makes with the perpendicular to the meridian.

In the uſe of theſe formulæ, it ſhould be obſerved, that in the above examples we have taken the elements for calculation, ſuch as are derived from the admiſſion of one hypotheſis applied to every portion of the globe. But from the various anomalies that have occurred in the courſe of the great trigonometrical ſurveys above related, it appears that this hypotheſis muſt be modified, if we wiſh to adapt our calculations to partial ſurveys. For we have ſeen in the preceding examples, that to reduce the ſides of the triangles, as given in linear meaſure, to an expreſſion in terms of the arc, it is neceſſary to know preciſel the radius of curvature to which each reſpective arc ſhould be adapted. Upon the ſuppoſition then of the earth being of ſome irregular figure, or that certain irregularities in the denſity of its ſtrata produce the ſame effect, by the deflection of the plumb-line, from the poſition it would otherwiſe aſſume; in either caſe, we may apply the formulæ above demonſtrated to practice, by chooſing ſuch an ellipſoid, as ſeems beſt adapted to the particular country on which the ſurvey is performed. It is upon this oſculatory ellipſoid that our calculations muſt be made, if we wiſh to determine the true latitudes and longitudes of places, as will moſt probably agree with accurate aſtronomical obſervation.

Thus, in the trigonometrical ſurvey, we find that by meaſuring an arc perpendicular to the meridian, the poſitions of ſeveral points were determined in a great meaſure independent of any hypotheſis. And this is the more neceſſary when a meredian line is interrupted, as is the caſe between Dunkirk and Dunnoſe, when we wiſh to conſider the meridian as meaſured in England as a continuation of that meaſured in France. In ſecondary ſurveys, where the triangles are ſmall, much of the labour of the preceding calculations may be abridged by rejecting the terms of the formulæ that involve e^2, and thus reducing the whole to ſpherical computation; nor will it often be found neceſſary to calculate the ſpherical exceſs, particularly if attention be paid to Le Gendre's theorem. And indeed the knowledge of the ſpherical exceſs might be always diſpenſed with, if we had only to calculate the triangles of the ſtations: but the caſe is different with the triangles which are decompoſed by the meridian line which paſſes through them. In theſe partial triangles, one ſide and two angles are uſually given, from which the third angle is to be deduced by ſubtracting it from 180°; the angles thus determined will be erroneous, if this correction be neglected.

The computed latitudes and longitudes will be but little affected by the omiſſion; but the correction ſhould be attended to, when the difference between the parallels is required with great exactneſs.

But it is very doubtful, if any one hypotheſis can be extended to a conſiderable diſtance from the place of actual obſervation. In example IV. it may be ſeen in what manner the longitude of Dunnoſe was found relatively to Beachyhead, by azimuthal obſervations at each ſtation; and the other longitudes weſtward are computed on a ſuppoſition that a degree of a great circle perpendicular to the meridian continues of the ſame magnitude in a given latitude. But from example IX. and X. taken from the next great triangle weſtward, it appears highly probable that the value of the degree on the perpendicular ſuddenly diminiſhes, and that the ſame irregularities take place in that direction, as have been obſerved in proceeding to the north. From all theſe conſiderations it follows, that the latitudes and longitudes of places, as referring to certain aſtronomical poſitions, can no longer be conſidered as accurate expreſſions to deſignate the relative ſituations of places on the earth. We think therefore that it would be adviſable, in geographical ſurveys of large extent, that the relative latitudes and longitudes to ſome central point ſhould be calculated by the above formulæ or other equivalent methods, and that theſe ſhould be conſidered as

mean latitudes and longitudes. From a careful comparifon of thefe with the aftronomical pofitions obtained by other means, we may expect to derive a more accurate knowledge of the irregularities in the figure of the earth.

There are many individuals in this country, who poffefs inftruments capable of making geodetical obfervations fufficiently accurate to throw great light upon this curious fubject. The great furvey fhould ferve as a bafis. The obferver, by means of the known objects already determined, might afcertain the pofition of any other ftation, and calculate trigonometrically its diftance from the meridian, and perpendicular of Greenwich; he fhould then determine the latitude aftronomically, and compare it with that deduced from computation, according to the rules already explained. It was to facilitate obfervations of this kind, and to induce the poffeffors of fuch inftruments to employ them, that we have allotted fo large a fpace to this fubject.

The formulæ we have made ufe of in the foregoing examples were intended only for obferved triangles, but they may be applied without fenfible error to a triangle of very conficerable extent; but ftill it fhould be remembered, that the fuppofitions upon which they are founded are not ftrictly true, for the fides of thefe triangles are lines connecting two given points by the fhorteft diftance over the furface of a fpheroid, and are in fact curve lines of double curvature, except in the cafe of their coincidence with the meridian or equator, that is, their extreme elements are not in the fame plane. Thefe and other confiderations of a fimilar nature, have no fenfible influence on any practical rule, we fhall therefore not enter into them any farther at prefent, but refer them to FIGURE *of the Earth*, to which article they more properly belong.

It is of great importance, in a trigonometrical furvey, to know the relative heights of the ftation above the level of the fea: for this purpofe it is neceffary to obferve the apparent depreffion of one ftation as feen from the other. For the method of making this obfervation and applying the requifite corrections, fee DEPRESSION.

A TABLE to convert Sexageſimal into Decimal Degrees.

°				°				°			
1	1	11	11.11	31	34	44	44.44	61	67	77	77.78
2	3	22	22.22	32	35	55	55.56	62	68	88	88.89
3	3	33	33.33	33	36	66	66.67	63	70	00	00.00
4	4	44	44.44	34	37	77	77.78	64	71	11	11.11
5	5	55	55.56	35	38	88	88.89	65	72	22	22.22
6	6	66	66.67	36	40	00	00.00	66	73	33	33.33
7	7	77	77.78	37	41	11	11.11	67	74	44	44.44
8	8	88	88.89	38	42	22	22.22	68	75	55	55.56
9	10	00	00 00	39	43	33	33.33	69	76	66	66.67
10	11	11	11.11	40	44	44	44.44	70	77	77	77.78
11	12	22	22.22	41	45	55	55.56	71	78	88	88.89
12	13	33	33.34	42	46	66	66.67	72	80	00	00.00
13	14	44	44.45	43	47	77	77.78	73	81	11	11.11
14	15	55	55.56	44	48	88	88.89	74	82	22	22.22
15	16	66	66.67	45	50	00	00.00	75	83	33	33.33
16	17	77	77.78	46	51	11	11.11	76	84	44	44.44
17	18	88	88.89	47	52	22	22.22	77	85	55	55.56
18	20	00	00.00	48	53	33	33.33	78	86	66	66.67
19	21	11	11.10	49	54	44	44.44	79	87	77	77.78
20	22	22	22.22	50	55	55	55.56	80	88	88	88.89
21	23	33	33.33	51	56	66	66.67	81	90	00	00.00
22	24	44	44.44	52	57	77	77.78	82	91	11	11.11
23	25	55	55.56	53	58	88	88.89	83	92	22	22.22
24	26	66	66.68	54	60	00	00.00	84	93	33	33.33
25	27	77	77.79	55	61	11	11.11	85	94	44	44.44
26	28	88	88.89	56	62	22	22.22	86	95	55	55.56
27	30	00	00.00	57	63	33	33.33	87	96	66	66.67
28	31	11	11.11	58	64	44	44.44	88	97	77	77.78
29	32	22	22.22	59	65	55	55.56	89	98	88	88.89
30	33	33	33 33	60	66	66	66.67	90	100	00	00.00

′	°	″	° ′
1	0.018518	1	0.000308
2	0.037037	2	0.000617
3	0.055556	3	0.000925
4	0.074074	4	0.001234
5	0.092592	5	0.001543
6	0.111111	6	0.001851
7	0.129629	7	0.002159
8	0.148148	8	0.002468
9	0.166666	9	0.002777

TABLES for the reduction of Angles obſerved with the repeating Circle.

TABLE I.

Reduction of the Angles to the Horizon.

Argument. $(H+h)$ and $(H-h)$ { Sum and Difference of the Altitude of the Signals.

5000. fin. ver. $(H+h.)$

M.	0°+	1°+	2°+	M.	0°+	1°+	2°+
1	0.000	0.787	3.097	31	0.203	1.751	4.822
2	0.001	0.813	3.148	32	0.217	1.790	4.836
3	0.002	0.839	3.200	33	0.230	1.829	4.951
4	0.003	0.866	3.252	34	0.244	1.869	5.016
5	0.005	0.893	3.305	35	0.259	1.909	5.081
6	0.007	0.921	3.358	36	0.274	1.949	5.147
7	0.010	0.949	3.411	37	0.289	1.990	5.213
8	0.013	0.978	3.465	38	0.305	2.031	5.280
9	0.017	1.007	3.520	39	0.321	2.073	5.347
10	0.021	1.036	3.575	40	0.338	2.115	5.414
11	0.026	1.066	3.630	41	0.355	2.158	5.482
12	0.030	1.096	3.685	42	0 373	2.201	5.550
13	0.036	1.127	3.741	43	0.391	2.244	5.619
14	0.041	1.158	3.798	44	0.409	2.288	5.688
15	0.047	1.190	3.855	45	0.428	2.332	5.758
16	0.054	1.222	3.912	46	0.447	2.376	5.828
17	0.061	1.254	3.970	47	0.467	2.421	5.899
18	0.068	1.287	4.028	48	0.487	2.467	5.970
19	0.076	1.320	4.086	49	0.508	2.513	6.041
20	0.081	1.354	4.145	50	0.529	2.559	6.112
21	0.093	1.388	4.205	51	0.550	2.606	6.184
22	0.102	1.422	4.265	52	0.572	2.653	6.257
23	0.112	1.457	4 325	53	0.594	2.701	6.330
24	0.122	1.492	4.386	54	0.617	2.749	6.403
25	0.132	1.528	4.447	55	0.640	2.797	6.477
26	0.143	1.564	4.508	56	0.663	2.846	6.551
27	0.154	1.601	4.570	57	0.687	2.895	6.626
28	0.166	1.638	4.633	58	0.711	2.945	6.701
29	0.178	1.675	4.695	59	0.736	2.995	6.776
30	0.190	1.713	4.758	60	0.761	3.046	6.852

TABLE II.

Arg. (P + Q, and (P − Q.)

Toiſes. P ± Q	—	Toiſes. P ± Q.	—
0000	0.000	31000	0.056
1000	0.000	32000	0.060
2000	0.000	33000	0.064
3000	0.001	34000	0.068
4000	0.001	35000	0.072
5000	0.001	36000	0.075
6000	0.002	37000	0.080
7000	0.003	38000	0.085
8000	0.004	39000	0.089
9000	0.005	40000	0.094
10000	0.006	41000	0.098
11000	0.007	42000	0.103
12000	0.008	43000	0.108
13000	0.010	44000	0.113
14000	0.011	45000	0.119
15000	0.013	46000	0.124
16000	0.015	47000	0.129
17000	0.017	48000	0.135
18000	0.019	49000	0.146
19000	0.021	50000	0.146
20000	0.023	51000	0.152
21000	0.026	52000	0.158
22000	0.028	53000	0.164
23000	0.031	54000	0.171
24000	0.034	55000	0.177
25000	0.037	56000	0.184
26000	0.040	57000	0.190
27000	0.043	58000	0.197
28000	0.048	59000	0.204
29000	0.050	60000	0.211
30000	0.053		

TABLE III. Sec. H × ſec. *h*.

Arg. H and *h*.

D. M.	0° 0′	0° 30′	1° 0′	1° 30′	2° 0′	2° 30′	3° 0′
	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0 0	00	00	02	03	06	10	14
10	00	01	02	03	06	10	14
20	00	01	02	04	06	10	14
30	00	02	02	04	06	10	14
40	01	02	02	04	07	11	15
50	01	02	03	05	07	11	15
1 0	02	02	03	05	08	11	15
10	02	02	04	06	08	12	16
20	03	03	04	06	09	12	16
30	03	04	05	07	09	13	17
40	04	05	06	08	10	14	18
50	05	05	07	09	11	15	19
2 0	06	06	08	10	12	16	20
10	07	07	09	11	13	17	21
20	08	09	10	12	14	18	22
30	10	10	11	13	16	19	23
40	11	11	12	14	17	20	25
50	12	14	13	16	18	21	26
3 0	14	15	14	17	20	23	27

The cyphers 1.00 at the head of the column are common to all the numbers of the table.

TABLE IV. Argument. Angle to be reduced.

$\left(\frac{0''.0001}{\text{ſin. } 1''}\right)$ Tang. $\frac{1}{2}$ A, and $\left(\frac{0''.0001}{\text{ſin. } 1''}\right)$ Cot. $\frac{1}{2}$ A.

Angle D. M.	Tang. +	Cot. −	D. M.	Angle D. M.	Tang. +	Cot. −	D. M.
	″	″			″	″	
12 0	2.17	196.25	168 0	20 0	3.64	116.98	160 0
10	2.20	193.54	167 50	10	3.67	115.99	50
20	2.23	190.90	40	20	3.70	115.02	40
30	2.26	188.34	30	30	3.73	114.07	30
40	2.29	185.84	20	40	3.76	113.13	20
50	2.32	183.40	10	50	3.79	112.20	10
13 0	2.35	181.04	167 0	21 0	3.82	111.29	159 0
10	2.38	178.72	50	10	3.85	110.39	50
20	2.41	176.37	40	20	3.88	109.51	40
30	2.44	174.27	30	30	3.92	108.64	30
40	2.47	172.12	20	40	3.95	107.79	20
50	2.50	170.03	10	50	3.98	106.94	10
14 0	2.53	167.99	166 0	22 0	4.01	105.11	158 0
10	2.56	165.99	50	10	4.04	105.30	50
20	2.60	164.04	40	20	4.07	104.49	40
30	2.63	162.14	30	30	4.11	103.70	30
40	2.66	160.27	20	40	4.14	102.91	20
50	2.69	158.45	10	50	4.17	102.14	10
15 0	2.72	156.68	165 0	23 0	4.20	101.38	157 0
10	2.75	154.93	50	10	4.23	100.63	50
20	2.78	153.23	40	20	4.26	99.89	40
30	2.81	151.56	30	30	4.29	99.17	30
40	2.84	149.93	20	40	4.32	98.44	20
50	2.87	148.33	10	50	4.35	97.74	10
16 0	2.90	146.77	164 0	24 0	4.38	97.04	156 0
10	2.93	145.23	50	10	4.41	96.35	50
20	2.96	143.72	40	20	4.45	95.67	40
30	2.99	142.26	30	30	4.48	95.00	30
40	3.02	140.82	20	40	4.51	94.34	20
50	3.05	139.40	10	50	4.54	93.68	10
17 0	3.08	138.02	163 0	25 0	4.57	93.04	155 0
10	3.11	136.66	50	10	4.60	92.40	50
20	3.14	135.32	40	20	4.63	91.77	40
30	3.18	134.01	30	30	4.67	91.16	30
40	3.21	132.73	20	40	4.70	90.54	20
50	3.24	131.47	10	50	4.73	89.34	10
18 0	3.27	130.23	162 0	26 0	4.76	89.95	154 0
10	3.30	129.02	50	10	4.79	88.75	50
20	3.33	127.82	40	20	4.82	88.17	40
30	3.36	126.65	30	30	4.86	87.60	30
40	3.39	125.50	20	40	4.89	87.03	20
50	3.42	124.37	10	50	4.92	86.58	10
19 0	3.45	123.26	161 0	27 0	4.95	85.92	153 0
10	3.48	122.17	50	10	4.98	85.37	50
20	3.51	121.09	40	20	5.02	84.83	40
30	3.55	120.04	30	30	5.05	84.30	30
40	3.58	119.00	20	40	5.08	83.77	20
50	3.61	117.93	10	50	5.11	83.25	10
20 0	3.64	116.98	160 0	28 0	5.14	82.74	152 0
	— Cot.	+ Tang.	D. M. Angle		— Cot.	+ Tang.	D. M. Angle

To the conſtant log. 1.31443. Add Tang. $\frac{1}{2}$ A, and Cot. $\frac{1}{2}$ A.

The number anſwering to the ſum will be the number of the Table.

TABLE IV.—*continued.*

Angle D. M.	Tang. +	Cot. −	D. M.	Angle D. M.	Tang. +	Cot. −	D. M.	Angle D. M.	Tang. +	Cot. −	D. M	Angle D. M.	Tang. +	Cot. −	D. M.
	″	″			″	″			″	″			″	″	
28 0	5.14	82.74	152 0	37 0	6.90	61.65	143 0	46 0	8.76	48.59	134 0	55 0	10.74	39.62	125 0
10	5.17	82 22	50	10	6.93	61.35	50	10	8.79	48.39	10	10	10.77	39.48	50
20	5.21	81.71	40	20	6.97	61.06	40	20	8.83	48.20	40	20	10.81	39.34	40
30	5.24	81.12	30	30	7.01	60.77	30	30	8.87	48.01	30	30	10.85	39.20	30
40	5.27	80.73	20	40	7.04	60.48	20	40	8.90	47.82	20	40	10.89	39.06	20
50	5.30	80.24	10	50	7.07	60.19	10	50	8.94	47.63	50	50	10.93	38.92	10
29 0	5.33	79.76	151 0	38 0	7.10	59.90	142 0	47 0	8.97	47.44	133 0	56 0	10.97	38.79	124 0
10	5.36	79.28	50	10	7.13	59.62	50	10	9.00	47.25	50	10	11.00	38.65	50
20	5.40	78.81	40	20	7.17	59.34	40	20	9.04	47.06	40	20	11.04	38.52	40
30	5.43	78.34	30	30	7.21	59.06	30	30	9.07	46.88	30	30	11.08	38.39	30
40	5.46	77.83	20	40	7.24	58.79	20	40	9.11	46.69	20	40	11.12	38.25	20
50	5.49	77.49	10	50	7.27	58.52	10	50	9.14	46.51	10	50	11.16	38.12	10
30 0	5.53	76.98	150 0	39 0	7.30	58.25	141 0	48 0	9.18	46.33	132 0	57 0	11.20	37.99	123 0
10	5.56	76.53	50	10	7 33	57.98	50	10	9.21	46.15	50	10	11.23	37.86	50
20	5.59	76.09	40	20	7.37	57.71	40	20	9.25	45 97	40	20	11.27	37.73	40
30	5.62	75.66	30	30	7.40	57.45	30	30	9.29	45.79	30	30	11.31	37.60	30
40	5.66	75.23	20	40	7.44	57.19	20	40	9.32	45.61	20	40	11.35	37.47	20
50	5.69	74.80	10	50	7.47	56.93	10	50	9.36	45.43	10	50	11.39	37.34	10
31 0	5.72	74.38	149 0	40 0	7.51	56.67	140 0	49 0	9.40	45.26	131 0	58 0	11.43	37.21	122 0
10	5.75	73.96	50	10	7.54	56.42	50	10	9.43	45.08	50	10	11.47	37.08	50
20	5.78	73.55	40	20	7.57	56.17	40	20	9.47	44.91	40	20	11.51	36.96	40
30	5.82	73.14	30	30	7.61	55.92	30	30	9.51	44.71	30	30	11.55	36.83	30
30	5.85	72.73	20	40	7.64	55.67	20	40	9.54	44.57	20	40	11.59	36.71	20
50	5.88	72.33	10	50	7.68	55.42	10	50	9.58	44.40	10	50	11.63	36.58	10
32 0	5.91	71.93	148 0	41 0	7 71	55.17	139 0	50 0	9.62	44.23	130 0	59 0	11.67	36.46	121 0
10	5.94	71.54	50	10	7.75	54.93	50	10	9.65	44.06	50	10	11.71	36.33	50
20	5 98	71.15	40	20	7.78	54.69	40	20	9.69	43.90	40	20	11.75	36.21	40
30	6.01	70.77	30	30	7.81	54.45	30	30	9.73	43.73	30	30	11.79	36.09	30
40	6.04	70.39	20	40	7.85	54.21	20	40	9.76	43.57	20	40	11.83	35.91	20
50	6.07	70.01	10	50	7.88	53.97	10	50	9.80	43.40	10	50	11.87	35.75	10
33 0	6 11	69.63	147 0	42 0	7.92	53.73	138 0	51 0	9.84	43.24	129 0	60 0	11.91	35.73	120 0
10	6.14	69.26	50	10	7.95	53.50	50	10	9.87	43 08	50	10	11.95	35.61	50
20	6.18	68.90	40	20	7.98	53.27	40	20	9.91	42.92	40	20	11.99	35.49	40
30	6.21	68.54	30	30	8.02	53.04	30	30	9.95	42.76	30	30	12.03	35.37	30
40	6.24	68.16	20	40	8.05	52.81	20	40	9.98	42.60	20	40	12.07	35.25	20
50	6.27	67.82	10	50	8.08	52.58	10	50	10.02	42.44	10	50	12.11	35.13	10
34 0	6.31	67 47	146 0	43 0	8.12	52.36	137 0	52 0	10.06	42.29	128 0	61 0	12.15	35.02	119 0
10	6.34	67.12	50	10	8.15	52.14	50	10	10.09	42.13	50	10	12.19	34.90	50
20	6.37	66.77	40	20	8.19	51.92	40	20	10.13	41.98	40	20	12.23	34.79	40
30	6.41	66.43	30	30	8.22	51.70	30	30	10.17	41.82	30	30	12.27	34.67	30
40	6.44	66.09	20	40	8.26	51.48	20	40	10.20	41.67	20	40	12.31	34.56	20
50	6.47	65.75	10	50	8.29	51.26	10	50	10.24	41.52	10	50	12.35	34.44	10
35 0	6.50	65.42	145 0	44 0	8.33	51.05	136 0	53 0	10.28	41 37	127 0	62 0	12.39	34.33	118 0
10	6.54	65.09	50	10	8.36	50.84	50	10	10.31	41.22	50	10	12.43	34.21	50
20	6.57	64.76	40	20	8.40	50.63	40	20	10.35	41.97	40	20	12.47	34.10	40
30	6.60	64.44	30	30	8.43	50.42	30	30	10.39	40.92	30	30	12.51	33 99	30
40	6.64	64.12	20	40	8.47	50.21	20	40	10.43	40.77	20	40	12.56	33.88	20
50	6.67	63.80	10	50	8.50	50.00	10	50	10.47	40.62	10	50	12.60	33.77	10
36 0	6.70	63.48	144 0	45 0	8.54	49.80	135 0	54 0	10.51	40.48	126 0	63 0	12.64	33.66	117 0
10	6.73	63.17	50	10	8.57	49.59	50	10	10.54	40.33	50	10	12.68	33.55	50
20	6.77	62.86	40	20	8.61	49.39	40	20	10.58	40.19	40	20	12.72	33.44	40
30	6.80	62.55	30	30	8.65	49.19	30	30	10.62	40.04	30	30	12.76	33.33	30
40	6.84	62.25	20	40	8.68	48.99	20	40	10.66	39.90	20	40	12.80	33.22	20
50	6.87	61.95	10	50	8.72	48.79	10	50	10.70	39.76	10	50	12.84	33.11	10
0	6.90	61.65	143 0	46 0	8.76	48.59	134 0	55 0	10.74	39.62	125 0	64 0	12 89	33.01	116 0
	−	+	D. M.		−	+	D. M.		−	+	D. M		−	+	D. M.
	Cot.	Tang.	Angle		Cot.	Tang.	Angle		Cot.	Tang.	Angle		Cot.	Tang.	Angle

TABLE IV.—*continued.*

Angle D. M.	Tang. +	Cot. −	D. M.	Angle D. M.	Tang. +	Cot. −	D. M.	Angle D. M.	Tang. +	Cot. −	D. M.
	"	"			"	"			"	"	
64 0	12.89	33.01	116 0	73 0	15.26	27.87	107 0	82 0	17.93	23.73	98 0
10	12.93	32.90	50	10	15.30	27.78	50	10	17.98	23.66	50
20	12.97	32.80	40	20	15 35	27.70	40	20	18.03	23 59	40
30	13.01	32.69	30	30	15.40	27.62	30	30	18.09	23.52	30
40	13.05	32.58	20	40	15 44	27.53	20	40	18.14	23 45	20
50	13.09	32.48	10	50	15 49	27.45	10	50	18.19	23.38	10
65 0	13 14	32.38	115 0	74 0	15.54	27.37	106 0	83 0	18.25	23.31	97 0
10	13.18	32.28	50	10	15.58	27.28	50	10	18.30	23.24	50
20	13.22	32.17	40	20	15.63	27.20	40	20	18.35	23.17	40
30	13.26	32.07	30	30	15.68	27.12	30	30	18.40	23.11	30
40	13.30	31.97	20	40	15.73	27 04	20	40	18.46	23.04	20
50	13.34	31 87	10	50	15.78	26.96	10	50	18.51	22.97	10
66 0	13.39	31.76	114 0	75 0	15 83	26.88	105 0	84 0	18.57	22.91	96 0
10	13.43	31.66	50	10	15.87	26.80	50	10	18.62	22.84	50
20	13 47	31.56	40	20	15 92	26.72	40	20	18.68	22.77	40
30	13.52	31.46	30	30	15.97	26.64	30	30	18.73	22.70	30
40	13.56	31.36	20	40	16.01	26.56	20	40	18.79	22.63	20
50	13.60	31.26	10	50	16.06	26.48	10	50	18 84	22.56	10
67 0	13.65	31.16	113 0	76 0	16.11	26.40	104 0	85 0	18 90	22.50	95 0
10	13.69	31.06	50	10	16 16	26.32	50	10	18.95	22.43	50
20	13.73	30.96	40	20	16.21	26.24	40	20	19.01	22.37	40
30	13.78	30.87	30	30	16.26	26.16	30	30	19.06	22.30	30
40	13 82	30.77	20	40	16.31	26.08	20	40	19.12	22.24	20
50	13.86	30.67	10	50	16.36	26.00	10	50	19.17	22.18	10
68 0	13.91	30 58	112 0	77 0	16.41	25.93	103 0	86 0	19.23	22.12	94 0
10	13.95	30.48	50	10	16.45	25.85	50	10	19.28	22.05	50
20	13.99	30.39	40	20	16.50	25.77	40	20	19.34	21.99	40
30	14.03	30.29	30	30	16.55	25.70	30	30	19.40	21.92	30
40	14.08	30.20	20	40	16.60	25.62	20	40	19 45	21.86	20
50	14.12	30.10	10	50	16.65	25.54	10	50	19 51	21.80	10
69 0	14.17	30.01	111 0	78 0	16.70	25.47	102 0	87 0	19.56	21.74	93 0
10	14.21	29.91	50	10	16 75	25.39	50	10	19.62	21.67	50
20	14.26	29 82	40	20	16.80	25.32	40	20	19 68	21.61	40
30	14.30	29.73	30	30	16.85	25.29	30	30	19.74	21.54	30
40	14.35	29.64	20	40	16.90	25.17	20	40	19 80	21.48	20
50	14.39	29.55	10	50	16.95	25.09	10	50	19.86	21.42	10
70 0	14.44	29.46	110 0	79 0	17.00	25.02	101 0	88 0	19 92	21.36	92 0
10	14.48	29.37	50	10	17.05	24.94	50	10	19.97	21.29	50
20	14 53	29.28	40	20	17.10	24.87	40	20	20.03	21.23	40
30	14.57	29.19	30	30	17.15	24.80	30	30	20.09	21.17	30
40	14.62	29.10	20	40	17.20	24.72	20	40	20.15	21.11	20
50	14.66	29.01	10	50	17.25	24.65	10	50	20.21	21.05	10
71 0	14.71	28 92	109 0	80 0	17.31	24.58	100 0	89 0	20.27	20.99	91 0
10	14.75	28.83	50	10	17.36	24.50	50	10	20.33	20.93	50
20	14.80	28.74	40	20	17.41	24.43	40	20	20.39	20.87	40
30	14.85	28.65	30	30	17.46	24.36	30	30	20 45	20.81	30
40	14.89	28.56	20	40	17.51	24.29	20	40	20 51	20.75	20
50	14.98	28.47	10	50	17.56	24.22	10	50	20.57	20.69	10
72 0	14 99	28.39	108 0	81 0	17.62	24.15	99 0	90 0	20.63	20.63	90 0
10	15.03	28.30	50	10	17.67	24.08	50		—	+	D. M.
20	15.08	28.21	40	20	17.72	24.01	40		Cot.	Tang.	Angle
30	15.12	28.13	30	30	17.77	23.94	30				
40	15 17	28.04	20	40	17.82	23.87	20				
50	15.21	27.95	10	50	17.87	23.80	10				
73 0	15.26	27.87	107 0	82 0	17.93	23.73	98 0				
	—	+	D. M.		—	+	D. M.				
	Cot.	Tang.	Angle		Cot.	Tang.	Angle				

TABLE V.

SPHERICAL EXCESS.

Base.	Height.															
	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000
	"	"	"	"	"	"	"	"	"	"	"		"	"	"	"
1000	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0 09	0.10	0.11	0.12	0.13	0 14	0.14	0.15
2000	0.02	0.04	0.06	0.08	0.10	0.12	0.13	0.15	0.17	0.19	0.21	0.23	0.25	0.27	0.29	0.31
3000	0.03	0.06	0.09	0.12	0.14	0.17	0.20	0.23	0.26	0.29	0.32	0.35	0.38	0.41	0.43	0.46
4000	0.04	0.08	0.12	0.15	0.19	0.24	0.27	0.31	0.35	0.39	0.42	0.46	0.50	0.54	0.58	0.62
5000	0.05	0.10	0.14	0.19	0.24	0.29	0.34	0.39	0.43	0.48	0.53	0.58	0.63	0.68	0.72	0.77
6000	0.06	0.12	0.17	0.23	0.29	0.35	0.40	0.46	0.52	0.58	0.64	0.69	0.75	0.81	0.87	0.93
7000	0.07	0.13	0.20	0.27	0.34	0.40	0.47	0.54	0.61	0.68	0.74	0.81	0.88	0.95	1.01	1.08
8000	0.08	0.15	0.23	0.31	0.39	0.46	0.54	0.62	0.69	0.77	0.85	0.93	1.00	1.08	1.16	1 23
9000	0.09	0.17	0.26	0.35	0.44	0.52	0.61	0.69	0 78	0.87	0.95	1.04	1.16	1.22	1.30	1.38
10000	0.10	0.19	0.29	0.39	0.49	0.58	0.68	0.77	0.87	0.96	1.06	1.16	1.25	1.35	1.45	1.54
11000	0.11	0.21	0.32	0.42	0.53	0.64	0.74	0.85	0.95	1.05	1.17	1.27	1.38	1.49	1.59	1.70
12000	0.12	0.23	0.35	0.46	0.58	0.69	0.81	0.93	1.04	1.16	1.27	1.39	1.50	1.62	1.74	1.85
13000	0.13	0.25	0.37	0.50	0.63	0.75	0.88	1.00	1.13	1.25	1.38	1.50	1.63	1.75	1.88	2.01
14000	0.14	0.27	0.40	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.48	1.62	1.76	1.89	2.03	2.16
15000	0.15	0.29	0.43	0.58	0.72	0.87	1.01	1.16	1.30	1.45	1.59	1.74	1.88	2.03	2.17	2.31
16000	0.16	0.31	0.46	0.62	0.77	0.93	1.08	1.23	1.39	1 54	1 70	1 85	2.01	2.16	2.31	2.47
17000	0.17	0.33	0.49	0.66	0.82	0.98	1.15	1 31	1.48	1.64	1.80	1.97	2.13	2.30	2.46	2.62
18000	0.18	0.35	0.52	0.69	0.87	1.04	1.22	1.39	1.55	1.74	1.91	2.08	2.26	2.43	2.60	2.78
19000	0.19	0.37	0.55	0.73	0.92	1.10	1.28	1.47	1 65	1.83	2.01	2.20	2.38	2.55	2.75	2.93
20000	0.20	0.39	0.58	0.77	0.96	1.16	1.35	1.54	1.74	1.93	2.12	2.31	2.51	2.77	2 89	3.09
21000	0.21	0.40	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.02	2.23	2.43	2.63	2.84	3.04	3.24
22000	0.22	0.42	0.63	0.85	1.06	1.27	1.49	1.70	1.91	2.12	2.33	2.54	2.76	2.97	3.18	3.39
23000	0.23	0.44	0.66	0.89	1.11	1.33	1.55	1.77	2.00	2.22	2.44	2.65	2.88	3.11	3.33	3.55
24000	0.24	0.46	0.69	0.93	1.16	1.39	1.62	1.85	2.08	2.31	2.54	2.78	3.01	3.24	3.47	3.70
25000	0.25	0.48	0.72	0.96	1.21	1.44	1.69	1.93	2.17	2 41	2.65	2.89	3.13	3.38	3.62	3.85
26000	0.26	0.50	0.75	1.00	1.25	1.50	1.76	2.01	2.26	2.51	2.76	3.01	3.26	3.51	3.76	4.01
27000	0.27	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	2.85	3.12	3.39	3.65	3.91	4.17
28000	0.28	0.54	0.81	1.08	1.35	1.62	1.89	2.16	2.43	2 70	2.97	3.24	3.51	3.78	4.05	4.32
29000	0.29	0.56	0.84	1.12	1.40	1.68	1.96	2.24	2.52	2 80	3.07	3.36	3.64	3.92	4.19	4.47
30000	0.30	0.58	0.87	1.16	1.45	1.74	2.03	2.31	2.60	2.89	3.18	3 47	3.75	4.05	4.34	4.63

The Arguments to this Table are the Base and Height of a Triangle in Toises.

The Toise is to the Fathom as 76,736 to 72.000.

TABLES to facilitate the Calculation of Spheroidical Triangles.

Lat.	I. Log. n or Log. of the Normal.	I. Co. log. of n.	II. $\frac{R''}{n}$ or $\frac{R''}{e\sqrt{1-e^2 \text{fin.}^2 L}}$	III. $\frac{1}{2}\frac{R''}{n^2}$	IV. $\frac{1}{2}\frac{R''}{n^2} e^2 \text{fin.}^2 L$ cof. L.	V. Log. r.	V. Co-log. r.	VI. $\frac{R''}{r}$	VII. $1 + e^2$ cof. ^{2}L. N°.	VII. Log.	VIII. Log. e^2 cof. ^{2}L.
50 0	7.3212858	2.6787142	7 9931393	0.3708235	7.83976	7.3202148	2.6797852	7.9942103	1.002470	0 0010712	7.3926970
5	2877	7123	1374	8197	954	2204	7796	2047	1.002462	10672	7.3912880
10	2896	7104	1355	8159	931	2260	7740	1991	1.002453	10632	7.3896975
15	2914	7086	1377	8123	908	2316	7684	1935	1.002445	10590	7.3882789
20	2932	7068	1319	8087	884	2372	7628	1879	1.002436	10556	7.3866773
25	2951	7049	1300	8049	860	2428	7572	1823	1.002428	10523	7.3852487
30	2970	7030	1281	8011	836	2484	7516	1767	1.002419	10490	7.3836359
35	2988	7012	1263	7973	811	2540	7460	1711	1.002411	10453	7.3821972
40	3007	6993	1244	7937	786	2596	7404	1655	4.002402	10416	7.3805730
45	3026	6974	1225	7899	761	2652	7348	1599	1.002394	10379	7.3791241
50	3044	6956	1207	7863	732	2708	7292	1543	1.002385	10345	7.3774880
55	3062	6938	1189	7827	707	2764	7236	1587	1.002376	10310	7.3758464
51 0	3081	6919	1170	7789	682	2820	7180	1431	1 002368	10270	7.3743817
5	3100	6899	1151	7749	655	2875	7125	1375	1.002359	10230	7.3727279
10	3118	6882	1133	7715	628	2930	7070	1320	1.002351	10194	7.3712526
15	3136	6864	1115	7679	698	2985	7015	1266	1.002342	10159	7.3695869
20	3155	6845	1096	7643	571	3040	6960	1210	1.002334	10122	7.3681009
25	3174	6826	1077	7603	541	3095	6905	1155	1.002325	10085	7.3664230
30	3192	6808	1059	7567	512	3150	6850	1100	1.002317	10048	7.3649260
35	3210	6790	1041	7531	483	3205	6795	1045	1.002308	10011	7.3632358
40	3228	6772	1023	7495	454	3260	6740	0990	1.002300	09974	7.3617278
45	3247	6753	1004	7457	424	3315	6685	0935	1.002291	09937	7.3600251
50	3266	6734	0986	7419	393	3370	6630	0880	1.002282	09900	7.3583156
55	3284	6716	0968	7383	362	3425	6575	0825	1.002275	09863	7.3569814
52 0	3302	6698	0949	7347	334	3480	6520	0770	1.002266	09826	7.3552599
5	3320	6680	0931	7311	299	3534	6466	0716	1.002257	09788	7.3535316
10	3338	6662	0913	7275	265	3588	6412	0663	1.002249	09753	7.3519895
15	3356	6644	0895	7239	230	3642	6358	0609	1.002240	09717	7.3502480
20	3374	6626	0877	7203	195	3696	6304	0555	1.002232	09680	7.3486942
25	3392	6608	0858	7167	160	3750	6250	0501	1.002224	09643	7.3471348
30	3411	6589	0840	7129	124	3805	6195	0446	1.002216	09610	7.3455698
35	3429	6571	0821	7091	089	3859	6141	0392	1.002207	09577	7.3438023
40	3447	6553	0804	7057	054	2913	6087	0338	1.002199	09540	7.3422252
45	3465	6535	0786	7021	018	3967	6033	0284	1.002191	09503	7.3406424
50	3483	6517	0768	6985	7.82982	4021	5979	0230	1.002182	09465	7.3388547
55	3502	6498	0749	6947	946	4075	5925	0176	1.002173	09428	7.3370597
53 0	3520	6480	0731	6911	911	4130	5870	0121	1.002165	09390	7.3354579

TABLE IX.

Value of the Arc in Seconds.	$\frac{3}{2} e^2 d$ L fin. d L fin. L cof. L. Latitude. 50	51	52	53	Value of the Arc in Seconds.	$\frac{3}{2} e^2 d$ L fin. d L fin. L cof. L. Latitude. 50	51	52	53
100	0.0000021	0.0000021	0.0000021	0.0000021	900	0.0000192	0.0000191	0.0000189	0.0000188
200	0.0000042	0.0000042	0.0000042	0.0000041	1000	0.0000214	0.0000213	0.0000211	0.0000209
300	0.0000064	0.0000063	0.0000063	0.0000062	1100	0.0000235	0.0000234	0.0000232	0.0000230
400	0.0000085	0.0000085	0.0000084	0 0000083	1200	0.0000257	0.0000255	0.0000253	0.0000251
500	0.0000107	0.0000106	0.0000105	0.0000104	1300	0.0000278	0.0000276	0.0000274	0.0000272
600	0.0000128	0.0000127	0.0000126	0.0000125	1400	0.0000299	0.0000297	0.0000295	0.0000292
700	0.0000149	0.0000149	0.0000147	0.0000146	1500	0.0000321	0.0000319	0.0000316	0.0000313
800	0.0000171	0.0000170	0.0000168	0.0000167	1600	0.0000342	0.0000342	0.0000337	0.0000334

DEGREE.

A TABLE of the Meridional Degrees of the Terreſtrial Spheroid calculated to every Degree of Latitude.

Lat. of the middle Point.	Engliſh Feet.	Diff.	Lat. of the middle Point.	Engliſh Feet.	Diff.	Lat. of the middle Point	Engliſh Feet.	Diff.	Lat. of the middle Point.	Engliſh Feet.	Diff.	Lat. of the middle Point.	Engliſh Feet.	Diff.	Lat. of the middle Point	Engliſh Feet.	Diff.
0	362909	1	15	363127	30	30	363724	49	45	364546	58	60	365368	48	75	365965	28
1	362910	3	16	363157	32	31	363773	50	46	364604	58	61	365416	47	76	365993	26
2	362913	5	17	363189	34	32	363823	51	47	364662	57	62	365463	46	77	366019	24
3	362918	7	18	363223	35	33	363874	52	48	364720	57	63	365509	45	78	366043	22
4	362925	9	19	363258	37	34	363926	53	49	364777	57	64	365554	44	79	366065	20
5	362934	11	20	363295	38	35	363979	54	50	364834	57	65	365598	43	80	366084	18
6	362945	13	21	363333	39	36	364033	55	51	364891	57	66	365641	41	81	366102	16
7	362958	15	22	363370	40	37	364088	56	52	364948	56	67	365682	40	82	366118	15
8	362973	16	23	363410	41	38	364144	57	53	365004	55	68	365722	39	83	366133	13
9	362989	18	24	363451	43	39	364201	57	54	365059	54	69	365761	38	84	366146	11
10	363007	20	25	363494	44	40	364258	57	55	365113	53	70	365798	37	85	366159	9
11	363027	22	26	363538	45	41	364315	57	56	365166	52	71	365836	35	86	366168	7
12	363049	24	27	363583	46	42	364372	57	57	365218	51	72	365871	33	87	366175	5
13	363073	26	28	363629	47	43	364430	58	58	365269	50	73	365904	31	88	366180	3
14	363099	28	29	363676	48	44	364488	58	59	365319	49	74	365935	30	89	366183	1
15	363127		30	363724		45	364546		60	365368		75	365965		90	366184	

In the above table, the ellipticity is ſuppoſed $\frac{1}{334}$, the degree at the equator, and at 45°, taken from actual meaſurement; and the other, degrees calculated according to the rules explained in the text.

TABLE of Perpendicular Degrees on the Spheroid calculated to every Degree of the Meridian in Engliſh Feet, (elliptcity $= \frac{1}{334}$.)

Lat.	Perp. Deg.	Diff.	Lat.	Perp. Deg.	Diff.	Lat.	Perp. Deg.	Diff.	Lat.	Perp. Deg.	Diff.	Lat.	Perp. Deg.	Diff.	Lat	Perp. Deg.	Diff.
0	365094	1	15	365172	9	30	365360	17	45	365640	20	60	365920	17	75	366108	9
1	365095	2	16	365181	10	31	365377	18	46	365660	19	61	365937	16	76	366117	9
2	365097	2	17	365191	10	32	365395	18	47	365679	19	62	365953	16	77	366126	8
3	365099	3	18	365201	10	33	365413	18	48	365698	19	63	365969	15	78	366134	7
4	365102	4	19	365211	11	34	365431	18	49	365717	19	64	365984	14	79	366141	7
5	365106	4	20	365222	11	35	365449	19	50	365736	19	65	365998	13	80	366148	6
6	365110	5	21	365233	12	36	365468	19	51	365755	19	66	366011	12	81	366154	5
7	365115	5	22	365245	12	37	365487	19	52	365774	19	67	366023	12	82	366159	5
8	365120	5	23	365257	12	38	365506	19	53	365793	19	68	366035	12	83	366164	4
9	365125	6	24	365269	13	39	365525	19	54	365812	19	69	366047	11	84	366168	4
10	365131	7	25	365282	14	40	365544	19	55	365831	18	70	366058	11	85	366172	4
11	365138	8	26	365296	15	41	365563	19	56	365849	18	71	366069	10	86	366176	3
12	365146	8	27	365311	16	42	365582	19	57	365867	18	72	366079	10	87	366179	2
13	365156	9	28	365327	16	43	365601	19	58	365885	18	73	366089	10	88	366181	2
14	365163	9	29	365343	17	44	365620	20	59	365903	17	74	366099	9	89	366183	1
15	365172		30	365360		45	365640		60	365920		75	366108		90	366184	

TABLE of the Degrees of Longitude on the Spheroid, to every Degree of Latitude, computed in Fathoms, the ellipticity being ſuppoſed $\frac{1}{334}$.

Lat.	Deg. of Long.	Diff.	2d Diff.	Lat.	Deg. of Long.	Diff.	2d Diff.	Lat.	Deg. of Long.	Diff.	2d Diff.	Lat.	Deg. of Long.	Diff.	2d Diff.	Lat.	Deg. of Long.	Diff.	2d Diff.
	Fath.				Fath.				Fath.				Fath.				Fath.		
0	60849			18	57890			36	49279			54	35835			72	18854		
		9	19			336	18			630	15			864	11			1015	6
1	60840	28	18	19	57554	354	18	37	48649	645	15	55	34971	175	11	73	17839	1021	5
2	60812	46	18	20	57209	372	18	38	48004	660	15	56	34096	886	11	74	16818	1026	4
3	60766	64	19	21	56828	390	17	39	47344	674	14	57	33211	896	10	75	15792	1030	5
4	60702	83	18	22	56438	407	16	40	46670	688	14	58	32315	906	10	76	14762	1035	5
5	60619	101	18	23	56031	423	16	41	45982	702	14	59	31409	916	9	77	13727	1040	4
6	60518	119	19	24	55608	489	16	42	45280	716	14	60	30493	925	9	78	12687	1044	3
7	60899	138	18	25	55169	455	16	43	44564	730	13	61	29568	939	9	79	11643	1047	3
8	60261	156	18	26	54714	471	16	44	43834	743	13	62	28634	943	8	80	10596	1050	3
9	60105	174	18	27	54243	487	16	45	43091	756	13	63	27691	952	8	81	9546	1053	3
10	59931	192	18	28	53756	503	16	46	42335	769	13	64	26738	960	8	82	8493	1056	2
11	59738	210	18	29	53253	519	16	47	41566	782	13	65	25778	968	7	83	7437	1058	2
12	59527	228	18	30	52734	536	16	48	40784	795	13	66	24810	976	7	84	6379	1060	2
13	59299	246	18	31	52198	552	16	49	39989	808	13	67	23835	983	7	85	5319	1062	1
14	59053	264	18	32	51646	568	16	50	39181	820	12	68	22852	990	6	86	4257	1063	1
15	58789	282	18	33	51078	584	16	51	38361	831	11	69	21863	997	6	87	3194	1064	1
16	58507	300	18	34	50494	600	16	52	37530	842	11	70	20866	1003	6	88	2130	1065	1
17	58207	318	18	35	49894	615	15	53	36688	853	11	71	19863	1009	6	89	1065	1065	0
18	57890			36	49279			54	35835			72	18854			90	0000		

TABLE of Degrees of Longitude on the Sphere to every Degree of Latitude.

Lat.	Fathoms.	Differ.	2d Diff	Lat.	Fathoms.	Differ.	2d Diff.	Lat.	Fathoms.	Differ.	2d Diff	Lat.	Fathoms.	Differ.	2d Diff.
0	60758			23	55928			46	42206			68	22760		
		9				423				769				985	
1	60749		19	24	55505		17	47	41437		13	69	21774		7
		28				440				782				993	
2	60721		19	25	55065		16	48	40655		12	70	20781		6
		47				456				794				999	
3	60674		18	26	54609		17	49	39861		12	71	19782		6
		65				473				806				1005	
4	60610		18	27	54136		17	50	39054		12	72	18777		6
		83				490				818				1011	
5	60527		19	28	53646		16	51	39236		12	73	17766		6
		102				506				830				1017	
6	60425		18	29	53140		16	52	37406		11	74	16749		5
		120				522				841				1022	
7	60305		19	30	52618		16	53	36565		11	75	15727		5
		139				538				852				1027	
8	60166		17	31	52080		16	54	35713		12	76	14700		5
		156				554				864				1032	
9	60010		19	32	51526		16	55	34849		10	77	13658		4
		175				570				874				1006	
10	59835		18	33	50956		15	56	33975		10	78	12633		4
		193				585				884				1040	
11	59642		19	34	50371		16	57	33091		10	79	11593		3
		212				601				894				1043	
12	59430		17	35	49770		15	58	32197		10	80	10550		3
		229				616				904				1046	
13	59201		19	36	49154		15	59	31293		10	81	9505		3
		248				631				914				1049	
14	58953		18	37	48523		15	60	30379		9	82	8456		3
		265				646				923				1052	
15	58688		19	38	47878		14	61	29456		9	83	7404		2
		284				660				932				1054	
16	58404		17	39	47218		15	62	28524		8	84	6351		2
		301				675				940				1056	
17	58103		18	40	46543		13	63	27584		9	85	5295		1
		319				688				949				1057	
18	57784		18	41	45855		15	64	26635		9	86	4238		1
		337				703				958				1058	
19	57447		17	42	45152		13	65	25677		7	87	3180		1
		354				716				965				1059	
20	57093		17	43	44436		14	66	24712		7	88	2121		1
		371				730				972				1060	
21	56722		17	44	43706		14	67	23740		7	89	1060		0
		388				744				979				1060	
22	56334		18	45	42962		12	68	22760			90	0000		
		406				756									
23	55928			46	42206										

TABLE of Decimal Degrees of Longitude on a Sphere.

Latitude in Decimal Degrees.	Degrees of Longitude.	Latitude in Decimal Degrees.	Degrees of Longitude.	Latitude in Decimal Degrees.	Degrees of Longitude.	Latitude in Decimal Degrees.	Degrees of Longitude.
	Kiliom.		Kiliom.		Kiliom.		Kiliom.
0	100 000	26	91.775	51	69.591	76	36.812
1	99 988	27	91.140	52	68.455	77	35.347
2	99.951	28	90.483	53	67.301	78	33.874
3	99 889	29	89.803	54	66.131	79	32.392
4	99.803	30	89 101	55	64.945	80	30.902
5	99.692	31	88.377	56	63.742	81	29.404
6	99 556	32	87.631	57	62.524	82	27.899
7	99 396	33	86.863	58	61.291	83	26.387
8	99.211	34	86.074	59	60.042	84	24.869
9	99.002	35	85.264	60	58.778	85	23.344
10	98.769	36	84.433	61	57.500	86	21 814
11	98 511	37	83.581	62	56.208	87	20.279
12	98.229	38	82.708	63	54.902	88	18.738
13	97.922	39	81.815	64	53.583	82	17.193
14	97.592	40	80.902	65	52.250	90	15.643
15	97.237	41	79 968	66	50.904	91	14.090
16	96.858	42	79.015	67	49.546	92	12 533
17	96.456	43	78 043	68	48.175	93	10.973
18	96.029	44	77.051	69	46.793	94	9.411
19	95.579	45	76.040	70	45.399	95	7.846
20	95.106	46	75.011	71	43.994	96	6.279
21	94 608	47	73.963	72	42.578	97	4.711
22	94.088	48	72.897	73	41.151	98	3.141
23	94.544	49	71.813	74	39.115	99	1 571
24	92.978	50	70.711	75	38.268	100	0.000
25	92 388						

TABLE

TABLE of Decimal Degrees of Latitude, the Ellipticity being ſuppoſed $\frac{1}{335}$.

Lat.	Degrees of Latitude.	Differ.	Lat.	Degrees of Latitude.	Differ.
G.	Metres.	M.	G.	Metres.	M.
0	99552.5		50	100006 2	
		0 4			14.1
1	99552.9		51	100020.3	
		0.9			14.1
2	99553.8		52	100034.4	
		1.3			14 0
3	99555 1		53	100048.4	
		1.8			14.0
4	99556.9		54	100062.4	
		2.1			13.9
5	99559.0		55	100076.3	
		2.8			13 9
6	99561.8		56	100090.2	
		3.0			13.7
7	99564.7		57	100103.9	
		3.5			13.7
8	99568.2		58	100117.6	
		3.9			13.6
9	99572.1		59	100131.2	
		4 3			13.4
10	99576.4		60	100144.6	
		4.8			13.3
11	99581.2		61	100157.9	
		5.1			13.1
12	99586.3		62	100171.0	
		5.6			13.0
13	99591.8		63	100184.0	
		5.9			12.8
14	99597.8		64	100196.8	
		6.4			12.6
15	99604.2		65	100209.4	
		6.7			12.3
16	99610.9		66	100221.7	
		7.1			12.2
17	99618.0		67	100233.9	
		7.4			12.0
18	99625.4		68	100245.9	
		8.0			11.7
19	99633.4		69	100257.5	
		8.2			11.5
20	99641.6		70	100269.0	
		8.6			11.2
21	99650.2		71	100280.2	
		8.9			10.9
22	99659.1		72	100291.1	
		9.3			10.6
23	99668.4		73	100301.7	
		9.6			10.3
24	99678.0		74	100312.0	
		9.9			10.0
25	99687.9		75	100322.0	
		10.2			9.7
26	99698.1		76	100331.7	
		10.5			9.4
27	99708.6		77	100341.1	
		10.8			9.0
28	99719.4		78	100350.1	
		11.1			8.7
29	99730.5		79	100358.8	
		11.4			8.4
30	99741.9		80	100367.2	
		11.6			7.9
31	99753.5		81	100375.1	
		11.8			7.6
32	99765.3		82	100382.7	
		12.1			7.2
33	99777.4		83	100389 9	
		12.3			6.9
34	99789.7		84	100396.8	
		12.5			6.4
35	99802.2		85	100403.2	
		12.7			6.1
36	998149		86	100409.3	
		12.9			5.6
37	99827.8		87	100414.9	
		13 1			5.2
38	99840.9		88	100420.1	
		13.2			4.8
39	99854.1		89	100424.9	
		13.4			4.4
40	99867.5		90	100429.3	
		13.5			3.9
41	99881.0		91	160433 2	
		13.6			3.6
42	99894.6		92	100436.8	
		13.7			3.1
43	99908.3		93	100439.9	
		13.8			2.6
44	99922.1		94	100442.5	
		13.9			2.2
45	99936.0		95	100444.7	
		13.9			1.8
46	99950.0		96	100446.5	
		14.0			1.3
47	99964.0		97	100447.8	
		14.0			0.9
48	99978.0		98	100448.7	
		14.1			0.5
49	99992.1		99	100449.2	
		14.1			
50	100006.2		100		

TABLE of Decimal Degrees of Longitude.

Lat.	Degrees of Longitude.	Differ.	Lat.	Degrees of Longitude.	Differ.
G.	Metres.	M.	G.	Metres.	M
0	100149 4		50	70922.1	
		12.3			1119 5
1	100137.1		51	69802.6	
		36 8			1136.8
2	100100.3		52	68665.8	
		61.4			1153.7
3	100038.9		53	67512.0	
		85 9			1170.7
4	99953 0		54	66341.3	
		110.5			1187 1
5	99842.5		55	65154.2	
		134 9			1203.3
6	99707.6		56	63950 9	
		159 4			1219.2
7	99548.2		57	62731.7	
		183.9			1234.9
8	99364.3		58	61496.8	
		208 1			1250.1
9	99156.2		59	60246.7	
		232.6			1265.2
10	98923.6		60	58981 5	
		256.8			1279.9
11	98666.8		61	57701.6	
		281.0			1294.2
12	98385 8		62	56407 4	
		305.2			1308.3
13	98080.6		63	55099.1	
		329.3			1322.0
14	97751.3		64	53777.1	
		358.2			1335.4
15	97398.1		65	52441.7	
		377.2			1348.6
16	97020.9		66	51093.1	
		401.0			1361.3
17	96616.9		67	49731.8	
		424.8			1373.6
18	96195.1		68	48358.3	
		448.4			1385.8
19	95746.8		69	46972.4	
		471.9			1397.6
20	95274.9		70	45574.8	
		495.3			1408.9
21	94779.6		71	44165.9	
		518.7			1419.9
22	94260.9		72	42746.0	
		541.8			1430.7
23	93719.1		73	41315.3	
		564.9			1440.9
24	93154.2		74	39874.4	
		587.8			1451.0
25	92566.4		75	38423.4	
		610.6			1460.6
26	91955.8		76	36962.8	
		633.2			1469 8
27	91322.6		77	35493.0	
		655.7			1478.8
28	90666.9		78	34014.2	
		678.0			1487.2
29	89988.9		79	32527.0	
		700.3			1495.4
30	89288.6		80	31031.6	
		722.2			1508.1
31	88566.4		81	29528.5	
		744.0			1510 6
32	87822.4		82	28017.9	
		765.7			1517 6
33	87056.7		83	26500.3	
		787.2			1524.2
34	86269 5		84	24976.1	
		808.5			1530.5
35	85461.0		85	23445.6	
		829.6			1536.4
36	84631.4		86	21909.2	
		850 5			1541.9
37	83780.9		87	20367.3	
		871.2			1547.0
38	82909.7		88	18820.3	
		891.6			1551.7
39	82018.1		89	17268.6	
		911.9			1556.0
40	81106.2		90	15712.6	
		932.1			1560.0
41	80174.1		91	14152.6	
		951.8			1563.6
42	79222.3		92	12589.0	
		971.4			1566.7
43	78250.9		93	11022.3	
		990.8			1569 4
44	77260.1		94	9452.9	
		1010.0			1571.9
45	76250.1		95	7881.0	
		1028.8			1573.8
46	752 21.3		96	6307.2	
		1047.5			1575.4
47	74173 8		97	4731.8	
		1065.8			1576.1
48	73108.0		98	3155.7	
		1084 0			1577.9
49	72024 0		99	1577.8	
		1101.9			1577.8
50	70922.1		100	0.0	

DEGREE *of Longitude.* See the preceding article and LONGITUDE.

DEGREE, in *Civil* and *Canon Law*, denotes an interval in cognation of kinſhip, whereby proximity and remoteneſs of blood are computed.

Degrees are the intervals whereby it is known what perſons are neareſt to the ſtock or root. Or they are the diſtances of one perſon from another in the line of conſanguinity or affinity, reckoned from ſome common parent or anceſtor. See CONSANGUINITY.

We ſay, the ſecond degree, the third degree; Gregory the Great was the firſt who prohibited marriage to the ſeventh degree; which reſtriction was long obſerved: the ſecond council of Lateran, under Innocent III. reſtrained the prohibition to the fourth degree incluſive, that is, to couſin Germans' children. See MARRIAGE.

In computing degrees of conſanguinity, the rule of the civil law is univerſal, either in the direct or collateral, otherwiſe called the oblique line: "Quot ſunt generationes tot ſunt gradus." Every generation in the direct line conſtitutes a different degree, reckoning either upwards or downwards; and this method of computation univerſally obtains, as well in the civil and canon, as in the common law. But in the canon law, the rule is different for the oblique line, and here a diſtinction is made between the equal and unequal oblique line.

In the firſt caſe the rule is, "Quot gradibus perſonæ cognatæ diſtant a communi ſtipiti, tot gradibus inter ſe diſtant." In the ſecond caſe, the rule is, "Quot gradibus perſona remotior diſtat a communi ſtipite tot gradibus perſonæ diſtant inter ſe." Or, generally, in whatſoever degree two perſons, or the moſt remote of them, are diſtant from the common anceſtor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the firſt degree, becauſe from the father to each of them is counted only one; Titius and his nephew are related in the ſecond degree; for the nephew is two degrees removed from the common anceſtor; *viz.* his own grandfather, the father of Titius. This rule of computation is adopted by our law; though the civilians count upwards from either of the perſons related to the common ſtock, and then downwards again to the other, reckoning a degree for each perſon both aſcending and deſcending. For the true reaſon of the different methods of computing the degrees of conſanguinity, in the civil law on the one hand, and in the canon and common laws on the other; ſee DESCENT.

DEGREES *of Compariſon*, in *Grammar*, are uſually reckoned three, *viz. poſitive, comparative*, and *ſuperlative;* which ſee reſpectively. The ingenious Mr. Harris, (Hermes, p. 197.) in tracing the riſe of compariſon, and its different degrees, obſerves, that they cannot be more than two; one to denote ſimple exceſs, and one to denote ſuperlative. If we were to introduce more degrees than theſe, we ought, he ſays, perhaps, to introduce infinite, which is abſurd. For why ſtop at a limited number, when in all ſubjects, ſuſceptible of intenſion, the intermediate exceſſes are in a manner infinite? There are infinite degrees of *more* white, between the firſt ſimple white, and the ſuperlative, *whiteſt;* the ſame may be ſaid of *more* great, *more* ſtrong, *more* minute, &c. He adds, the doctrine of grammarians about *three* ſuch degrees, which they call the poſitive, the comparative, and the ſuperlative, muſt needs be abſurd; both becauſe in their poſitive there is no compariſon at all, and becauſe their ſuperlative is a comparative, as much as their comparative itſelf; *e. g.* "Socrates was the *moſt wiſe* of all the Athenians." "Homer was the *moſt ſublime* of all poets." Theſe comparatives however, as well the ſimple as the ſuperlative, ſeem ſometimes to part with their relative nature, and only retain their intenſive. Thus, in the degree denoting ſimple exceſs,

"*Triſtior*, et lacrymis oculos ſuffuſa nitentes."
Virg.

In the ſuperlative degree this is more uſual, "Vir doctiſſimus;" Vir fortiſſimus," a moſt learned man, a moſt brave man; that is to ſay, not the *braveſt* and *moſt learned* man, that ever exiſted, but a man poſſeſſing thoſe qualities in an eminent degree. Comparative adverbs are retrenched by expreſſing their force in the primary attributive: thus, inſtead of *more fair*, grammarians ſay *fairer;* inſtead of *moſt fair, faireſt;* and the ſame holds true both in the Greek and Latin. But this practice has reached no farther than to adjectives, or, at leaſt, to participles, ſharing the nature of adjectives. As ſome attributives admit of compariſon, there are others which admit of none. Such, for example, are thoſe which denote that quality of bodies that ariſes from their figure, as when we ſay, a *circular* table, a *quadrangular* court, &c. the reaſon of which is, that a million of things participating the ſame figure, participate it *equally*, if they participate it at all. The ſame holds true in all attributives, denoting definitive quantities, whether continuous or diſcrete, whether abſolute or relative. Thus the *two-foot* rule A cannot be *more a two-foot* rule than any other of the ſame length, &c. &c. The reaſon of this is, that there can be no compariſon without intenſion and remiſſion; there can be no intenſion and remiſſion in things always definite. By the ſame reaſoning we perceive the cauſe, why no ſubſtantive is ſuſceptible of theſe comparative degrees. A mountain cannot be ſaid *more to be*, or to exiſt, than a mole-hill, but the *more* and *leſs* muſt be ſought for in their quantities.

DEGREES, in *Muſic*. This term has long been ſuperſeded by that of interval. The ſmall intervals, degrees, or intermediate ſteps from a given note to its 4th above, are three in number, the tone major, tone minor, and major ſemi-tone; as *c, d, e, f*.

Degrees or intervals leſs than concords are neceſſary in melody, as by theſe the concords are graduated, and their diſtance aſcertained. Des Cartes, who has been copied by our muſical lexicographer Graffineau, has rendered his definition of the term *degree* perplexing, and obſcure to ſtudents, by uſing, mathematically, his letters of reference, ſuppoſing A and B the diſtance of a major 3d; whereas, in muſical language, from A to B is but a major 2d. Then he talks of another ſound C put between A and B, which renders the paſſage wholly unintelligible. The following period from Des Cartes is clear and accurate. "It appears," ſays that author, "that degrees (in practical muſic) are the ſmall intervals, of which the concords or harmonical intervals are compoſed." See INTERVAL and CONCORD. "Muſical degrees are three: the major or greater tone, the leſs or minor tone, and the ſemitone."

The primary cauſe of the invention of ſmall degrees or intervals leſs than concords, and by which concords are divided, and as it were graduated, he judges to have been this, that there would be too great a diſproportion or inequality in their intenſeneſs, which would weary both the ſinger and the hearer.

Suppoſing A and C the diſtance of a third, if the voice were to proceed immediately, aſcending from A to C, then as C is the acuter ſound it ſtrikes the ear with more force than A; leſt the leap or proportion ſhould prove uneaſy to the performer, another ſound, B, is placed between them, by which, as by a ſtep or degree, we may move upwards or downwards more eaſily, and with leſs exertion of voice.

"Hence

"Hence it appears," continues Deſcartes, "that the degrees are only certain media contrived to be placed between the extremes of concords, for moderating the inequality, and are only of uſe with reſpect to concords, ſo that when the voice has moved one degree, the ear is not ſatisfied till we come to the other, which therefore muſt be concord to the firſt ſound." The ſubſtance of what is here alleged amounts to this; that by a proper diviſion of the concording intervals in ſuch as are leſs remote, the voice will move ſmoothly and gracefully from one ſound to another, and the hearer be prepared for a more exquiſite delight in arriving at the completion of the concord, whoſe extremes are the proper ſounds in which the ear finds its expected reſt and pleaſure.

DEGREES, *for the Uſe of*, in the conſtruction of the ſcale of muſic. See SCALE.

DEGREE, in *Univerſities*, denotes a quality conferred on the ſtudents, or members of them, as a teſtimony of the proficiency in the arts or faculties; and entitling them to certain privileges, precedencies, &c.

The degrees are much the ſame in the ſeveral univerſities: but the laws of them, and the diſcipline or exerciſe previous to their being obtained, differ. The degrees are, *bachelor*, *maſter*, and *doctor*; inſtead of the ſecond, in ſome foreign univerſities, they have *licentiate*.

In each faculty there are but two degrees, *viz. bachelor* and *doctor*, which were anciently called *bachelor* and *maſter*: nor do the arts admit of more than two, which ſtill retain the denomination of the ancient degrees, *viz. bachelor* and *maſter*. At Oxford, degrees of maſter and doctor are only conferred once a year, *viz.* on Monday after the ſeventh of July, when a ſolemn act is held for the purpoſe. See ACT.

The expences of a degree of doctor in any of the faculties in treats and ſet fees, uſually amount to 100*l.*, and thoſe of a maſter of arts to 20 or 30*l.*

The degree of bachelor is only conferred in Lent.

To take the degree of bachelor of arts, four years are required, and three more for maſter of arts. See BACHELOR.

At Cambridge, matters are nearly on the ſame footing, only the diſcipline is ſomewhat more ſevere, and the exerciſes more difficult. The commencement, which anſwers to the act of Oxford, is the Monday before the firſt Tueſday in July. The degrees of bachelor are taken up in Lent, beginning on Aſh-Wedneſday.

The degree of maſter of arts is not given till above three years after that of bachelor; during which time the candidate is obliged, three ſeveral times, to maintain two philoſophical queſtions in the public ſchools, and to anſwer the objections raiſed againſt him by a maſter of arts. He muſt alſo keep two acts in the bachelor's ſchool, and declaim one.

For the DEGREE *of Doctor*, ſee DOCTOR.

DEGREES conferred on muſical ſtudents in our univerſities. The title of *doctor* in muſic, peculiar to the univerſities of our own country, according to Anthony Wood, was firſt conferred in the reign of king Henry II.; but this is fixing it at an earlier period than that in which ſuch a title can be proved to have ſubſiſted at Oxford or Cambridge, or to have been conferred on the profeſſors of other ſciences. Spelman, a more nice and accurate ſifter of facts, believes that the appellation of doctor was not among the degrees granted to graduates in England, till the reign of king John, about 1207.

It is known that this title was created on the continent about the middle of the twelfth century, as more honourable than that of *magiſter*, or maſter, which was become too common. Its original ſignification implied not only learning and ſkill, but abilities to *teach*, according to the opinion of Ariſtotle, who ſays, that the moſt certain proof of knowledge in any ſcience is the being able to inſtruct others. John de Muris begins the ſecond part of his Treatiſe on Muſic with the following paſſage: "Princeps philoſophorum Ariſtoteles ait in principio mathematicæ ſuæ, omnino ſcientis ſignum eſt poſſe docere." Muſices Tract. MS. Bodl. 300.

The firſt degree of this kind which was conferred in a public ſchool or academy, was at Bologna, about the year 1130, where, according to Bayle, it was an honour inſtituted in favour of Irnerius, chancellor to the emperor Lotharius, who was created doctor of civil law. This ceremony ſoon after was adopted in other univerſities, and paſſed from the law to theology.

Peter Lombard is the firſt doctor in ſacred theology upon record in the univerſity of Paris; and John Hambois has been imagined by ſome to be the firſt muſician who was honoured with the title of doctor in England.

The preciſe time when this creation extended to the faculties of medicine and muſic does not appear; nor can the names be found of thoſe profeſſors in either to whom the title was firſt granted.

It has, however, been frequently remarked (Burney's Hiſt. Muſ. vol. ii.) that during the middle ages muſic was always ranked among the ſeven liberal arts, that it was included in the *trivium* and *quadrivium*, and that it was ſtudied by all thoſe who aſpired at reputation for learning throughout Europe. The *trivium* compriſed the three ſciences of grammar, rhetoric, and logic, which teach us how to reaſon with accuracy and preciſion; and the *quadrivium* comprehended arithmetic, muſic, geometry, and aſtronomy, as the four branches of the mathematics which ſilently contemplate whatever is capable of being numbered or meaſured. Now it is remarkable, that, in our univerſities, muſic is the only one of theſe ſeven ſciences that confers degrees on its ſtudents; and, in other countries, though theology, law, and medicine beſtow this honour, which are *not* of the ſeven, yet muſic, which *is*, can aſpire at no ſuch diſtinction.

However, it evidently appears that the muſic which was regarded as a ſcience by our forefathers, was merely ſpeculative, and ſuch as concerned harmonics, the ratio of muſical intervals, and philoſophy of ſound; and in this ſenſe muſical degrees are perhaps but ſeldom conferred in our univerſities according to the original ſpirit of the inſtitution. But the preſent ſtatutes, not wholly neglecting the gratification of the ear, are more favourable to practical muſic, and allow candidates for degrees to perform exerciſes, in which ſpecimens may be furniſhed of their ſkill in melody, harmony, and compoſition, where thoſe ſounds are arranged and combined which ſcience meaſures and fixes by calculation.

By the ſtatutes of the univerſity of Oxford, it is required of every proceeder to the degree of bachelor in muſic, that he employ ſeven years in the ſtudy or practice of that faculty, and at the end of that term, produce a teſtimonial of his having ſo done, under the hands of credible witneſſes; and that previous to the ſupplication of his grace towards this degree, he compoſe a ſong of five parts, and perform the ſame publicly in the muſic-ſchool, with vocal and inſtrumental muſic, firſt cauſing to be affixed on each of the doors of the great gates of the ſchools a programma, giving three days notice of the day and hour of each performance. Of a bachelor proceeding to the degree of doctor, it is required that he ſhall ſtudy five years after the taking his bachelor's degree, and produce the like proof of his having ſo done as

is requiſite in the caſe of a bachelor; and farther, ſhall compoſe a ſong in ſix or eight parts, and publicly perform the ſame "tum vocibus quam inſtrumentis etiam muſicis," on ſome day to be appointed for that purpoſe, previouſly notifying the day and hour of performance in the manner before preſcribed. Such exerciſe to be performed in the preſence of Dr. Heyther's profeſſor of muſic. This being done, the candidate ſhall ſupplicate his grace in the convocation-houſe, which being granted by both the Savilian profeſſors, or by ſome maſter of arts deputed by them for that purpoſe, he ſhall be preſented to his degree.

It is obſerved by the authors of the "Hiſtoire litteraire de la France," tom. vii. p. 142, and tom. ix. p. 200, that in the ſemi-barbarous ages, muſic was in ſuch high eſtimation, that no one could omit the ſtudy of it who cultivated letters. The learned Gerbert, who arrived at the pontificate by the title of Sylveſter II., and many other illuſtrious perſonages, regarded it as the ſecond branch of mathematics. But if muſic does no honour to the ſciences at preſent, it is little indebted to them for the diſtinction of being admitted into their company during ſo many ages, as ignorant artiſts of talents and ſenſibility have perhaps contributed more to her perfection, than all the ſublime reveries and profound calculations of men of ſcience.

The firſt qualification for the degree either of bachelor or doctor in muſic, was formerly the reading and expounding of certain books in Boethius, as the only writings whence knowledge in the principles of the ſcience could be acquired. (See the ſtatutes of the univerſity.) But the candidate for academical degrees is no longer put to this teſt; he is now to compoſe an exerciſe for voices and inſtruments in ſix or eight parts, which he is to ſubmit to the inſpection of the muſic profeſſor, and to have publicly performed in the muſic ſchool of the univerſity.

Wood, in his Faſti, has been able to produce no names of muſicians that have been enrolled among the graduates of the univerſity of Oxford before the ſixteenth century, though we are told of ſeveral at Cambridge of an earlier period. Whether Hambois was a member of this univerſity, or of Oxford, does not appear, nor indeed is it preciſely known at what time he received his diploma. In Hollinſhed's chronicle, vol. ii. p. 1355, there is an enumeration of the moſt eminent men of learning in the reign of Edward IV. among whom the author includes John Hamboys, "an excellent muſician," adding, that "for his notable cunning therein, he was made a doctor of muſic." But academical honours in the faculty of muſic may be traced up to the year 1463, when Henry Habengton was admitted to the degree of bachelor of muſic at Cambridge, and Thomas Saintwix, doctor in muſic, was made maſter of king's college in the ſame univerſity.

DEGUELIA, in *Botany*, Aublet Guian. 750. *t.* 300. Juſſ. 363, a ſhrub, three or four feet high, with long, twining branches, pinnate leaves, and ſmall white ſpicate-papilionaceous flowers, is known only by the deſcription and plate of Aublet, who found it near the banks of rivers in Guiana. Juſſieu ſuſpects it to belong to the genus *Geoffræa*.

DEHAM, a town of Arabia, in the country of Yemen; 28 miles W.N.W. of Sana.

DEH-Bouzour, in *Geography*, a town of Perſia, in the province of Irak; 80 miles N.N.W. of Iſpahan.

DEHCHAR, a town of Perſia, in the province of Kerman; 70 miles S.W. of Sirgian.

DEH-Couchek, a town of Perſia, in the province of Irak; 48 miles N.W. of Iſpahan.

DEHDANAH, a town of Perſia, in the province of Khoraſan; 60 miles N.E. of Herat.

DEHEWBARTH, one of the ſix principalities into which Wales was divided about the cloſe of the ſixth century; the other five were Gwynedd, Powys, Reynnuc, Eſylluc, and Morgannuc; but the moſt permanent diviſion of the Britiſh territories about this time was into three principalities or kingdoms; *viz.* Dehewbarth, Powyſland, and Gwynedd. Dehewbarth, now South-Wales, was the country of the brave Silures; and was anciently divided into the ſix diſtricts of Cairdigan, now Cardiganſhire, Dyvat, now Pembrokeſhire, Cairmarden, now Caermarthenſhire, Morgannuc, now Glamorganſhire, Guent, now Monmouthſhire, and Brecknock, or Brecknockſhire. The chief reſidence, or capital of the ancient princes of South-Wales, was Cairmarden, and ſometimes Dinevor caſtle.

DEHI-COUH, or Dehaka, a town of Perſia, in the province of Lariſtan; 9 miles W. of Lar.

DEHI-DOMDE, a town of Perſia, in the province of Farſiſtan; 100 miles S.E. of Schiras.

DEHI-GHERDOU, a town of Perſia, in the province of Farſiſtan; 100 miles N. of Schiras.

DEHI-KOURD, a town of Perſia, in the province of Lariſtan; 21 miles N.W. of Lar.

DEHISCENTIA, a ſplitting or ſeparation of parts, in *Vegetable Phyſiology*, is particularly applied to the opening of capſules, or dry ſeed-veſſels, when they arrive at maturity. The word is alſo uſed for the ſeaſon when this principally happens.

Moſt capſules are ſo conſtructed, that while juicy and verdant, they remain cloſed, but when dry, they either ſplit aſunder by the elaſticity of their valves, ſometimes, as in *Euphorbia* and its allies, with great force; or their thin ſides ſhrivel and ſhrink, thus forming apertures, as in the Poppy, the Lily, and with great regularity and beauty in ſome ſpecies of *Ariſtolochia*. By this contrivance the ſeeds are diſperſed in dry weather, which is moſt favourable to their ſucceſs. Some annual ſpecies of *Meſembryanthemum* have however been diſcovered in the ſandy deſerts of Africa, whoſe capſules expand, and ſcatter their ſeeds, in wet weather only, rain being of ſuch rare occurrence there, that they might otherwiſe lie too long expoſed, before they could meet with ſufficient moiſture to vegetate. See Sm. Introduction to Botany, 277. *t.* 14. *f.* 178.

DEHNE, in *Geography*, a town of Perſia, in the province of Khoraſan; 108 miles E. of Meſchid.

DEHORS, Fr. *without*, in *Law*, a word uſed in ancient pleading, when a thing is *without* the land, &c. or *out* of the point in queſtion. See Hors *de ſon fee*.

DEHTIEZ, in *Geography*, a town of Hungary; 15 miles N.W. of Leopoldſtadt.

DEICIDE, Deicida, from *Deus*, *God*, and *cædo*, *I kill*, a term only uſed by ſome writers in ſpeaking of the condemnation and execution of the Saviour of the world, by Pontius Pilate and the Jews.

Some have objected to the propriety of the term, ſince Chriſt ſuffered and died, not as God, but as man,

DEIDIER, Anthony, in *Biography*, a voluminous writer on almoſt every branch of medicine, was the ſon of a ſurgeon of Montpellier. In 1691 he was made doctor in medicine, and in 1697 profeſſor of chemiſtry. He was alſo honoured with the cordon of the order of St. Michael, and was admitted one of the foreign members of the royal ſociety of London. In 1732, being appointed phyſician to the galleys, he quitted Montpellier, and went to Marſeilles, where he died on the 3d of April 1746. Of his works the following have been

been moſt noticed: "Experiences ſur la Bile, et les cadavres des peſtiferes, faites par M.D.; accompagnees des Lettres, &c." Zurich, 1772. He was at Marſeilles while the plague raged there. He attributed the diſeaſe to a prevailing acid. He injected bile taken from perſons who had died of the plague into the veins of ſome dogs, which were almoſt immediately killed by the venom: A ſenſeleſs experiment, from which no uſeful reſult could be expected to follow. He tried inunctions with mercury in the diſeaſe; from which, he ſays, no benefit nor miſchief was found to accrue. "Chymie raiſonnee, ou l'outache de decouvrir la nature et la maniere d'agir des remedes chymiques les plus en uſage en medicine et en chirurgie." Lyon, 1715, 12mo. Theſe experiments were alſo fruitleſs; they ſhew, however, an active and inquiſitive turn of mind, which, properly directed, might have been productive of ſome profits. In his treatiſe on the venereal diſeaſe, he ſuppoſes the diſeaſe to be occaſioned by a particular ſpecies of inſect, which mercury had the power of deſtroying. He publiſhed three volumes of conſultations and obſervations, which may be read with advantage, the diſeaſes being generally correctly deſcribed, and the method of treating them ſuch as is now commonly practiſed. For the titles and accounts of the remainder of his works, ſee Haller's Bib. Med. Eloy. Dict. Hiſt.

DEJECTION, in *Aſtrology*, is applied to the planets, when in their detriment, as aſtrologers ſpeak, *i. e.* when they have loſt their force, or influence, as it is pretended, by reaſon of their being in oppoſition to ſome others, which check and counteract them.

Or, it is uſed when a planet is in a ſign oppoſite to that wherein it has its greateſt effect, of influence, which is called its exaltation. Thus the ſign Aries being the exaltation of the Sun, the ſign Libra is its dejection. See EXALTATION.

DEJECTION, in *Medicine*, from *dejicio, I throw off*, properly ſignifies the act of ejecting or evacuating the excrements. But it is alſo more commonly applied to the excrements themſelves, thus evacuated; in which ſenſe it is of the ſame import with *ſtool*.

An examination of the condition of the alvine excretions is highly important in the treatment of all acute, and many chronic, diſeaſes; inaſmuch as the ſenſible qualities of the excrement indicate, in a conſiderable degree, the various diſordered ſtates of the organs of digeſtion, and the alimentary canal, and more particularly of the liver. For, although, in many caſes, both of acute and chronic diſorder, theſe morbid conditions of the digeſtive organs are the effect of the general, or of ſome local derangement of health; yet they become, perhaps in all caſes, by a re-action on the conſtitution, the cauſes of a continuance of the original maladies, or of new complaints. It has lately been demonſtrated, that many diſeaſes of the ſyſtem at large either depend altogether upon the morbid ſtate of the chylopoietic viſcera, indicated by unnatural fœces, or are ſo connected with it, as to ceaſe when that morbid ſtate is removed by medicine. See CATHARTIC, and CHOREA.

The ancients did not fail to pay attention to the ſtools, as well as the other evacuations of the ſick; and they deduced their practical inferences, according to their humoral pathology, from the ſuppoſed crude or concocted ſtate of the fœces. But this hypotheſis ſeems to be leſs correctly applicable to the alvine, than to ſome other diſcharges; and the concoction of the excretions by ſtool appears to have only ſignified in general their approach to the natural or healthy appearance, and the term crude to have included all the various morbid appearances, which they exhibited. See CRUDITY and CONCOCTION.

In diſeaſes of the digeſtive organs and inteſtines themſelves, the nature of the dejections affords ſome of the diagnoſtic ſigns of the nature of the diſeaſes. In dyſentery, for example, in which the mucous coat of the inteſtines is inflamed, the paſſage conſtricted, and the fœcal matter detained, the ſtools conſiſt principally of the ſlime or mucus of the bowel, or, in more violent caſes, of blood only; and the fœcal matter, if any be diſcharged, is in the form of hard balls, or ſcybala: in the more advanced ſtages, when ulceration has taken place, pieces of coagulated lymph, like membranes, are diſcharged, with ſanious matter. In ſimple diarrhœa, the fœcal matter, though diluted with the ſerous effuſion from the exhalent veſſels of the canal, or mixed with portions of undigeſted aliment, paſſes off nevertheleſs, retaining moſt of its other natural qualities. When the ſecretion of bile, or its paſſage into the inteſtines, is interrupted in adults, as in jaundice, the ſtools are clayey, and pale, like whitiſh-brown paper. In children, when that ſecretion is ſtopped by the irritation of teething, their diet being chiefly of bread and milk, the fœces are white; and when digeſtion is diſordered, the biliary ſecretion going on, acid is generated in the ſtomach, which, mixing with the bile, gives the alvine diſcharges a green colour. Inſtances occaſionally occur, in which a fluid like coffee-grounds in colour and conſiſtence is vomited, and ſimilar matter, of a darker colour and of an offenſive ſmell, is diſcharged in great quantities *per anum*; ſometimes green bile is obſerved mixed with theſe diſcharges, ſometimes none. They conſiſt undoubtedly of blood ſlowly evacuated, ſometimes ariſing from the inner ſurface of the inteſtines, ſometimes from the liver, and generally occur in ſpirit-drinkers. This diſeaſe has been termed MELÆNA (μελαινα, black diſeaſe). On the examination of the bodies of perſons who have died of ſuch attack, the lining of the inteſtinal canal has been found highly inflamed, and apparently tending to mortification, through the whole extent, ſometimes with and at other times without any diſeaſe of the liver.

In many nervous and febrile diſorders of the conſtitution, as in chorea, St. Vitus's dance, in hyſteria, in typhus, and ſcarlatina, as ſhewn by Dr. Hamilton; and in ſome more local affections, as pointed out by Mr. Abernethy; the ſtools, by their unnatural colour, and fœtid odour, indicate diſorder in the chylopoietic organs; and eſpecially, as Mr. Abernethy maintains, in the liver and its ſecretion, the bile. Medical men, he obſerves, entertain various opinions reſpecting the colour of the fœces; but to him this property ſeems generally to depend on the kind and quantity of the bile. All the ſecretions, which are poured into the alimentary canal, except the bile, are colourleſs, or white; if, therefore, this fluid were wanting, the reſidue of the aliment would be of the colour, which might be expected to reſult from ſome of its undigeſted parts combined; and this is the caſe in jaundice, and ſometimes in children, during dentition, as before mentioned. The fœces, voided during a ſtate of diſorder of the digeſtive organs, are ſometimes partially coloured; which circumſtance cannot be well accounted for upon any other ſuppoſition, than that of an irregular ſecretion of the bile. Beſides, fluids ſecreted from the inteſtines do not uſually enter into combination with the fœcal matter, but appear diſtinctly when excreted. Thus we find mucus and jelly diſcharged from the bowels, unmixed with the fœces. And, laſtly, medicines which affect the liver, produce a very ſudden change in the colour of the fœces. Small doſes of mercury, without any alteration of diet, ſometimes change the ſtools immediately from a blackiſh to a light

a light yellow colour, which indicates a healthy but deficient ſecretion of bile. Healthy bile, in the human ſubject, is generally of a deep yellow brown colour; the brown ſeems to be the reſult of the yellow colour concentrated. Mr. Abernethy compares it to the colour of wetted rhubarb: for if a ſmall portion of either of theſe ſubſtances be put into a large quantity of water, it will dye it of a bright yellow colour; which is actually the colour of theſe ſubſtances, yet it is ſo concentrated in the maſs as to appear of a deep brown. The quantity of this fluid ſhould be ſuch as completely to dye the excrement of its peculiar colour. By attending, therefore, to the colour of the fœces, the kind and quantity of bile, which the liver excretes, may in general be aſcertained.

The colour of the alvine excretions in theſe diſordered ſtates of the viſcera, is various. Sometimes they appear to conſiſt of the reſidue of the food, untinged in the leaſt degree with bile. Sometimes they are of a light yellow colour, which denotes a very deficient quantity of healthy biliary ſecretion. They may alſo be of a deep olive, of a clay brown, and of a blackiſh brown; all of which ſhew a vitiated ſtate of the biliary ſecretion. Any kind of brown, which dilution will not convert into yellow, muſt be conſidered, according to Mr. Abernethy's principle, as unhealthy; ſince the colour of the healthy bile is a bright yellow, which by concentration appears brown.

The effects, which medicine or diet may have upon the colour of the fœces, ought, however, to be conſidered. When the food is coloured, and this colour is not altered by digeſtion, it will, of courſe, appear in the fœces; hence if it ſhould be thought deſirable to know accurately the ſtate of the biliary ſecretion, it would be right to reſtrict patients to a diet that is not likely to colour the fœces. In acute diſeaſes, however, as little or no food is taken, this conſideration is ſuperfluous. The green colouring matter of vegetables tinges the fœcal reſidue of the food. Steel is alſo known to influence the colour of the fœces, as well as the red varieties of cinchona, and ſeveral other drugs. It ſhould alſo be remarked, that the expoſure of fœces to air, after their expulſion, will in ſome inſtances cauſe a conſiderable alteration of their colour. In our endeavours, therefore, to aſcertain whether the liver is performing its office rightly, by obſerving the colour of the fœces, attention ſhould be paid to ſuch circumſtances, leſt we ſhould deceive ourſelves.

The reſidue of the alimentary matter, mixed with the bile, paſſes from the ſmall into the large inteſtines, and there undergoes a ſudden change; it acquires a peculiar fœtor, and becomes what we denominate fœces. This change is ſo ſudden, that it cannot be aſcribed to ſpontaneous chemical alterations, (which would be gradual,) but to ſome new animal agency. If the contents of the ſmall inteſtines at their termination, and of the large at their commencement, be examined, they will be found totally different even within a line of each other; the former being without fœtor, and the latter being in all reſpects what is denominated fœces. The fœces quickly ſuffer chemical decompoſition out of the body, although they often remain in the bowels, without undergoing the ſame kind of change. Their chemical decompoſition is attended with the ſudden formation of ammonia; yet if they be examined when recent, they are found to contain acids which ammonia would neutralize. The inference, therefore, naturally ariſes, that this agency of the large inteſtines may be deſigned, among other purpoſes, ſo to modify the reſidue of the alimentary matter, as to prevent it from undergoing thoſe various chemical changes, which might be ſtimulating to the containing organs, as well as injurious to the general health. In a perfectly healthy ſtate of the digeſtive organs, probably no chemical decompoſition, even of the fœces, takes place; yet ſuch changes happen in ſome degree, without apparently producing any injurious conſequences. To chemical changes we may probably attribute the extrication of inflammable air, and the various and unnatural odour of the fœcal matter, which is obſervable in diſordered ſtates of the digeſtive viſcera. Analogy would lead us to refer the changes, produced in the large inteſtines, to the effects of a ſecretion from their lining membrane, which ſecretion of courſe will be deranged by a diſordered and irritated ſtate of the organs, and a correſponding derangement of the fœcal proceſs muſt be expected to enſue. See Abernethy, Surgical Obſervations, vol. ii.

Dr. Hamilton, however, ſeems to be of opinion, that the fœces undergo a change, when long detained in the inteſtines, which this change of colour and ſmell indicates, and he attributes much to the ſtate of conſtipation or accumulation of fœces in the bowels, which this morbid condition of the dejections accompanies. Hence he conſiders dark and fœtid excretions from the bowels as indicating the neceſſity of purgative medicines; which experience has ſhewn to be ſalutary under ſuch circumſtances, whether in nervous, febrile, or other complaints. See Obſervations on Purgative Medicines.

The neceſſity of removing theſe morbid fœces by cathartics, which alſo ſtimulate the bowels, and the adjoining viſcera, the liver, and pancreas, is the inference likewiſe drawn by Mr. Abernethy, from his view of the ſubject.

The digeſtive organs are peculiarly liable to derangement in children, ſo that every diſeaſe in them, whether in the teeth, the lungs, or elſewhere, is accompanied with a diſcharge of unhealthy ſtools, and laxatives are therefore powerful auxiliaries in the cure of the majority of their complaints.

DEJECTORIA, denote purging medicines.

DEI FACIES *Promontorium*, in *Ancient Geography*, a promontory more commonly called from the Greek *Theoproſopon*, ſituated on the coaſt of Phœnicia, between Tripolis to the north, and Botrus or Botrys to the ſouth.

DEIFAN, in *Geography*, a town of Arabia, in the country of Yemen; 32 miles north of Sana.

DEIFICATION, in the *Pagan Theology*, the act, or ceremony, of deifying their emperors, *i. e.* of placing them among the gods, and decreeing divine honours to be rendered them. The deification is the ſame with *apotheoſis*; which ſee.

The deification of the emperors is the only inſtance in which they departed from their accuſtomed prudence and modeſty. The Aſiatic Greeks were the firſt inventors, and the ſucceſſors of Alexander the firſt objects of this ſervile and impious mode of adulation. It was eaſily transferred from the kings to the governors of Aſia; and the Roman magiſtrates very frequently were adored as provincial deities, with the pomp of altars and temples, of feſtivals and ſacrifices. (Mengault in vol. i. Acad. Inſcript.) It was natural that the emperors ſhould not refuſe what the proconſuls had accepted; and the divine honours, which both the one and the other received from the provinces, atteſted rather the deſpotiſm than the ſervitude of Rome. But the conquerors ſoon imitated the vanquiſhed nations in the arts of flattery; and the imperious ſpirit of the firſt Cæſar too eaſily conſented to aſſume, during his lifetime, a place among the tutelary deities of Rome. The milder temper of his ſucceſſor declined ſo dangerous an ambition, which was never afterwards revived, except by the madneſs of Ca-

ligula and Domitian. Auguſtus, indeed, permitted ſome of the provincial cities to erect temples to his honour, on condition that they ſhould aſſociate the worſhip of Rome with that of the ſovereign; he tolerated private ſuperſtition, of which he might be the object; but he contented himſelf with being revered by the ſenate and people in his human character, and wiſely left to his ſucceſſor the care of his public deification. A regular cuſtom was introduced, that on the deceaſe of every emperor, who had neither lived nor died like a tyrant, the ſenate by a ſolemn decree ſhould place him in the number of the gods; and the ceremonies of his apotheoſis were blended with thoſe of his funeral. This loyal, and, as it ſhould ſeem, injudicious profanation, ſo abhorrent to our ſtricter principles, was received with a very faint murmur (Cicero in Philippic. i. 6. Julian in Cæſaribus.) by the eaſy nature of polytheiſm; but it was received as an inſtitution, not of religion, but of policy. We ſhould diſgrace the virtues of the Antonines, by comparing them with the vices of Hercules or Jupiter. Hence the characters of Cæſar or Auguſtus were far ſuperior to thoſe of the popular deities. But it was the misfortune of the former to live in an enlightened age, and their actions were too faithfully recorded to admit of ſuch a mixture of fable and myſtery, as the devotion of the vulgar requires. As ſoon as their divinity was eſtabliſhed by law, it ſunk into oblivion, without contributing either to their own fame, or to the dignity of ſucceeding princes. Gibbon's Hiſt. vol. i.

DEIGGITSCH, in *Geography*, a river of Germany, which runs into the Kainach, about a mile ſouth-eaſt from Voitſberg.

DEI JUDICIUM, in *Antiquity*, a name given to the old Saxon trial by ordeal; becauſe they thought it an appeal to God, for the juſtice of a cauſe, and verily believed that the deciſion was according to the will and pleaſure of divine providence. See ORDEAL.

DEINCLINERS, or DEINCLINING *dials*, are ſuch as both decline, and incline or recline, at the ſame time.

Suppoſe, for inſtance, a plane to cut the prime vertical circle at an angle of 30 degrees, and the horizontal plane under an angle of 24 degrees, the elevation of the pole being 52 degrees; a dial, drawn on this plane, is called a *deincliner*. See DIAL.

DEINEK, in *Geography*, a town of European Turkey, in the province of Moldavia; 36 miles weſt of Birlet.

DE INJURIA *ſua propria, abſque tali cauſa*, in *Law*, are words uſed in replications, in actions of treſpaſs. (1 Lil. Abr. 427.) When one juſtifies by command or authority derived from another, or if a defendant juſtifies by authority at common law, as a conſtable by arreſt for breach of the peace; or if he juſtifies by act of parliament, &c.; the plaintiff may reply that he did it of *his own wrong, without any ſuch cauſe as the defendant has alleged*. Cro. Eliz. 539. 2 Salk. 628. See TRESPASS.

DEINSBURG, in *Geography*, a town of Germany in the duchy of Carinthia; 5 miles north of Ebernſtein.

DEINSE, DEINZE, or DEYNSE, a ſmall town of France, in the department of the Eſcaut, chief place of a canton in the diſtrict of Gand, with a population of 2958 individuals, nine miles ſouth-weſt of Gand, and 15 north-eaſt of Courtray. The canton has an extent of 85 kiliometres, 10 communes, and 17,158 inhabitants.

DEJOCES, in *Biography*, the firſt king of the Medes, raiſed to that honour from the rank of citizen, on account of his zeal in the adminiſtration of juſtice and equity among his countrymen. His influence as a private man was ſo great, that when he ceaſed to act, anarchy and confuſion ſeemed always and immediately to prevail: he was, in conſequence of this, choſen ſovereign about the year B. C. 709. He ſoon obtained all the honours attaching to that rank in life, and did not fail to magnify the importance of his ſituation; and to excite in the minds of his ſubjects an awe of his perſon, he would not ſuffer himſelf to be ſeen by any but thoſe of his immediate houſehold. He tranſacted all his buſineſs through the medium of ſervants and miniſters. By theſe means, and by employing a multitude of ſpies in all parts of his dominions, he eſtabliſhed a perfect deſpotiſm, which he adminiſtered with judgment, and with ſome degree of ſeverity. He reigned 53 years; and at his death was ſucceeded by his ſon Phraortes. Univer. Hiſt.

DEJOTARUS, firſt diſtinguiſhed as tetrarch of Galatia, and on account of the eminent ſervices which he performed in that ſtation, and of the figure which he made in the Mithridatic war, was afterwards appointed to the throne of the Leſſer Armenia by Pompey, which appointment was confirmed by the ſenate. He was highly reſpected by moſt of the principal people in Rome, and was of much ſervice in repreſſing many tumults which were excited in the empire. In the civil war between Pompey and Cæſar, he ſided with the former, and was on that account deprived of part of his territory, and became tributary to the victorious Cæſar. After his death, Dejotarus, by bribery, recovered his forfeited territories. He intended next to have joined Brutus, but the commander to whoſe care he truſted his troops went over to Antony, which was ſo far fortunate for him, that on the defeat of Brutus he was permitted to retain his kingdom. He arrived to an advanced age, and, towards the cloſe of life, was exceſſively devoted to the ſuperſtitions of the age and country in which he lived, and was governed almoſt entirely by omens and auguries. See BAYLE, who has given a very elaborate and learned article of this prince.

DEIPARA, Θεοτοκος. See MOTHER *of God*.

DEIRA, in *Ancient Geography*, one of the two kingdoms, into which the 7th kingdom of the heptarchy, or Northumberland, was divided; comprehending the country between the Humber and the Tyne, whoſe capital was York. The other of theſe two kingdoms was Bernicia, or the country between the Tyne and the Forth, whoſe capital was Bamburgh. Theſe two kingdoms were united by Oſwald about the middle of the 7th century, into the kingdom of Northumberland.

DEIR-ABULISE, in *Geography*, a town of Egypt; 45 miles ſouth-weſt of Cairo.

DEIRGEART LOUGH, often called *Lough Derg*, a very large ſheet of water in Ireland, into which the river Shannon expands, between the counties of Galway and Clare on one ſide, and Tipperary on the other. This lake is about 16 miles long, and from two to ſix in breadth, and contains ſome, though not many, iſlands.

DEIROUT, or DEIRÛT, a large and handſome town of Egypt, ſituated on the weſtern bank of the Nile, almoſt oppoſite to Foueh, and about 16 miles ſouth-eaſt of Roſetta.

DEIS, or DAIS, the chief table in a monaſtery. "Solus in refectorio prandebit ſupremus habens vaſtellum, priore prandente ad magnam menſam quam *deis* vulgariter appellamus."

It is thus called from a cloth called dais, with which the tables of kings were covered.

DEISM, the doctrine or belief of the Deiſts.

Deiſm, *Theiſm*, from Θεος, *God*, may properly be uſed to denote natural religion, as comprehending thoſe truths which have a real foundation in reaſon and nature; and in this ſenſe it is ſo far from being oppoſite to Chriſtianity, that it is one great deſign of the Goſpel to illuſtrate and enforce

enforce it. Thus ſome of the deiſtical writers have affected to uſe it; but deiſm more preciſely ſignifies that ſyſtem of religion, relating both to doctrine and practice, which every man is to diſcover for himſelf by the mere force of natural reaſon, independent of all revelation, and excluſive of it; and this religion Dr. Tindal, and others, pretend is ſo perfect, as to be incapable of receiving any addition or improvement, even from divine revelation.

It has not been, however, uncommon to boaſt of the perfection of this religion in conſequence of the aſſiſtance which it has received from revelation, though its advocates are neither ſufficiently humble nor candid to acknowledge it. Natural religion, with the clear views and extraordinary helps which it derives from the Scriptures of divine truth, is very different with regard to extent and evidence, from what it would have been without ſupernatural direction and aſſiſtance. It is not eaſy to determine what unaided reaſon might have done, and how far it might have diſcovered the principles and duties of religion; becauſe, in every period of time, its powers have been more or leſs aſſiſted by divine revelation, the benefits of which have been tranſmitted from one age to another. Under the diſpenſation of Chriſtianity, more eſpecially, men have been taught to reaſon juſtly concerning religious truth and duty by the aid of revelation, though they have not duly acknowledged their obligations. It therefore becomes thoſe who urge the perfection of natural religion as an argument againſt the neceſſity of divine revelation, to conſider to what this perfection is owing; and whether they are not indebted for it to thoſe extraordinary communications, of which they have availed themſelves, and which, being no farther neceſſary, they depretiate and diſcard. Some perſons, however, whilſt they have boaſted of the perfection of natural religion, have diſparaged Chriſtianity on account of the difficulties that embarraſs the inveſtigation of ſome of its doctrines and diſcoveries. It behoves ſuch perſons to conſider how far this kind of reaſoning may be urged againſt other ſyſtems both of religion and philoſophy, which they themſelves profeſs to admit. Are there not in *deiſm* itſelf, the moſt ſimple, as it is deemed, of all religious opinions, ſeveral difficulties, for which human reaſon can but ill account, which may therefore be not improperly ſtyled "articles of faith?" Such is the origin of evil under the government of an all-good and all-powerful God; ſuch is the reconciling of the preſcience of God, with the free-will of man, which, after much thought on the ſubject, Mr. Locke, (Letter to Mr. Molyneux, p. 509, vol. iii.) fairly confeſſes he could not do, though he acknowledges both; ſuch is alſo the creation of the world at any ſuppoſed time, or the eternal production of it from God, &c. &c. But becauſe of theſe difficulties, or any others that may occur in the ſyſtem of deiſm, no wiſe man will deny the *being* of God; or his *infinite wiſdom, goodneſs*, and *power*, which are proved by ſuch evidence as carries the cleareſt and ſtrongeſt conviction, and cannot be refuted without involving the mind in *far greater difficulties*, even in downright *abſurdities* and *impoſſibilities*. The only part, therefore, that can be taken is, to account in the beſt manner that our weak reaſon is able to do, for ſuch ſeeming objections; and when *that* fails, to acknowledge its weakneſs, and acquieſce under the certainty that our very imperfect knowledge or judgment cannot be the meaſure of the divine wiſdom, or the univerſal ſtandard of truth. So it is likewiſe with reſpect to the *Chriſtian religion*. Some *difficulties* occur in that revelation, which human reaſon can hardly clear; but as the truth of it ſtands upon evidence ſo ſtrong and convincing, that it cannot be denied without much *greater difficulties* than thoſe that attend the belief of it, we ought not to reject it upon ſuch objections, however mortifying they may be to our pride. *That* indeed would have all things made plain to us; but God has thought proper to proportion our knowledge to our *wants*, not to our *pride*. All that concerns our *duty* is clear; and as to other points either of natural or revealed religion, if he has left ſome obſcurities in them, is that any reaſonable cauſe of complaint? Not to rejoice in the benefit of what he has graciouſly allowed us to know, from a preſumptuous diſguſt at our incapacity of knowing more, is as abſurd as it would be to refuſe to *walk*, becauſe we cannot *fly*. From the arrogant ignorance of metaphyſical reaſonings, aiming at matters above our knowledge, aroſe all the ſpeculative impiety, and many of the worſt ſuperſtitions, of the old Heathen world, before the Goſpel was preached to bring men back again to the primitive faith; and from the ſame ſource have ſince flowed ſome of the greateſt corruptions of the evangelical truth, and the moſt inveterate prejudices againſt it; an effect juſt as natural as for our eyes to grow weak and even blind, by being ſtrained to look at objects too diſtant, or not made for them to ſee. If the *external* evidence of our religion be convincingly ſtrong, and there is no *internal* proof of its falſehood, but much to ſupport and confirm its truth; then ſurely no difficulties ought to prevent our giving a full aſſent and belief to it. It is our duty indeed to endeavour to find the beſt ſolutions we can to them; but where no ſatisfactory ones are to be found, it is no leſs our duty to acquieſce with humility, and believe that to be right which we know is above us, and belonging to a wiſdom ſuperior to ours. In the preſent compariſon of deiſm with Chriſtianity, and in contraſting the one againſt the other, with a view to the perfection of either, we have been led to mention the difficulties that attend both the one and the other; but the difficulties to which we refer, as peculiar to Chriſtianity, are ſuch as attend the belief of the Goſpel in ſome of its pure and eſſential doctrines, plainly and evidently delivered; which, being made known to us by a *revelation* ſupported by *proofs* that our reaſon *ought to admit*, and not being ſuch things as it could *certainly know to be falſe*, muſt be received by it as *objects of faith*, though they are ſuch as it could not have diſcovered by any natural means, and ſuch as are difficult to be conceived, or ſatisfactorily explained, by its limited powers. If the *glorious light of the Goſpel* be ſometimes overcaſt with clouds of doubt, ſo is the light of our *reaſon* too. But ſhall we deprive ourſelves of the advantage of *either*, becauſe thoſe clouds cannot perhaps be entirely removed, while we remain in this mortal life? Shall we obſtinately and frowardly ſhut our eyes againſt "that day-ſpring from on high that hath viſited us," becauſe we are not as yet able to bear the full blaze of his beams? Shall man preſume that his weak and narrow underſtanding is ſufficient to guide him *into all truth*, without any need of *revelation* or *faith?* Shall he complain that "the ways of God are not like his ways, and paſt his finding out?" True philoſophy, as well as true Chriſtianity, would teach us a wiſer and more modeſt part. It would teach us to be content within thoſe bounds which God has aſſigned to us, "caſting down imaginations, and every high thing that exalteth itſelf againſt the knowledge of God, and bringing into captivity every thought to the obedience of Chriſt." Lyttelton on the Converſion of St. Paul.

DEISTS, a claſs of people known alſo under the denomination of *Free-thinkers*, whoſe diſtinguiſhing character it is, not to profeſs any particular form, or ſyſtem, of religion; but only to acknowledge the exiſtence of a God, and to follow the light and law of nature, rejecting revelation, and oppoſing Chriſtianity.

This name ſeems to have been firſt aſſumed, as the denomination of a party, about the middle of the ſixteenth century,

tury, by ſome gentlemen in France and Italy, who were deſirous of thus diſguiſing their oppoſition to Chriſtianity by a more honourable appellation than that of atheiſts. Viret, an eminent reformer, mentions certain perſons in his epiſtle dedicatory, prefixed to the ſecond tome of his "Inſtruction Chretienne," publiſhed in 1563, who called themſelves by a new name, that of Deiſts. Theſe, he tells us, profeſſed to believe in God, but ſhewed no regard to Jeſus Chriſt, and conſidered the doctrines of the apoſtles and evangeliſts as fables, and dreams. He adds, that they laughed at all religion, though they outwardly conformed to the religion of thoſe with whom they lived, or whom they wiſhed to pleaſe, or feared to offend. Some, he obſerves, profeſſed to believe the immortality of the ſoul; others denied both this doctrine and that of providence. Many of them were conſidered as perſons of acute and ſubtil genius, and took pains in diſſeminating their notions. See Bayle's Dict. art. VIRET. vol. v. or Leland's View of the Deiſtical Writers, vol. i. p. 2.

The Deiſts hold, that, conſidering the multiplicity of religions, the numerous pretences to revelation, and the precarious arguments generally advanced in proof thereof, the beſt and ſureſt way is, to return to the ſimplicity of nature, and the belief of one God; which is the only truth agreed to by all nations.

They complain that the freedom of thinking and reaſoning is oppreſſed under the yoke of religion; and that the minds of men are ridden, and tyrannized, by the neceſſity impoſed on them of believing inconceivable myſteries; and contend, that nothing ſhould be required to be aſſented to, or believed, but what their reaſon clearly conceives. See DEISM.

The diſtinguiſhing character of modern Deiſts is, that they reject all revealed religion, and diſcard all pretences to it, as the effects of impoſture and enthuſiaſm. They profeſs a regard for natural religion, though they are far from being agreed in their notions concerning it. They are claſſed by ſome of their own writers into mortal and immortal Deiſts: the latter acknowledging a future ſtate, and the former denying it, or repreſenting it as very uncertain. Oracles of Reaſon, p. 99.

Dr. Clarke diſtinguiſhes four ſorts of Deiſts. 1. Thoſe who pretend to believe the exiſtence of an eternal, infinite, independent, intelligent Being, who made the world, without concerning himſelf in the government of it. 2. Thoſe who believe the being and natural providence of God, but deny the difference of actions, as morally good or evil, reſolving it into the arbitrary conſtitution of human laws; and therefore they ſuppoſe that God takes no notice of them. With reſpect to both theſe claſſes, he obſerves that their opinion can conſiſtently terminate in nothing but downright atheiſm. 3. Thoſe who having right apprehenſions concerning the nature, attributes, and all-governing providence of God, ſeem alſo to have ſome notion of his moral perfections, though they conſider them as tranſcendent, and ſuch in nature and degree, that we can form no true judgment, nor argue with any certainty concerning them: but they deny the immortality of human ſouls, alleging that men periſh at death, and that the preſent life is the whole of human exiſtence. 4. Thoſe who believe the exiſtence, perfections, and providence of God, the obligations of natural religion, and a ſtate of future retribution, on the evidence of the light of nature, without a divine revelation: ſuch as theſe, he ſays, are the only true Deiſts, but their principles, he apprehends, ſhould lead them to embrace Chriſtianity; and therefore he concludes, that there is now no conſiſtent ſcheme of Deiſm in the world. Evidence on Nat. and Rev. Religion, p. 12, 27.

The firſt Deiſtical writer of any that appeared in this country, was Herbert, baron of Cherbury. He lived and wrote in the 17th century. His book "De Veritate" was firſt publiſhed at Paris in 1624. This together with his book "De Cauſis Errorum," and his Treatiſe "De Religione Laïci," were afterwardes publiſhed in London. His celebrated work "De Religione Gentilium," was publiſhed at Amſterdam in 1663, in 4to, and in 1700 in 8vo. and an Engliſh tranſlation of it was publiſhed at London in 1705.

As he was one of the firſt that formed Deiſm into a ſyſtem, and aſſerted the ſufficiency, univerſality, and abſolute perfection of natural religion, with a view to diſcard all extraordinary revelation, as uſeleſs and needleſs, we ſhall ſubjoin the five fundamental articles of this univerſal religion. They are theſe: 1. That there is one ſupreme God. 2. That he is chiefly to be worſhipped. 3. That piety and virtue are the principal part of his worſhip. 4. That we muſt repent of our ſins; and if we do ſo, God will pardon them. 5. That there are rewards for good men, and puniſhments for bad men, both here and hereafter. Our own and the preceding age has produced a number of advocates in the ſame cauſe; and however they may have differed among themſelves, they have been agreed in their attempts of invalidating the evidence and authority of divine revelation. We might mention Hobbes, Blount, Toland, Collins, Woolſton, Tindal, Morgan, Chubb, lord Bolingbroke, Hume, &c. Some have alſo added lord Shafteſbury to the number.

But the friends of Chriſtianity have no reaſon to regret the free and unreſerved diſcuſſion which their religion has undergone. Objections have been ſtated and urged in their full force, and as fully anſwered; argument and raillery have been repelled; and the controverſy between Chriſtians and Deiſts has called forth a great number of excellent writers, who have illuſtrated both the doctrines and evidence of Chriſtianity in a manner that will ever reflect honour on their names, and be of laſting ſervice to the cauſe of genuine religion, and the beſt intereſts of mankind.

The number of Deiſts is ſaid to be daily increaſing: in England many men of ſpeculation and letters are ſaid to incline that way; and the like is obſerved in ſome of our neighbour nations, where freedom of ſpeaking, writing, and thinking, is indulged. Not that unreſtrained liberty in this reſpect can ever injure Chriſtianity, or ſerve the cauſe of Deiſm: truth neither needs nor ſeeks diſguiſe; but where freedom is allowed, men's ſentiments, on the ſubject of religion, are more generally known.

DEITY, GODHEAD, a common appellation given to God; and alſo by the poets to the heathen gods and goddeſſes.

DEIVIRILE, a term in the ſchool theology, ſignifying ſomething divine and human at the ſame time. See THEANDRIC.

The word is a compound of *Deus*, God, and *virilis*, of *vir*, man.

DEIZABAD, in *Geography* a town of Perſia in the province of Irak; 90 miles N. of Iſpahan.

DELAGOA BAY, a bay on the eaſt coaſt of Africa, ſituated in S. lat. 26°, E. long. 32°; and frequently viſited by veſſels employed in the ſouthern whale fiſhery. One of the chief rivers which enters the bay is the Mafumo; and the natives on the northern and ſouthern banks follow diſtinct cuſtoms, the men on the former wearing ſingular helmets of ſtraw. On the ſouthern ſide are 14 chiefs, ſubject to a king called Capellah, whoſe dominions extend about 200 miles inland, and about 100 on the ſea-ſhore, computed by the natives in days' journies of 20 miles each. Cattle and poultry are abundant, and may be purchaſed at a very cheap rate; the favourite articles being blue linens, old cloaths, braſs rings, copper wire, large glaſs beads, tobacco, pipes, &c.; the fiſh are numerous and excellent; and turtle is taken in

Deer iſland. The ſoil is a rich black mould, ſown with rice or maize in December or January; the dry ſeaſon laſting from April till October. There are many fruit-trees and uſeful plants, particularly the ſugar-cane; but no horſes, aſſes, nor buffaloes. The wild animals are the tiger, (panther), rhinoceros, antelope, hare, rabbit, wild hog, with Guinea hens, partridges, quails, wild geeſe, ducks, and ſome ſmall ſinging birds. The natives are Kuffees, that is, pagans, of a bright black colour, tall and ſtout, who go nearly naked, and are tattooed. They are good-humoured and harmleſs, and fond of excurſions on the river; there being what is called a king of the water, only yielding in power to Capellah. Like the reſt of Africa, the country is not populous; and Mr. White in his "Journal of a Voyage from Madras," 1800, 4to. ſuppoſes, that the inhabitants around this large bay may be from ſix to ten thouſand.

DE LA FOND, in *Biography*, a ſhallow conceited author of a treatiſe on muſic, publiſhed in 1725, octavo, under the title of "A new Syſtem of Muſic," in which he pretended to entirely new invent the art, furniſh it with new technica, and ſhorten its ſtudy three-fourths of the time uſually beſtowed on it, and alſo to teach a new and eaſier method than any yet known of figuring and playing thorough baſe, or, as he affectedly calls it, compound baſe.

DELAIRE, one of the claimants to the formula of accompanying the muſical ſcale of eight notes aſcending, and eight deſcending, commonly called by the French, *La regle de l'octave*, which ſee.

DELAKUS, in *Geography*, a ſmall town of Abyſſinia, ſituated on the top of a hill near the river Nile, W. of the lake of Dembea, in N. lat. 11° 44′. E. long. 37° 2′. It extends from N. E. to N. N. E. and is more conſiderable in appearance than the generality of the ſmall towns or villages in Abyſſinia, becauſe it is inhabited by Mahometans only, a trading, frugal, intelligent, and induſtrious people. It gives name to a ford of the river, which is paſſable from the end of October to the middle of May.

DE LA MARCH, a weſtern water of Illinois river, in the N. W. territory of America; 30 yards wide, and navigable eight or nine miles.

DELAMATTENOOS, an Indian tribe, in alliance with the Delawares.

DELANY, PATRICK, in *Biography*, a clergyman of conſiderable celebrity in Ireland, was born about the year 1686. It is not known where or under whom he received the early part of his education; but he finiſhed his ſtudies at Trinity college, Dublin. Here he became diſtinguiſhed for learning, and was elected fellow of his college. He obtained numerous pupils, and by their progreſs Mr Delany gained a high reputation. He was the friend and aſſociate of Dr. Swift, and joined him and Dr. Sheridan in a variety of poetical effuſions, in which, however, he indulged only in the hours of relaxation from his ſtudies. He cultivated the talents of a preacher, and became very popular. About the year 1724 he was involved in a diſpute with the provoſt of the college, and was obliged ſo far to ſubmit himſelf as to acknowledge he had acted with impropriety. This offence created him other enemies, and prevented him from riſing in the church. His political principles, alſo, as a tory were obſtacles to any important preferment. About the year 1727 Delany, who had already taken his degree as Dr., was preſented, by the univerſity of Dublin, to a ſmall living worth about 100*l. per ann.*: and alſo was appointed chancellor of Chriſt-church, which produced a ſimilar income. He was afterwards appointed prebend of St. Patrick's cathedral; but he had previouſly relinquiſhed the advantages and emoluments ariſing from his fellowſhip, ſo that his income was ſtill very limited. In 1729 he commenced the publication of a periodical paper, called "The Tribune," which was a work of merit, but not ſufficiently adapted to the taſte of the public to become popular or long-lived. In 1731 Dr. Delany came to London with introductory letters to Dr. Gibſon, biſhop of London: he ſubmitted to his lordſhip's judgment a theological work, entitled "Revelation examined with Candour," &c. This he afterwards publiſhed, with the approbation of the worthy prelate. It was ſo highly eſteemed at the time that it ſoon paſſed through three editions. It conſiſts of a variety of diſſertations on ſubjects, deemed at that period of conſiderable importance, but which have ſince, or at leaſt many of them, been very little attended to. During our author's abſence from Dublin he married an Iriſh widow lady of conſiderable fortune, by which he was enabled to indulge his natural generoſity, and to live in a ſtyle of hoſpitality, to which his former narrow means were wholly unequal. This fortune, however, in after-life, was the occaſion of much trouble, and expenſive law and chancery ſuits, which, though they terminated in favour of the doctor's fortune and fame, which had been virulently attacked, muſt for ſeveral years have been the ſource of great uneaſineſs. In the Biographia Britannica is a long and intereſting account of the diſpute drawn from authentic legal ſources. In 1738 Dr. Delany gave to the world one of the beſt, if not the very beſt, of his productions; it was entitled "Reflections upon Polygamy, and the Encouragement given to that Practice in the Old Teſtament." The object of the author was to point out the diſorders and miſchiefs which the practice of polygamy muſt introduce into ſociety: the arguments have generally been admitted to be ſtrong, and his reaſoning very concluſive. There have, however, we apprehend, been very few in this country, at any times, who have been advocates for the contrary opinion, and therefore the ſubject was of leſs practical importance than was ſuppoſed by the doctor and his adherents. Dr. Delany's next publication was "An hiſtorical Account of the Life and Reign of David, King of Iſrael," which, by the candid and judicious, was conſidered as too much of an eulogy on a character, which, in ſome reſpects, is expoſed to the ſeverity of animadverſion. (See DAVID.) Dr. Delany, having loſt his wife, married a ſecond time a lady of great taſte and ſkill in painting, and other ingenious arts. To this lady Dr. Kippis has devoted a ſeparate article; we may therefore in this place obſerve that Mrs. Delany excelled in embroidery and ſhell-work, and at the age of 74 ſhe invented a new and beautiful mode of exerciſing her ingenuity by the conſtruction of a Flora of a moſt ſingular kind, formed by applying coloured papers together. It conſiſted of nearly 1000 plants executed with unparalleled preciſion and truth. In the year 1744 Dr. Delany publiſhed a volume of "Sermons on the ſocial Duties;" and in another edition were added "Sermons on the oppoſite Vices." In the ſame year he was preſented with the deanery of Down, chiefly through the recommendation of the whigs, who had formerly ſet themſelves againſt his promotion in the church. In 1754 he publiſhed "Obſervations upon Lord Orrery's Remarks on the Life and Writings of Dr. Jonathan Swift, containing ſeveral ſingular Anecdotes relating to the Character and Conduct of that great Genius, and the moſt deſervedly celebrated Stella." The chief object of this work was to vindicate the dean from ſome miſrepreſentations contained in the noble lord's remarks, in which the doctor has been very ſucceſsful: he has alſo afforded a clearer view of the real character of Dr. Swift than had been given in any other publication. Our author alſo publiſhed another volume of ſermons, of which thoſe on practical ſubjects, are of real and ſterling merit. In 1763 he publiſhed the third volume of his "Revelation examined with Candour:" and in 1766 another

another volume of diſcourſes and diſſertations made their appearance. This was the laſt work publiſhed by Dr. Delany: we have not, however, enumerated all his publications; many ſingle ſermons and ſmall tracts do not appear to command ſeparate notice. The doctor died at Bath, in the month of May 1768, in the 83d year of his age. As a writer he poſſeſſed reſpectable talents, which he exerciſed in the cauſe of virtue and true religion. His piety and benevolence were conſpicuous; but the warmth of his temper was ſometimes accompanied with a certain portion of irritability and impetuoſity. Few excelled him in charity, and hoſpitality. His income which, during the laſt twenty years of his life, was 3000*l. per ann.*, ſunk under the exerciſe of theſe virtues, and he left little behind him but his books and furniture. He is ſaid to have been a very abſent man, in proof of which the following anecdote, among others, has been told of him. Being at his own deſire appointed to preach before the king, and not knowing the uſual etiquette of the buſineſs, he entered the royal chapel after ſervice was commenced; not knowing the place appropriated to the preacher, he crouded into the deſk by the reader. The veſturer in the midſt of his devotions went and pulled him by the ſleeve, but the doctor chagrined at being interrupted during the ſolemnity of prayer, reſiſted the intruder, who in vain begged him to come out; and ſaid, "There was no text:" the doctor ſaid he had a text, and it was ſome time before he could be brought to underſtand that the text muſt be written out for the cloſets. Biog. Brit.

DELARAM, in *Geography*, a town of Perſia, in the province of Segiſtan; 90 miles N. E. of Zareng.

DELAS, a river of Wales, in the county of Brecknock, which runs into the Yrvon, five miles S. W. of Bealth.

DELAS, or *Silla*, *Diala*, in *Ancient Geography*, a river of Aſia, in Perſia, to the left of the Tigris, into which it diſcharges itſelf, after having watered the towns of Apollonia, Aſtargeda, &c. in flowing from its ſource in mount Zagrus.

DE LA WAR, a town of America, in the ſtate of Virginia, and King William's county, ſituated on the broad peninſula formed by the confluence of the Pamunky and Mattapony. The united ſtream here aſſumes the name of York-river. The town lies 20 miles N. by W. of Williamſburg.

DELAWARE, one of the United States of N. America, ſituated between 38° 29′ 30″, and 39° 54′ N. latitude, and between 75° and 75° 48′ W. long., being 92 miles in length and 24 miles in breadth, and containing 2000 ſquare miles, or 1,200,000 acres. This ſtate is bounded E. by the river and bay of the ſame name, and the Atlantic ocean; on the S. by a line from Fenewick's iſland, in N. lat. 38° 29′ 30″, drawn weſt till it interſects what is commonly called the *tangent* line, dividing it from the ſtate of Maryland; on the W. by the ſaid tangent line, paſſing northward up the peninſula, till it touches the weſtern part of the territorial circle; and thence on the N. by the ſaid circle, deſcribed with a radius of 12 miles about the town of Newcaſtle, which divides this ſtate from Pennſylvania. It derived its name from Lord De La War, who was inſtrumental in eſtabliſhing the firſt ſettlement of Virginia. The Delaware ſtate is divided into three counties, viz. Newcaſtle, Kent, and Suſſex, whoſe chief towns are Wilmington, Newcaſtle, Dover, and Lewes. Dover is the ſeat of government. The number of inhabitants is 64,273, of whom 6153 are ſlaves. The eaſtern ſide of the ſtate is indented with numerous creeks, or rivers, which generally have a ſhort courſe, ſoft banks, many ſhoals, and are ſkirted with very extenſive marſhes. In the ſouthern and weſtern parts of this ſtate, ſpring the head-waters of Pocomoke, Wicomico, Nanticoke, Choptank, Cheſter, Saſſafras, and Bohemia rivers, all of which fall into Cheſapeak bay, and ſome are navigable for 20 or 30 miles into the country by veſſels of 50 or 60 tons. Excepting the upper part of the county of Newcaſtle, this ſtate is, generally ſpeaking, low and level. It abounds at particular ſeaſons of the year with ſtagnant water, which renders it unfit for the purpoſes of agriculture, and injurious to the health of its inhabitants. The ſpine, or higheſt ridge of the peninſula, runs through the ſtate of Delaware, inclining to the eaſtern or Delaware ſide. It is deſignated in Suſſex, Kent, and part of Newcaſtle, counties by a remarkable chain of ſwamps, from which the waters deſcend on each ſide, paſſing on the E. to the Delaware, and on the W. to the Cheſapeak. Notwithſtanding the ſwamps already mentioned, Delaware is an agricultural ſtate; including a fertile tract of country, which yields a variety of uſeful productions. Along the Delaware, and from eight or ten miles into the interior country, the ſoil is generally a rich clay. Thence to the ſwamps above mentioned, it is light, ſandy, and of an inferior quality. About Chriſtiana the heights are lofty; ſome of the hills of Brandywine are rough and ſtony; but with theſe and ſome few other exceptions, the lower country forms almoſt one extended plain. In the county of Newcaſtle the ſoil is a ſtrong clay; in Kent it has a conſiderable mixture of ſand; and in Suſſex the ſand predominates. Wheat of the beſt quality is cultivated in this ſtate, and it is much valued and ſought for, not only through the States of the Union, but in foreign markets. Beſides wheat, which yields the beſt ſuperfine flower, this ſtate generally produces plentiful crops of Indian corn, barley, rye, oats, flax, buckwheat, and potatoes, and various kinds of fruit in great perfection. It abounds in natural and artificial meadows containing a large variety of graſſes. Hemp, cotton, and ſilk, duly attended, would, without doubt, flouriſh here very well. The county of Suſſex has excellent grazing lands. From hence are alſo exported large quantities of lumber, obtained chiefly from an extenſive ſwamp, called the Indian river or Cypreſs ſwamp, lying partly in this ſtate, and partly in the ſtate of Maryland. This moraſs extends ſix miles from E. to W., and nearly twelve from N. to S., including an area of nearly 50,000 acres of land. It contains a great variety of plants, trees, wild beaſts, birds, and reptiles. Almoſt the whole of the foreign exports of Delaware are from Wilmington; the trade from this ſtate to Philadelphia is very conſiderable, being the principal ſource whence that city draws its ſtaple commodity. No leſs than 265,000 barrels of flour, 300,090 buſhels of wheat, 170,000 buſhels of Indian corn, beſide barley, oats, flax-ſeed, paper, ſlit iron, ſnuff, ſalted proviſions, &c. &c. to a very conſiderable amount, are annually ſent from the waters of the Delaware ſtate; of which the Chriſtiana is much the moſt productive, and probably much more ſo than any other creek or river of like magnitude in the Union; 245,000 barrels of flour, and other articles to the amount of 80,000 dollars, or more, being exported from this creek; of which to the value of 550,000 dollars are manufactured on its northern bank, within two or three miles of the navigation. Among other branches of induſtry exerciſed in or near Wilmington, are a cotton manufactory, and a bolting-cloth manufactory, both of which promiſe to be of laſting benefit to the country. In the county of Newcaſtle are ſeveral fulling mills, two ſnuff mills, a ſlitting mill, four paper mills, and 60 mills for grinding grain, all of which are turned by water; and this neighbourhood admits ſtill of greater improvements. The legiſlature in the January ſeſſion 1796 paſſed an act to create a fund for the eſtabliſhment of ſchools throughout the ſtate. The manufacture of flour is carried unto great perfection in this

ſtate; numerous mills are erected for this purpoſe; and thoſe of Brandywine ſtream, three miles from the creek on which they ſtand, half a mile from Wilmington, and 27 from Philadelphia, are moſt extolled, as capable of grinding annually 400 000 buſhels, though, from collateral circumſtances, their uſual yearly produce does not amount to more than from 290 to 300,000 buſhels. Theſe mills employ about 200 perſons; and they are ſo conveniently ſituated with regard to navigation, that a veſſel carrying 1000 buſhels of wheat may be laid along-ſide any of theſe mills, and the water adjoining ſome of them is ſufficiently deep to admit veſſels of twice the above ſize. By means of well contrived machinery the veſſels are loaded and unloaded with ſurprizing expedition. Beſides wheat and flour, this ſtate exports lumber, and various other articles. The amount of exports for the year ending September 30, 1791, was 119,878 dollars 93 cents; in 1792, 133,972 dollars 27 cents.; in 1794, 207,985 dollars 33 cents.; and in 1801, 440,504 dollars.

In the ſtate of Delaware, there is a variety of religious denominations; of Preſbyterians there are 24 churches; of Epiſcopalians, 14; of Baptiſts, 7; and of Methodiſts, a conſiderable number, particularly in the two lower counties of Kent and Suſſex. At Wilmington there is a Swediſh church, one of the oldeſt in the United States.

Of minerals there are few in this ſtate, except iron. Wheat and lumber are its ſtaple commodities. We have already mentioned ſeveral other articles of its produce and manufacture.

Settlements were made in Delaware by the Dutch about the year 1623, and by the Swedes about the year 1627. Their ſettlements were comprehended in the grant to the duke of York; and William Penn united them to his government by purchaſe. They were afterwards ſeparated, in ſome meaſure, from Pennſylvania, and denominated, the "Three Lower Counties." They had their own aſſemblies; but the governor of Pennſylvania uſed to attend, as he did in his own proper government. At the late revolution, the three counties were erected into a ſovereign ſtate, and have eſtabliſhed a republican conſtitution. Morſe.

DELAWARE *County*, a county of Pennſylvania, S.W. of Philadelphia county, on the Delaware river; about 21 miles long, and 15 broad, containing 115,200 acres, and ſubdivided into 21 townſhips, the chief of which is Cheſter. The number of inhabitants is 12,809. The lands bordering on the Delaware are low, and afford excellent meadow and paſturage; and are guarded from inundations by mounds of earth or dykes, which are ſometimes broken down by extraordinary freſhes in the river, to the great damage and ſubſequent expence of the proprietors. Great numbers of cattle are brought hither from the weſtern parts of Virginia, and N. Carolina, to be fattened for ſupplying the Philadelphia market.

DELAWARE, a county in New-York, on the head-waters of Delaware river, containing 21,700 inhabitants.

DELAWARE, a townſhip in Wayne county, Pennſylvania, including 381 inhabitants.

DELAWARE *Bay* and *River*. The bay is 60 miles long, from the cape to the entrance of the river, at Bombay Hook; occupies a ſpace of about 630,000 acres; and is in ſome parts ſo wide, that a ſhip, in the middle of it, cannot be ſeen from the land. It opens into the Atlantic N.W. and S.E. between cape Henlopen on the right, and cape May on the left. Theſe capes are 18 or 20 miles apart. Delaware river was called Chihohocki by the aboriginals, and in an old Nuremberg map is named Zuydt river. It riſes by two principal branches in the ſtate of New York; the northernmoſt of which, called the Mohawk's or Cookquago branch, riſes in lake Utſayanthe, lat. 42° 25′, and takes a S.W. courſe, and turning ſouth-eaſterly, croſſes the Pennſylvania line in lat. 42°; and about 7 miles from thence, it receives the Popachton branch from the N.E., which riſes in the Kaat's-Kill mountains. Thence it runs ſouthwardly, until it touches the N.W. corner of New Jerſey, in lat. 41° 24′; and then paſſes off to ſea through Delaware bay; having N. Jerſey E. and Pennſylvania and Delaware W. The bay and river are navigable from the ſea to the great or lower falls at Trenton, 155 miles; and are accommodated with buoys and piers for the direction and ſafety of ſhips. A 74 gun ſhip may go up to Philadelphia, 120 miles by the ſhip channel from the ſea. The diſtance acroſs the land, in a S.E. courſe to N. Jerſey coaſt, is but 60 miles. Sloops go 35 miles above Philadelphia to Trenton falls; boats, that carry 8 or 9 tons, 100 miles farther; and Indian canoes 150 miles, except ſeveral ſmall falls or portages. It is in contemplation to connect the waters of Cheſapeak bay with thoſe of Delaware river by 4 different canals, *viz.* Elk river with Chriſtiana creek; Broad creek, another branch, with Red-lion creek; Bohemia, a third branch of the Elk, with Apoquinemy creek; and Cheſter river with Duck creek. Morſe.

DELAWARE, a ſmall river of Eaſt Florida.

DELAWARE, a townſhip in the county of Suffolk, Upper Canada, lying on the E. ſide of the river Thames, in the plains above the Delaware village of Indians.

DELAWARES, an Indian nation, formerly numerous and powerful, who poſſeſſed part of Pennſylvania, New Jerſey, and New York. This name was given them by the Europeans; for they call themſelves Lennilenape, that is, Indian men; or Woapannackky, which ſignifies, a people living towards the riſing ſun. They now reſide about halfway between lake Erie and Ohio river. They are an ingenious and intelligent people; and, like the Six Nations, are celebrated for their courage, peaceable diſpoſition, and powerful alliances. Almoſt all the neighbouring nations are in league with them, eſpecially the Mahikun, Shawanees, Cherokees, Twichtwees, Wawiachtanos, Kickapees, Moſhkos, Tuckachſhas, Chippeways, Ottawas, Putiwoatamies, and Kaſkakias. The Delawares, who were hoſtile, made peace with the United States in 1795, and ceded ſome lands. The United States, on their part, have engaged to pay them in goods to the value of 1000 dollars a year for ever. Formerly the Delawares could furniſh 600 warriors; but their number has been lately conſiderably decreaſed by war. Morſe.

DELBRUCK, a ſmall town of the kingdom of Weſtphalia. It formerly belonged to the biſhopric of Paderborn; and is ſituated 12 miles W. of Paderborn.

DEL CREDERE, *Commiſſion of*, in *Commerce*, an undertaking by an inſurance-broker, for an additional premium, to inſure his principal againſt the contingency of the failure of the under-writer. 1 Term Rep. 112.

DELDEN, in *Geography*, a ſmall town of the kingdom of Holland, in the department of Overyſſel.

DELEBIO, a ſmall town of the canton of the Griſons, in the Helvetic republic, ſituated in the Veltlin, in the Squadra de Morbegno, near the caſtle of Fuentes, remarkable for the abbey of Aqua Fredda, and a chapel built on the field where Philip Maria, duke of Milan, defeated the Venetians in 1434. Dictionnaire de la Suiſſe.

DELECITO, a town of Naples, in the province of Capitanata; 10 miles S.S.E. of Troja.

DELEGATES, certain perſons delegated, or appointed by the king's commiſſion, under the great ſeal, to ſit upon

an appeal to the king in the court of chancery. See COURT *of Delegates*.

For delegates in academical cauſes; ſee *Univerſity* COURT.

DELEGATION, a commiſſion extraordinary given a judge to take cognizance of and determine ſome cauſe, which ordinarily does not come before him.

In the civil law, delegation alſo denotes a ſort of ſurrender, whereby a perſon ſubſtitutes another debtor in his place. See Ulpian, l. 11. ff. *de novationibus & delegationibus*.

This delegation differs from transferring, or tranſlation, becauſe three perſons intervene in a delegation, *viz.* the creditor, the debtor, and a third, who himſelf is indebted to the debtor, and on whom the debtor transfers the obligation he was under to pay the creditor, delegating him, as it were, for that purpoſe. But, in a ſimple transfer, it is enough the transferrer and the transferree be preſent.

DE'LE'MONT, or DELSBERG, and *Delſperg*, in *Geography*, a ſmall town of France, in the department of the Upper Rhine, chief place of a diſtrict of the ſame name, ſituated on the river Byrſe, with a population of 904 individuals. It has a ſubprefect, a court of juſtice, and a regiſter office. Its canton has an extent of 307½ kiliometres, 32 communes, and 10,118 inhabitants. The whole diſtrict comprizes 5 cantons, 107 communes, 35,779 inhabitants, and a territorial extent of 920 kiliometres. The country is mountainous, and produces very little.

Till the year 1793 Délémont belonged to the biſhopric of Baſle. The prince biſhop had a palace here, and the canons of Moutiers ſome very elegant houſes. Near Délémont are fine quarries of white free-ſtone, reſembling marble, a mineral ſpring, and other natural curioſities, but chiefly petrifications. Herbin Statiſtique de la France. Dictionnaire de la Suiſſe.

DELETERIOUS (from δηλεω, *noceo, I hurt*), a term ſometimes uſed among naturaliſts for ſuch things as are of a pernicious and poiſonous nature. See POISON.

DELF, a quarry, or mine, where ſtone or coal is dug. From the Saxon word *delfan*, to delve or dig.

DELF *of Coal*, denotes coal lying in veins under ground, before it is dug up.

DELF, or *Delve of Coals*, is alſo a certain quantity, dug out of a mine or pit. See COAL.

DELF is alſo uſed in *Heraldry* for one of the abatements of honour; being a ſquare in the middle of the eſcutcheon.

A delf tenne was anciently due to him who receded from his own challenge, or any way departed from his parole, or word. If there be two or more delfs in an eſcutcheon, it is then no longer an abatement: ſo alſo, if it be of metal, or charged upon; it then becomes a charge of perfect bearing.

DELF, or *Delft-ware*, Fr. *Fayence*, a kind of pottery of baked earth, covered with an enamel, or white glazing, which gives it the appearance and neatneſs of porcelain. The baſis of this pottery is clay; and the kinds of clay chiefly uſed are the blue and green, with an addition of marle or ſand, in order to leſſen the contraction of the clay, to render it leſs compact, and to afford a better ground for the enamel. Red clay is alſo added, which, on account of its ferruginous matter, binds and gives a greater ſolidity. The proportions of theſe ingredients vary in different works, according to the different qualities of the earths employed. Three parts of blue clay, two of red clay, and five parts of marle, form the compoſition uſed in ſeveral manufactories. Veſſels formed of theſe materials muſt be dried very gently, to avoid cracking. They are then to be placed in a furnace to receive a ſlight baking, and they are laſtly to be covered with an enamel or glazing, which is done by putting upon the veſſels thus prepared, the enamel, which has been ground very fine, and diluted with water. The glazing, which is nothing but white enamel, ought to be ſo opake as not to ſhew the ware under it. The enamels for delf-ware are compoſed of ſand or flints, vitrifying ſalts, calx of lead, and calx of tin. The vitrification of ſand is effected by ſomewhat leſs than an equal part of alkaline ſalt, or twice its weight of calx of lead, and one part of calx of tin, which is deſigned for giving a white opake colour to the maſs, is to be added to three or four parts of all the other ingredients taken together. M. D'Antic recommends for the white enamel, uſed in glazing, a mixture of a hundred pounds of calx of lead, with about a ſeventh part of that quantity of calx of tin, for common delf, or a fourth part of calx of tin for the fineſt delf; a hundred, or a hundred and ten pounds of fine ſand; and about twenty or thirty pounds of ſea-ſalt or ſalt of glaſs. To make this enamel, lead and tin are calcined together with a ſtrong fire, or the ſand is alſo to be made into a frit with the ſalt or aſhes. The whole, being well mixed and ground together, is placed under the furnace, where it is melted and vitrified during the baking of the ware. Then it is to be ground in a mill, and applied as above directed. Dict. of Chem. Eng. edit. 1777. See ENAMEL, GLAZING, and PORCELAIN.

DELFACE, FRANCIS, in *Biography*, a learned French monk, was born at Montet in Auvergne, in the year 1637. He entered upon the monaſtic life at Clermont, in 1656, where he recommended himſelf to the notice and reſpect of his ſuperiors, as well by his ſteady application, as by his talents. He was fixed on, at the inſtigation of the celebrated Arnaud, to give a new edition of the works of St. Auguſtine. To this work he applied himſelf with all diligence, and had made conſiderable preparation for the publication, when an anonymous tract, that expoſed church abuſes, came out, and was imputed to him. For this he was unjuſtly baniſhed, having, it is believed, had no concern in the offence for which he ſuffered puniſhment. The place of his exile was Lower Bretagne, where he was unable to proceed on his great work. He was ſhortly after his baniſhment called upon to preach at Breſt, on ſome public occaſion, when the veſſel in which he took his paſſage was wrecked, and he was among the number of thoſe that were drowned. This happened in October 1676, in the thirty-ninth year of his age. He was author of ſeveral works which are not intereſting to the Engliſh reader. His hiſtorical eulogy, entitled, "The Epitaph of Caſimir, King of Poland, who, after having abdicated his Crown, retired into France, and became Abbot of St. Germain de Pres," is a work of conſiderable merit. Moreri.

DELFINO, in *Geography*, a town of European Turkey, and capital of Lower Albania, where the pacha reſides; 356 miles W. of Conſtantinople, and 60 S.S.W. of Edeſſa. N. lat. 40° 4′. E. long. 21° 15′.

DELFT, or VAN DELPHUS, WILLIAM JAMES, in *Biography*, an excellent painter and engraver, was the ſon of William Delft, and a near relation (grandſon, according to Pilkington) of Michael Miravelt, and born at Delft in 1619. He drew and painted portraits with excellent taſte; and having been inſtructed by Miravelt, acquired a ſimilar mode of deſign and colouring, and ſucceſsfully imitated him in the management of his pencil, ſo that he is ſaid to have equalled Miravelt in force and delicacy. However, he is more generally known as an engraver; and his beſt prints are highly finiſhed: ſome of them are executed in a bold, powerful, open ſtyle, which produces a fine effect. Such

was his portrait of Hugo Grotius, dated 1652; and others in a neat and much more finiſhed manner, as we find, ſays Strutt, in the admirable portrait of Michael Miravelt, from a picture of Vandyck. He uſually ſigned his name at length, and ſometimes ſubſtituted the letters G. V. D., or a cypher compoſed of a G and a D. It does not appear that he was ever in England; and yet he engraved ſeveral Engliſh portraits, as Charles I. of England, Henrietta Maria, his queen, George Villars, duke of Buckingham, &c. and ſtyles himſelf the king's engraver. He died in 1661, Pilkington and Strutt.

DELFT, in Latin *Delphi*, in *Geography*, a conſiderable and handſome town of the kingdom of Holland, in the department of the Maeſe, or Meuſe, on the river Schie between Rotterdam and Leyden, 4 miles S. of the Hague, 6 miles N.W. of Rotterdam, and 9 miles S. of Leyden. N. lat. 51° 53′. It has 25,000 inhabitants, is nearly two miles in circumference, and defended againſt inundations by three dams or dikes. The principal ſtreets have ſpacious canals planted on each ſide with trees. The public buildings, particularly the town-houſe or guild-hall, are very magnificent. The arſenal, before the late revolutions, was conſidered as one of the beſt furniſhed in Holland. In the principal church is the noble tomb of prince William I. of Orange, founder of the former Batavian republic, who was baſely aſſaſſinated in 1584; and in another church a marble monument erected to the memory of admiral Tromp.

Delft owes its origin to Godfrey the Hunchback, duke of Lower Lorraine, who built a caſtle here in 1071, but it is chiefly remarkable for its manufacture of earthen ware, or pottery, made of baked earth covered with an enamel or white glazing which gives it the appearance and neatneſs of porcelain. This earthen ware is known in commerce by the name of *Delft ware*.

DELFTLAND, was formerly that portion or diſtrict of the department of the Maeſe, in Holland, in which the towns of Delft and Delftſhaven are ſituated.

DELFTSHAVEN, or the port of Delft, a ſmall neat town of the kingdom of Holland, in the department of the Maeſe, on the mouth of the river Maeſe, 6 miles S. by E. of Delft, with which it is connected by a handſome canal. It is in fact the harbour of Delft.

DELFZYL, a ſmall town of the kingdom of Holland, in the department of Groeningen, with a caſtle near the mouth of the river Eems at its confluence with the Fivel, or Damſter Diep, 3 miles N. of Dam, 18 miles N.E. of Groeningen, and 12 S.W. of Emden. N. lat. 53°. 18′. E. long. 6° 20′.

DELGADO, CAPE, a cape on the eaſt coaſt of Africa, in the Indian ſea. S. lat. 10° 5′. E. long. 40°.—Alſo, a cape on the eaſt coaſt of Africa, in the Indian ſea. N. lat. 9° 45′. E. long. 50°. 15′.

DELGOVITIA, in *Ancient Geography*, a place of Britain, marked in Antoninus's Itinerary, iter I., 20 miles from York, belonging to the Brigantes. This ſtation is generally placed by antiquarians at Wighton, or at Godmanham, a village about half a mile from it.

DELHI, or DEHLI, one of the eleven ſoubahs, or provinces, into which Acbar, during his long reign in the 11th century, divided Hindooſtan Proper; to which four more were afterwards added. It was formerly a kingdom or empire of conſiderable extent, containing ſeveral provinces or circars, and many cities and towns; but having been the ſeat of continual wars for more than 50 years, and encroached upon by numerous invaders, it is now reduced into a wretched ſtate, and its boundaries have been fluctuating and precarious, as well as very limited. The country is almoſt depopulated, and moſt of the lands are lying waſte; the wretched inhabitants not daring to provide more than the bare means of ſubſiſtence, for fear of attracting the notice of thoſe whoſe trade is pillage. Nothing but the natural fertility of the ſoil, which produces wheat, rice, millet, ſugar, indigo, pulſe, and fruits of various kinds, and the mildneſs of the climate, more temperate even than that of the neighbouring province of Agra, could have kept up any degree of population; and rendered the ſovereignty of it, at this day, worth contending for. A tract of country, which poſſeſſes every advantage that can be derived from nature, contains the moſt miſerable of inhabitants; ſuch is the dire effect of the ambition of their ſuperiors, and ſo dearly do mankind pay for it; who, miſcalculating their powers, think they can govern as much as they can conquer. The only territory remaining to the tribe of Timur or Tamerlane is a ſmall diſtrict round Delhi, together with the city itſelf (now no longer a capital), expoſed to repeated depredations, maſſacres, and famines, by the conteſts of invaders. The province has now 8 circars, ſubdivided into 232 pergunnahs. Its revenue is ſaid to be 601,615,555 dams, reckoning 320 dams equal to 1*l.* ſterling. It is moſtly in the poſſeſſion of Sindia.

DELHI, or *Dehli*, the chief town of the fore-mentioned province, was once a celebrated city, the capital of Muſſulman ſovereignty in Hindooſtan, and in more early times, the ſeat of Hindoo dominion over northern India. We firſt hear of it, as the capital of Hindooſtan, about the year 1200; and it is ſaid to have been founded by Delu about 300 years before our era, and, as Mr. Rennell thinks, ſhould properly be written "Dehly;" the Ayen Acbaree ſays, that its ancient name (in Sanſcrit) was "Inderput," or "Indraput," the houſe of Indra. As Canouge declined, Delhi roſe in reputation; and it continued the unrivalled metropolis of Hindooſtan, till the year 1398, when Timur, or Tamerlane, turned his arms towards Hindooſtan; in October he croſſed the Indus; and ſoon after his army proceeded in different diviſions to Delhi, which ſubmitted, without what may be properly termed a battle. On the 16th of December in the ſame year, it is ſaid, that this mercileſs conqueror entered the city, erected the great ſtandard of the Tartarian empire immediately on its walls; and the uſurper, ſeated on the throne of India, in all the pride of conqueſt, received the proſtrate homage of the nobility of both nations. In conſequence of ſome reſiſtance reluctantly made by the inhabitants to the wanton ravages of their conquerors, Delhi, and all the wonderful monuments of art contained in it, were devoted to be pillaged; and on the 13th of January, this great city was deſtroyed. Delhi, however, recovered part of its former ſplendour under the dynaſty of ſuceeding kings, and was ſtill conſidered as the imperial city of Hindooſtan until the reign of Acbar, or Akbar, who, commencing his reign in 1556, and fixing his reſidence at Agra, where he died in 1605, completed the ruin which time and neglect had united to ſpread through the wide circumference, and amid the deſolated towns of Delhi. In 1647, Shah-Jehan, grandſon of Acbar, removed the ſeat of his empire from Agra to Delhi, calling it "Shahjehanabad," or "Jehannabad;" where on the banks of the river Chun he built a noble caſtle and palace, with gardens and other conveniences, which coſt above 50 lacks of rupees, or 625,000*l.* At this time the yearly revenue of Delhi amounted to 100 krores of dams, or (reckoning each dam at the 40th part of a rupee, and the rupee as 2*s.* 6*d.* ſterling) 3,125,000*l.* Aurungzebe, the third ſon of Shah-Jehan, took poſſeſſion of the throne in 1659; and during his reign the revenues of the province of Delhi amounted to 1,221,950,137 dams. Delhi

continued

continued to increaſe in ſplendour and importance, until it was entered in 1738-9 by Nadir Shah, the uſurper of the Perſian throne, who demanded 30 millions ſterling, by way of ranſom. Tumults, maſſacres, and famine were the reſult; 100,000 of the inhabitants were ſlaughtered, and 62 millions of plunder were ſaid to be collected. It was again plundered and depopulated by Ahmed Abdalla in 1756, 1759, and 1760; although during the time of Aurungzebe, it was ſuppoſed to contain two millions of ſouls. Abdalla on this occaſion became emperor of Delhi; and if his inclinations had led him to eſtabliſh himſelf in Hindooſtan, it is probable that he might have begun a new dynaſty of emperors in his own perſon. Shah-Aulum, the lineal deſcendant of the houſe of Timur, aſpired to poſſeſs the capital city of his anceſtors, and with this view put himſelf into the hands of the Mahrattas, who promiſed to ſeat him on the throne of Delhi. Thus deluded, he left Allahabad, where he reſided under the protection of the Engliſh, to whom he owed all that he poſſeſſed, and went to Delhi, where he remained a kind of ſtate-priſoner. The private diſtreſſes of this prince, for it would be almoſt mockery to call him the great Mogul, or emperor, were ſo great, that in 1784 his ſon was deputed to ſolicit aſſiſtance from the Engliſh. Since the peace of 1782, Madajee Sindia, a Mahratta chief, and the poſſeſſor of the principal part of Malwa, has taken the lead at Delhi, and taken poſſeſſion of ſeveral places, with a view to extend his conqueſts on the ſide of Agimere, and to eſtabliſh a conſiderable ſtate or kingdom.

Delhi is not ſo well built as Agra. It is not eaſy to aſcertain its extent, which was ſaid to contain, as we have above mentioned, two millions of inhabitants. Bernier, a reſpectable and credible writer, who penned his account in 1663, only four years after the acceſſion of Aurungzebe, does not warrant ſo high a calculation of its inhabitants; and it is well known that, under his reign, both the empire and capital were greatly augmented. Bernier eſtimated the circumference of Delhi at 3 leagues only, reckoning what was within the fortifications, beſides which he deſcribes ſeveral ſuburbs, but altogether, no extraordinary extent for a capital city in India. He deſcribes Agra as being conſiderably larger. After the plunders and maſſacres which it has undergone, ſince the decline and downfall of the Mogul empire, it muſt be ſuppoſed to have been reduced very low; and accordingly, it is ſpoken of by late travellers as a city of moderate extent; and even for an Indian city, very ill built. Claud Boudier found the latitude of Delhi to be 28° 37′, and its longitude 77° 40′. The account from which we ſhall make the following extracts is the lateſt we have ſeen, and we have no reaſon to queſtion its accuracy. It is extracted from a journal of obſervations made during an official tour through the Dowab and the adjacent diſtricts, by lieutenant W. Franklin, in company with captain Reynolds of the Bombay eſtabliſhment, appointed by the Bengal government to ſurvey that part of the country in the year 1793. (Aſiatic Reſearches, vol. iv. p. 417, &c.) The extent of the ruins of old Delhi cannot, as this writer ſuppoſes, be leſs than a circumference of 20 miles. The environs to the N.W. are crowded with the remains of ſpacious gardens and country-houſes of the nobility, which were formerly ſupplied with abundance of water by means of the noble canal dug by Ali Mirdan Khan, and which formerly extended from above Paniput quite down to Delhi, where it joined the Jumna; fertilizing in its courſe a tract of more than 90 miles in length, and beſtowing affluence on thoſe who lived within its extent. The new city of Shah-Jehanabad, built by Shah-Jehan, A.D. 1631-2, lies on the weſtern bank of the Jumna, in N. lat. 28° 36′. The city is about 7 miles in circumference and is ſurrounded on three ſides by a wall of brick and ſtone; a parapet runs along the whole, with loop-holes for muſquetry; but no cannon are planted on the ramparts. The city has 7 gates, *viz.* Lahore-gate, Ajmere-gate, Turkoman-gate, Delhi-gate, Moor-gate, Cabul-gate, and Caſhmere-gate; all of which are built of ſtone, and have handſome arched entrances of ſtone, where the guards of the city keep watch. Near the Ajmere gate is a "Madriſſa," or college, erected by the nephew of Nizam-ul-Moolluch; it is built of red ſtone, and ſituated at the centre of a ſpacious quadrangle, with a ſtone fountain. At the upper end of the area is a handſome moſque built of red ſtone, inlaid with white marble. The apartments for the ſtudents are on the ſides of the ſquare, divided into ſeparate chambers, which are ſmall but commodious. The tomb of Ghazi, its founder, is in the corner of the ſquare, ſurrounded by a ſhrine of white marble, pierced with lattice-work. The college is now ſhut up, and deſtitute of inhabitants. In the neighbourhood of the Cabul-gate is a garden, in which are two tombs, one of the wife of the emperor Mahommed Shah, and another of the daughter of Aurungzebe. On a riſing ground near this garden, whence there is a fine view of Shah-Jehanabad, are two broken columns of brown granate, 8 feet high, and 2½ feet broad, on which are inſcriptions in an ancient character.

Within the city of New Delhi are the remains of many ſplendid palaces, belonging to the great Omrahs of the empire; all of which are ſurrounded with high walls, and occupy a conſiderable ſpace of ground. Their entrances are through lofty arched gate-ways of brick and ſtone, at the top of which are the galleries for muſic; before each is a ſpacious court-yard for the elephants, horſes, and attendants of the viſitors. Each palace has likewiſe a "Mahal," or ſeraglio, adjoining, which is ſeparated from the "Dewan-Khana," by a partition-wall, and communicates by means of private paſſages. All of them had gardens with capacious ſtone-reſervoirs, and fountains in the centre; an ample terrace extended round the whole of each palace; and within the walls were houſes and apartments for ſervants and followers of every deſcription, beſides ſtabling for horſes and other accommodations. Each palace was likewiſe provided with a handſome ſet of baths, ſome of which were furniſhed with beautiful rooms, paved and lined with white marble, and conſiſting of five diſtinct apartments, into which light is admitted by glazed windows at the top of the domes.

Shah Jehànabad is alſo adorned with many fine moſques, ſeveral of which are ſtill in perfect repair and beauty. One of thoſe that are moſt worthy of notice is the "Jama Muſjed," or great cathedral, ſituated about a quarter of a mile from the royal palace, the aſcent of which, as it is ſituated on a rocky eminence, is by a flight of 35 ſtone ſteps, through a handſome gate-way of red ſtone. The doors of this gate-way are covered throughout with plates of wrought braſs, imagined by Mr. Bernier to be copper. The terrace on which the moſque is ſituated, is a ſquare of about 1400 yards of red ſtone; in the centre is a fountain lined with marble, for the purpoſe of performing the neceſſary ablutions previous to prayer. An arched colonnade of red ſtone ſurrounds the whole terrace, which is adorned with octagon pavilions at convenient diſtances, accommodated with ſeats. The moſque is of an oblong form, 261 feet long, ſurrounded at the top, with three magnificent domes of white marble, interſected by black ſtripes, and flanked by two minarets of black marble and red ſtone alternately, riſing to the height of 130 feet. Each of theſe minarets has three projecting galleries of white marble; and their ſummits are crowned with light octagon pavilions of the ſame. The whole front is faced with large ſlabs of beautiful white marble; and along the cornice are 10 compartments, 4 feet long, and 2½ broad,

inlaid with inſcriptions in black marble, in the "Nuſki," character, which are ſaid to contain great part, if not the whole, of the Koran. The inſide of the moſque is paved with flags of white marble, decorated with a black border. The walls and roof are lined with plain white marble; and the "nimber," or pulpit, is of marble, having an aſcent of four ſteps and balluſtraded. The aſcent to the minarets is by a winding ſtair-caſe of 130 ſteps of red ſtone; and at the top is a noble and extenſive view. The domes are crowned with culliſes, richly gilt; and preſenting a glittering appearance at a diſtance. This moſque was begun by Shah Jehan, in the 4th year of his reign, and completed in the tenth; the expences of its erection amounted to 10 lacks of rupees; and it is in every reſpect worthy of being the grand cathedral of the empire of Hindooſtan. Beſides the moſque above deſcribed, there are in the city and its environs above 40 others, of inferior ſize and of the ſame faſhion.

The modern city of Shah Jehanabad is rebuilt, and contains many good houſes, chiefly of brick. The ſtreets are in general narrow; but there were formerly two very noble ſtreets, one in a direction N. and S., and another lying E. and W.; the former having handſome houſes on each ſide of the way, and merchants' ſhops well furniſhed with the richeſt articles of all kinds, and provided with water by means of an aqueduct of red ſtone, conſtructed by Shah Jehan. The bazars in Delhi are at preſent but indifferently furniſhed, and the population of the city has been of late years much reduced. Cotton cloths are ſtill manufactured, and the inhabitants export indigo. Their chief imports are by means of the northern caravans, which arrive once a-year, and bring with them from Cabul and Caſhmere ſhawls, fruit, and horſes. There is alſo a manufacture at Delhi for beedree hooka bottoms. The cultivation about the city is principally on the banks of the Jumna, where it is very good; the vicinity produces corn and rice, millet and indigo. The limes are very large and fine. Precious ſtones are likewiſe to be had at Delhi, of very good quality; particularly the large red and black cornelians. The city is divided into 36 mohauls or quarters, each of which is named either after the particular Omrah who reſided there, or from ſome local circumſtances relative to the place. The modern city of Shah Jehanabad appears to have been built upon two rocky eminences; the one where the "Jama Musjid" is ſituated, named "Jujula Pahar," and the other the quarter of the oil-ſellers, called "Bejula Pahar;" both of theſe eminences afford a commanding view of the remainder of the city. From the vaſt quantity of buildings, found in the environs of Delhi for upwards of 20 miles in extent, as well as from their grandeur and ſtyle of architecture, we may infer that this had once been a rich, flouriſhing, and populous city. The palace of the royal family of Timur was erected by the emperor Shah Jehan, when he finiſhed the new city; it is ſituated on the weſtern bank of the Jumna, and ſurrounded on three ſides by a wall of red ſtone. Its circumference is about a mile, and comprehends ſeveral public buildings, particularly two halls of audience, one called "Dewaun Aum," for people of all deſcriptions, and the other, or "Dewaun Khaſs," for the nobility. The latter was formerly adorned with exceſſive magnificence; but it has in later times been much deſpoiled by invaders. It is about 150 feet in length, by 40 in breadth, and ſtill poſſeſſes many remains of beauty and ſplendour which excite admiration. Around its interior, in the cornice, are the following lines, engraved in letters of gold upon a white marble ground; "If there be a paradiſe upon earth, this is it:—'tis this, 'tis this." The royal baths, built by Shah Jehan, are ſituated to the northward of the Dewaun Khaſs, and conſiſt of three very large apartments ſurmounted by white marble domes, and admirably finiſhed within. The light is admitted from the roof by windows of party-coloured glaſſes. In the "Shah Baug," or royal gardens, is a very large octagon room, which looks towards the river Jumna.

The "Gentur Munter," or obſervatory, in the vicinity of Delhi, was built in the third year of the reign of Mohammed Shah, by the rajah Jeyſing, who was aſſiſted by many perſons celebrated for their knowledge in aſtronomy from Perſia, India, and Europe; it has been ſince plundered by the Jeits under Juwaher Sing. The royal gardens of Shalimar, began by the emperor Shah Jehan in the 4th year of his reign, and finiſhed in the thirteenth, were laid out with admirable taſte, and coſt the enormous ſum of a million ſterling; but they have ſince been laid waſte, and the greateſt part of the coſtly materials have been removed. Here are found among other buildings the apartments of the Haram, encloſed by high walls; ſome of theſe apartments are conſtructed with red ſtone, and others with brick faced with fine chunam, and decorated with paintings of flowers of various patterns. All of them have winding paſſages, which communicate with each other, and the adjoining gardens by private doors. The extent of the gardens is not above a mile in circumference, encompaſſed by a high brick wall, deſtroyed in many parts of it; and the extremities are flanked with octagon pavilions of red ſtone. They ſtill abound with old trees of a very large ſize. The proſpect to the ſouthward of Shalimar towards Delhi, as far as the eye can reach, is covered with the remains of extenſive gardens, pavilions, moſques, and burying places, all deſolate and in ruins. The environs of this once magnificent and celebrated city appear now nothing more than a ſhapeleſs heap of ruins; and the country round about is equally forlorn.

Delhi, a town of America, in the county of Delaware, and ſtate of New York, containing 820 inhabitants.

DELIA, Δηλια, in *Antiquity*, a quinquennial feſtival in the iſland of Delos, inſtituted by Theſeus when, upon his return from Crete, he placed in the temple the ſtatue of Venus, given him by Ariadne.

Delia, feaſts celebrated by the Athenians, in honour of Apollo, ſurnamed *Deliús*.

The principal ceremony in this feaſt was an embaſſy, or rather a pilgrimage, to Apollo of Delos, performed every five years by a certain number of citizens, deputed for that purpoſe, and called *Deliaſtæ*, Δηλιασται, or *Theori*, Θεωροι, *q. d.* the *ſeers*, and the firſt perſon of the embaſſy, or deputation, *Architheorus*, Αρχιθεωρος. To him were added four more of the family of the *Ceryci*, prieſts deſcended from Mercury, who reſided all the year at Delos, to aſſiſt in the temple. The whole deputation ſet out in five veſſels, carrying with them every thing neceſſary for the feaſt, and the ſacrifices.

The Deliaſts, who went abroad, were crowned with laurel. At their arrival, they immediately offered a ſacrifice to Apollo: and, after the ſacrifice, a number of young maids danced round the altar, a dance called in Greek γερανος, wherein, by their various motions and directions, they repreſented the turnings and windings of a labyrinth. When the Deliaſts returned to Athens, the people went out to meet them, and received them with all the joy and acclamation imaginable. They never laid aſide their crown till their commiſſion was fully completed; and then they conſecrated it to ſome god in his temple.

The whole time of their going and returning, with all the ceremonies of their embaſſy, was called the Delia; during which time no criminal might be executed, which was a peculiar privilege of this feaſt, not allowed to any other, not even thoſe of Jupiter. Thus, Plutarch obſerves, that it was a day conſecrated to Jupiter, when Phocion was made to take

take the poiſon to which he was condemned; whereas they waited thirty days to give it to Socrates, by reaſon of the Delia.

According to Thucydides, the Delia were firſt inſtituted in the ſixth year of the Peloponneſian war, againſt the Athenians, who had extirpated the iſle of Delos, removed all the tombs out of it, and ordained that nobody ſhould either be born or die in it; but that all the ſick people ſhould be removed into a little iſland called Rhenia; though the Ionians, and the neighbouring iſlanders of Ionia, had long before that time held a ſort of Delia; that is, feaſts and games, like thoſe which the Athenians celebrated afterwards.

DELIAC, Deliacus, among the *Ancients*, denoted a poulterer, or a perſon who ſold fowls, fatted capons, &c.

The traders in this way were called Deliaci; the people of the iſle of Delos firſt practiſed this occupation. They alſo ſold eggs, as appears from Cicero, in his Academic Queſtions, lib. iv. Pliny, lib. x. cap. 30. and Columella, lib. viii. cap. 8. likewiſe mention the Deliaci.

DELIACAL Problem, *Problema Deliacum*, a famous problem among the ancients, concerning the duplication of the cube. See Duplication *of the Cube*.

DELIAN Games, games eſtabliſhed at Delos, anterior to the Olympic games, concerning which Homer is ſilent. Thucydides (lib. iii. cap. 104.) tells us, that in very remote antiquity, there were "Games of bodily exerciſe, and of muſic, in which cities exhibited their reſpective choruſes;" and, in teſtimony of this, he quotes the following verſes from Homer's hymn to Apollo:

"To thee, O Phœbus, moſt the Delian iſle
Gives cordial joy, excites the pleaſing ſmile;
When gay Ionians flock around thy fane;
Men, women, children, a reſplendent train,
Whoſe flowing garments ſweep the ſacred pile,
Whoſe grateful concourſe gladdens all the iſle,
Where champions fight, where dancers beat the ground,
Where chearful muſic echoes all around,
Thy feaſt to honour and thy praiſe to ſound."

"That there was alſo," continues Thucydides, "a muſical game, to which artiſts reſorted to make trials of ſkill, Homer fully ſhews in other verſes to be found in the ſame hymn: for having ſung the Delian chorus of females, he cloſes their praiſe with theſe lines, in which he makes ſome mention of himſelf;

"Hail! great Apollo, radiant god of day!
Hail! Cynthia, goddeſs of the lunar ſway!
Henceforth on me propitious ſmile! and you,
Ye blooming beauties of the iſle, adieu!
When future gueſts ſhall reach your happy ſhore,
And refug'd here from toils, lament no more;
When ſocial talk the mind unbending chears,
And this demand ſhall greet your friendly ears—
Who was the bard, e'er landed on your coaſt,
That ſung the ſweeteſt, and that pleaſed you moſt?—
With voice united, all ye blooming fair,
Join in your anſwer, and for me declare;
Say—the blind bard the ſweeteſt notes may boaſt,
He lives at Chios and he pleaſ'd us moſt."

Smith's Thucydides.

We cannot help pointing out another circumſtance in this hymn, which is really curious, as it implies the cultivation of a talent for imitation, at a time when ſimplicity and original genius ſeem moſt likely to have ſubſiſted, pure and untainted, by ludicrous ſimilitudes.

Homer, in verſe 162, deſcribing the employment of the Delian prieſteſſes, or nuns of the order of ſaint Apollo of Delos, tells us, that they were great adepts in the art of mimicry; and that part of the entertainment which they afforded to the numerous people of different nations, who formed their congregation, was, as the poet expreſſes it, from their being ſkilled to imitate the voices and the pulſation, (Κρεμβαλιαζειν, ſtrepitum,) or meaſure, of all nations; and ſo exactly was their ſong adapted, that every man would think he himſelf was ſinging. By the expreſſion παντων ἀνθρωπων φωνας, literally, the voices of all men, is hardly meant that theſe ladies were in poſſeſſion of the talent of *taking off* individuals, like ſome of our comedians. Φωνας ſeems only to imply national melody, or at moſt national dialects, and inflexions of ſpeech; and κρεμβαλιασυς, national rhythm, which, in all probability, was the moſt ſtriking characteriſtic in thoſe early ages of muſic.

Homer ſeems to ſketch out the order of the performance in theſe old pagan conſervatorios, v. 158; firſt they ſung a hymn in praiſe of Apollo; then another in praiſe of Latona and Diana; then they deſcended to the celebration of human heroes and heroines of ancient times; and it ſeems to have been in this part of their performance that they exerted their mimetic powers, and charmed the nations. (Θελγεσι δε φυλ' ἀνθρωπων.)

DELIAS, Δηλιας, in *Antiquity*, the name of the ſhip in which the Delian proceſſion was annually made by the Athenians. See Delia.

DELIBACHES, formed of the Turkiſh *deli*, ſignifying mad, and denoting *mad-headed*, or Deles, in the *Military Language* of the Ottoman empire, are a corps of volunteers on horſeback in the ſervice of the pachas. Theſe ſoldiers are brave, determined, enterpriſing, and ever ready to execute the orders of their maſter in the expeditions which he commands, and in the extortions which he directs. They follow him in war, perform the office of light troops, and fight without order and without diſcipline; they ſtop and bring back to battle the runaways, and frequently precipitate themſelves into the enemy's ranks, with a boldneſs which aſtoniſhes, and which ſometimes determines the victory in their favour. When a pacha is diſgraced, or when, from any motive, he diſmiſſes his delibaches, as they are without pay, and without reſources, they then commit the moſt terrible robberies; they ſpread themſelves over the fields, the villages, and even the towns; they rob indiſcriminately, lay all under contribution, and ſtop and plunder the caravans, till they are called into the ſervice of ſome other pacha, or till ſome impoſing force has put them to flight and diſperſed them.

DELIBAMENTA, in *Antiquity*, a libation offered to the infernal gods, which was always poured downwards; hence this act was expreſſed by the word *defundere*.

DELIBERATION is a voluntary operation of the mind that is employed about what we are to do or to forbear. Every man knows, ſays Dr. Reid, (Eſſays on the active Powers of Man, p. 82.) that it is in his power to deliberate or not to deliberate about any part of his conduct; to deliberate for a longer or ſhorter time, more careleſsly or more ſeriouſly; and when he has reaſon to ſuſpect that his affection may bias his judgment, he may either honeſtly uſe the beſt means in his power to form an impartial judgment, or he may yield to his bias, and only ſeek arguments to juſtify what his inclination leads him to do. In all theſe points, he determines, he wills, the right or the wrong. The general rules of deliberation ſeem, in the abſtract, perfectly evident, and form a kind of axioms in morals. They are ſuch as theſe. We ought not to deliberate in caſes that are perfectly clear. No man deliberates whether he ought to

chuſe happineſs or miſery. No honeſt man deliberates whether he ſhall ſteal his neighbour's property. When the caſe is not clear, when it is of importance, and when there is time for deliberation, we ought to deliberate with more or leſs care, in proportion to the importance of the action. In deliberation we ought to weigh things in an even balance, and to allow to every conſideration the weight, which, in ſober judgment, we think it ought to have, and no more. This is to deliberate impartially. Our deliberation ſhould be brought to an iſſue in due time, ſo that we may not loſe the opportunity of acting while we deliberate. It is not eaſy, however, to obſerve theſe ſelf-evident rules of deliberation. Our appetites, affections, and paſſions oppoſe all deliberation, but that which is employed in finding the means of their gratification, and under the influence of theſe, we may counteract and tranſgreſs thoſe maxims which reaſon approves. What is commonly called a fault of ignorance, is always owing to the want of due deliberation. The natural conſequence of deliberation with regard to any part of our conduct, is a determination how we ſhall act. When the opportunity is preſent, the determination to act is immediately followed by the action; or otherwiſe, when it is at a diſtance. In this latter caſe, the third operation of the mind called voluntary, (the firſt being ATTENTION, which ſee,) occurs, *viz.* a fixed purpoſe or reſolution, with regard to our future conduct; and ſuch a fixed purpoſe to do, ſome time hence, ſomething which we believe ſhall then be in our power, is ſtrictly and properly a determination of will, no leſs than a determination to do it inſtantly. Every definition of volition agrees to it. See VOLITION.

DELIBERATIVE, is applied to that kind, or branch, of *Rhetoric* employed in proving a thing, or convincing an aſſembly thereof, in order to oblige them to put it in execution. The deliberative kind was much in vogue among the Greeks and Romans, when the orators harangued the people.

The deliberative orations conſtitute one of the three kinds into which the ancients divided all orations; the other two are the *demonſtrative* and *judicial*. The ſcope of the deliberative was to adviſe or to diſſuade; and this kind of oration was employed in matters of public concern, agitated in the ſenate, or before the aſſemblies of the people. The ſubjects belonging to this kind of oration are taken from the nature and circumſtances of the thing itſelf under conſideration. Diſcourſes of the reaſoning kind muſt have been almoſt coëval with men's intercourſe with one another; as they no ſooner began to engage in mutual converſation, than they deliberated upon their common intereſt, and offered their advice to each other. The early practice of this mode of diſcourſe appears from ſacred writ, where we find, that when Moſes was ordered upon an embaſſy into Egypt, he would have excuſed himſelf for want of eloquence. (Exod. iv. 10.) And Homer (Il. β. 87.) repreſents the Greeks at the ſiege of Troy, as flocking like a ſwarm of bees to hear their generals harangue them. Nor is this ſpecies of oratory leſs conſpicuous for its uſefulneſs to mankind, than for its antiquity; being highly beneficial in councils, camps, or any ſocieties of men. Diſcourſes of the deliberative kind comprehend things public or private, ſacred or civil; and their chief end is either profit or intereſt; and as nothing is truly profitable that is not in ſome reſpect or other good, what is good and beneficial, as well as juſt and honourable, is the end here propoſed. The principal heads of this kind of deliberative diſcourſes, deducible from the nature and properties of the ſubject under conſideration, are ſuch as follow. *Pleaſure* often affords a cogent argument in ſuch diſcourſes, and it furniſhes an argument that has great influence on mankind in general. Quintilian, however, obſerves that pleaſure ought not to be propoſed as a fit motive of action in ſerious diſcourſes abſtractedly conſidered, and unleſs it is deſigned to recommend ſomething that is uſeful. Thus Cicero (Pro Archia, c. 7.) recommends ſtudy from the pleaſure which attends it: "If pleaſure only," ſays he, "was propoſed by theſe ſtudies," (referring to the purſuit of polite literature,) "you would think them an entertainment becoming a man of ſenſe, and a gentleman. For other purſuits neither agree with all times, all ages, nor all places; but theſe ſtudies improve youth, delight old age, adorn proſperity, afford a refuge and comfort in adverſity, divert us at home, are no hindrance abroad, ſleep, travel, and retire with us in the country." *Profit* or advantage, when it reſpects things truly valuable, is alſo a very juſt and laudable motive. *Honour* will ſupply another argument, that will have great influence in inſpiring generous minds with ardour. Virgil (Æn. l. ii. v. 289.) has very beautifully deſcribed Hector's ghoſt appearing to Æneas, in the night when Troy was taken, and adviſing him to depart, from this motive of honour:

"O goddeſs-born, eſcape by timely flight
The flames and horrors of this fatal night.
The foes already have poſſeſs'd the wall,
Troy nods from high, and totters to her fall.
Enough is paid to Priam's royal name;
More than enough to duty and to fame.
If by a mortal's hand my father's throne
Could be defended, 'twas by mine alone."

It is poſſible, however, that the expediency of undertaking any thing which, in itſelf conſidered, appears beneficial, may be queſtionable; and in this caſe the circumſtances that attend it will afford proper arguments for engaging in it. Accordingly, one of theſe is the *poſſibility* of ſucceeding. Thus, Hannibal endeavoured to convince king Antiochus, that it was poſſible for him to conquer the Romans, if he made Italy the ſeat of the war; by obſerving to him, not only that the Gauls had formerly deſtroyed their city, but that he had himſelf defeated them in every battle he fought with them in that country. (Juſtin, lib. xxxi. c. 5.) Moreover, an argument founded on *probability* will be ſtill more likely to prevail. Hence Cicero, after the fatal battle at Pharſalia, diſſuades thoſe of Pompey's party, with whom he was engaged, from continuing the war any longer againſt Cæſar; becauſe it was highly improbable after ſuch a defeat, by which their main ſtrength was broken, that they ſhould be able to ſtand their ground, or meet with better ſucceſs than they had before. (Ad. Fam. lib. vii. ep. 3.) When the poſſibility and probability of an event fail in ſupplying ſufficient motives for the proſecution of it, and a view of real or apprehended difficulties diſcourages, it may be neceſſary to recur to another argument deduced from the *facility* of accompliſhing the propoſed object. By this argument Cicero (Philipp. iv. c. 5.) encourages the Roman citizens in oppoſing Mark Antony (who, upon the death of Cæſar, had aſſumed an arbitrary power) by repreſenting to them, that his circumſtances were then deſperate, and that he might eaſily be vanquiſhed. Again the plea of *neceſſity* will give new force to the motive urged in favour of any undertaking; and therefore Cicero joins this argument with the former, to prevail with the Roman citizens to oppoſe Antony, by telling them, that "the conſideration before them was not in what circumſtances they ſhould live; but whether they ſhould live at all, or die with ignominy and diſgrace." To theſe heads may be added the conſideration of the *event*, which in ſome caſes carries great weight with it.

Cicero, in his oration for the Manilian law, uſes three of the arguments above ſtated; reaſoning from the topics of neceſſity,

the bottom of the veſſel, the particles of hot water which come firſt in contact with it, are cooled, and are rendered ſpecifically heavier, in conſequence of which they remain in their place, and no motion will take place within the water; hence the ice is not melted nearly ſo readily as in the former ſituation. Now count Rumford contends that it is by means of the above-mentioned motion only that heat is propagated through fluids, and not otherwiſe. This concluſion was no ſooner publiſhed to the ſcientific world, than it was oppoſed in an able manner by very ſkilful philoſophers. See Dalton's paper. Nich. Journ. vol. iv. p. 75. Traill's paper, ibid. for 1805, p. 133: and Murray's paper, ibid. vol. i. From theſe papers we ſhall make the following abridged extracts, which ſeem neceſſary for the elucidation of the ſubject; and in the firſt place we ſhall ſtate Mr. Murray's experiments.

Into a glaſs cylindrical veſſel water was poured, till it covered the bulb of a thermometer; its temperature was 46°, which was likewiſe the temperature of the air of the room. One ounce of olive oil, heated to 140°, was poured on a ſmall piece of cord, ſuſpended on the ſurface of the water, and the cord was ſlowly withdrawn. Any motion of the water was thus avoided. In the courſe of a minute the thermometer began to riſe ſlowly; in five minutes from the commencement of the experiment, it had riſen 4°, in ten minutes $6\frac{1}{2}$°, in fifteen minutes 8°. It then became ſtationary, and continued ſo for ſeven minutes, before it began to fall. Its deſcent was ſlow. This experiment was repeated with a hot metallic ball (inſtead of oil) immerſed in the water above the thermometer, and it was attended with a ſimilar effect.

From theſe reſults the concluſion might ſeem juſt, that the fluid muſt poſſeſs a conducting power. Yet this is rendered doubtful by the circumſtance, that in all experiments of this kind, a quantity of caloric muſt be conveyed by the ſides of the veſſel. In order to avoid this ſource of error, Mr. Murray employed a veſſel of ice. But water could not be uſed in this caſe, becauſe that fluid expands from 40° to 32°; therefore oil and mercury were uſed.

A quantity of almond oil was poured into the ice veſſel, ſo as to cover the bulb of the thermometer a quarter of an inch. A ſmall cylindrical iron cup, two inches in diameter, and having a flat bottom, capable of holding two ounces by meaſure, was ſuſpended ſo as merely to touch the ſurface of the oil, and was filled with boiling water. At the beginning of the experiment, the thermometer ſtood at 32°. In a minute and a half it had riſen to $32\frac{3}{4}$°, in three minutes to $34\frac{1}{2}$°, in five minutes to $36\frac{1}{4}$°, in ſeven minutes to $37\frac{1}{2}$°. At this point it became ſtationary, having riſen $5\frac{1}{2}$° in ſeven minutes. The temperature of the water in the cup had in this time fallen to 96°. The thermometer, after remaining ſtationary at $37\frac{1}{2}$° for ſix minutes, began to fall, and it continued to deſcend at the rate nearly of a degree in a minute and a half, till it returned to 32°. The experiment was repeated with this variation, *viz.* that the thermometer was placed lower, ſo that half an inch of oil ſtood over its bulb. It was alſo repeated with mercury inſtead of oil. But in both caſes the reſults were ſimilar to that of the firſt experiment.

"This riſe," Mr. Murray ſays, "it appears to me impoſſible to aſcribe to any other cauſe than to a power in the fluid to conduct caloric. Thus it is evident, that the ſides of the veſſel could not convey to the fluid in contact with the bulb of the thermometer any part of the caloric it received. Ice, in common with any other ſolid, may, at temperatures below its melting point, conduct caloric; but as it cannot poſſibly exiſt with a temperature above 32°, it cannot communicate any temperature above that to a fluid in contact with it, and conſequently it could not contribute in the above experiment to raiſe the thermometer above that temperature. Caloric does not radiate through tranſparent fluids; and it cannot even be ſuppoſed capable of paſſing by radiation through an opaque fluid as mercury.

If it be proved that oil and mercury are capable of conducting caloric, it will be admitted as ſufficiently probable, that other fluids may have a ſimilar power. Of theſe two, mercury, it is probable from theſe experiments, is the beſt conductor, as the riſe of the thermometer took place in it much more rapidly than in the oil."

Dr. Traill's experiments for aſcertaining the conducting powers of divers fluids, were performed in the following manner.

A cylindrical veſſel was turned out of wood, having its ſides half an inch thick, its height four inches and its diameter two. It has a moveable wooden top or cover, perforated with a hole in its centre, a little more than an inch in diameter, into which an iron cylinder, of one inch in diameter, could be eaſily introduced. This cylinder is ſupported by a ſlight flanch, or ſhoulder-piece, and can be taken up by means of a ſtring attached to its top. When the iron bar is in its place, its flat lower extremity is half an inch diſtant from the bulb of a delicate mercurial thermometer, which is fixed by wax in a hole perforating the cylinder near its bottom. This thermometer is bent to a right angle, ſo that its bulb and part of its ſtem lie in the axis of the wooden cylinder. This ſhape was preferred, becauſe the ſtem could be little affected by the caloric tranſmitted by the ſides of the veſſel, till after the bulb was acted on by the caloric of the iron bar.

A variety of experiments was performed with this apparatus in the following manner: The temperature of the room being ſteadily 67°, Fahren. therm.; during the trials, a kettle of water was kept boiling over the fire. Its temperature was between 211° and 212°, and in this the cylinder of iron was ſuffered to remain, at each experiment, for fifteen minutes. The liquid to be examined, and all the apparatus (but the iron bar) were at each experiment aſcertained to be at 67°. The liquid was poured into the wooden veſſel, till it could riſe $\frac{1}{10}$ of an inch on the ſide of the iron cylinder when in its place. The wooden top was put on, and the iron was drawn out of the kettle of boiling water by means of the attached ſtring, and inſtantly let down through the hole of the cover. The time the thermometer took to riſe through 3° (*viz.* from 67° to 70°) was accurately marked by means of a ſtop-watch, and the reſults of the experiments on ſeveral fluids, are exhibited in the following table.

Liquids.	Minutes.	Seconds.
Water - - - - -	7	5
Cow-milk - - - -	8	25
Proof ſpirit - - - -	8 nearly	
Alcohol, Lond. Pharmac. - - -	10	45
Tranſparent olive oil - - -	9	50
Mercury - - - -	9	15
Solution of ſulphate of iron. Salt 1. Water 5.	8	
Saturated ſolution of ſulphate of alumine	9	40
Saturated ſolution of ſulphate of ſoda -	6	30
Aqua potaſſ. pura. London Pharm. -	8	15
Saturated ſolution of ſulphate of ſoda, but the liquid not touching the iron cylinder, by $\frac{1}{10}$ of an inch, or nearly ſo -	19	20

ſliding the point up or down in the groove in the blade of the ſquare, it will be brought to cover the object; he then marks the point *m*, and finds another in the ſame manner; when points are thus found, it will be eaſy to connect them by lines, and thus complete the outline; the point at *m* ſhould be fixed to a ſpring, the tendency of which is to throw it off the paper, a braſs button ſhould be fixed on the end of the point, by preſſing which it will prick the paper; an inſtrument of this kind was contrived by Mr. James Peacock, who publiſhed an account of it in the Philoſ. Tranſactions. The frame of this machine will alſo explain the manner in which the two foregoing inſtruments may be ſupported.

Figs. 2, and 3, are repreſentations of a delineator deſcribed in the Philoſophical Journal, vol. i. by Mr. R. L. Edgeworth, who aſcribes the invention to Miſs Maria Edgeworth; the machine is exceedingly ſimple, conſiſting of three mahogany boards; *a b d, fig.* 2, joined together by hinges, which are connected with a common drawing board, *e f g*, to *fig.* 3, by ſcrewing the board *a* to the drawing board, and by putting one end of the paper under the board *a*, it will be fixed down; *k* is the ſight, capable of being elevated or depreſſed as occaſion requires: in uſing the inſtrument the obſerver looks through the ſight, the boards being laid out flat as in *fig.* 2, and directs the point of the index *l m*, to interſect the object he wiſhes to delineate; he then doubles up the machine as in *fig.* 3, bringing the index upon the paper, but taking care not to move the index with reſpect to itſelf; he then marks the place where the point of the index lies, and makes another obſervation; having thus obtained ſeveral points, he proceeds to draw the lines and finiſh the outline.

The camera obſcura is frequently uſed as a delineator, for a deſcription of which ſee that article; though the ſize which this inſtrument muſt have to anſwer the purpoſe effectually, is an objection to it, which, however, applies to all the machines we have hitherto deſcribed. The optigraph, invented by the celebrated Ramſden, ſhewn in *figs.* 4 and 5, poſſeſſes ſeveral advantages over the other machines, as it is portable, and the obſerver views whatever he is going to draw through a teleſcope, enabling him to delineate more minute objects than can be correctly done by any other method. Since the deceaſe of this great artiſt, Mr. Thomas Jones, of Mount-ſtreet, Berkeley-ſquare, London, a pupil of his, has improved the conſtruction of the inſtrument, particularly in adapting the means whereby the drawing made by the machine may be enlarged or diminiſhed, without removing the inſtrument to a greater diſtance from the object; a drawing and deſcription of this inſtrument are to be found in the Philoſophical Magazine, vol. xxviiii. p. 67. *Fig.* 4, is a perſpective view of this inſtrument, A repreſents the drawing board, on the outſide frame of which is fixed the pillar of the inſtrument B, C is a tube (ſliding in the pillar), on the top of which is fixed, by means of a ſcrew *c*, the frame D; at the end of this frame is a plain mirror E, beneath which is ſuſpended by a univerſal joint, the teleſcope F, of which G is the eye tube. H are ſliding tubes, capable of being ſhortened or lengthened in the ſame proportion as the inſide ſpeculum *c*, *fig.* 5, which is fixed to any place by the clamp ſcrew E. The pencil L, of which *h* is the handle, ſlides perfectly eaſy, without ſhake, in the tubes H: the pencil is ſo contrived as to have all the freedom of a pen when held in the hand for uſe.

Fig. 5, repreſents a ſection of the teleſcope, being the principal part of the invention. The rays from an object coming to the plane mirror E, are reflected into the teleſcope, paſſing through the object glaſs *b*, and entering the ſpeculum *a* are reflected through the eye-glaſs *d*, to the eye at *e*; *f* is a piece of parallel glaſs, with a ſmall dot on its centre, exactly in the focus of the eye-glaſs *d*.

Mode of uſing the Optigraph.

Fix the drawing board to the table (by a clamp which is packed in the box), ſo that the ſurface of the mirror E is nearly parallel to the object; then take hold of the handle *h*, and hold the pencil on that part of the paper where you would wiſh the centre of your drawing, or any part thereof, to be. Then place your eye at the eye tube G, and with your left hand alter the inclination of the mirror E, until the ſmall dot deſcribed at *f*, in *fig.* 5, is on ſome particular part of the object that you wiſh to begin with, adjuſting the teleſcope to diſtinct viſion by the milled head P. Then by moving your hand (having the pencil), you paſs the dot ſeen in the field of the teleſcope over the object, the pencil marking it at the ſame time on the paper.

To make your drawing larger, pull out the tube of the pillar C, *fig.* 4, and fix it with the ſcrew *e*; then pull out the ſliding tubes H, till the pencil is within half an inch of the paper (in the middle of the board) and proceed as before. This inſtrument will pack in a box 14 inches long, 3 deep, and 6 inches wide.

The next delineator we ſhall deſcribe is the camera lucida, invented by Mr. W. H. Wollaſton, and for which he took out a patent in 1806; for portability this exceeds all other inſtruments for the ſame purpoſe. It is repreſented in *fig.* 6, which only explains the ſtand or ſupport for the inſtrument; its principle is explained by *fig.* 7; *a b d e*, is a ſection of a glaſs priſm.

The priſm when in uſe is fixed with the ſide *a b* towards the objects to be delineated, and the eye at the angle *e*; the rays from the objects enter at the ſide *a b*, and falling upon *b* are reflected by it to *d e*, and from thence to the eye at *e*, entering it in a direction perpendicular to what they came to the priſm; in this manner a picture of whatever is before the ſide *a b* is repreſented upon the ſurface *e d*; now to tranſfer this picture to paper, the eye is ſo placed at *e*, that one half of the pupil is employed in viewing the reflected objects, while the other half ſees (by direct viſion clear of the ſide *e d* of the priſm) the paper placed on a table beneath the priſm at *f g*; now a pencil or pen may be traced over this paper, and will appear to the eye as though it was traced over the reflected image. This priſm is mounted in a braſs caſe, leaving open ſuch places as are neceſſary as ſeen in *fig.* 6; a pin *h* is fixed to the caſe of the priſm, and paſſes through a piece of braſs jointed to a tube, *i*. This tube ſlides up and down within another, *k*, which is fixed by a joint to a clamp, *l*, ſcrewed to the table whereon the paper is laid. By ſliding out the tube, *i*, the priſm may be ſet at any height from the table and the ſeveral joints; it may be put in any poſition, ſo as to throw the image upon the proper part of the paper. As the principle of the inſtrument depends upon ſeeing the reflected images of the objects, and the direct viſion of the pencil at the ſame time, the leaſt motion of the eye, at *e*, *fig.* 7, would cauſe it to ſee either the reflected image in the ſurface *d e* alone, or ſee only the pencil and paper at *f g*; to prevent this, a piece of braſs plate, *n*, *fig.* 6, is fixed on by a ſcrew, round which it turns as a centre; it has a ſmall hole through it which can be adjuſted by moving the braſs, to ſee the reflected image and the pencil both at once, ſo that a drawing may be made; but if the pencil ſhould not appear diſtinct enough, the braſs muſt be moved outwards from the priſm; this will enlarge the aperture for direct viſion, and diminiſh that of reflection; on the contrary, if the reflected image ſhould not appear diſtinct enough, the braſs ſight ſhould be moved towards the priſm.

Thoſe perſons whoſe ſight is not quite perfect, will not

ſee both a diſtant and a near object (when brought into one field) with the ſame diſtinctneſs; to remedy this, two lenſes, *r s*, *fig.* 3, are fixed by joints beneath the priſm, the lens *r*, is convex, and muſt be interpoſed between the eye and the pencil, as in the figure, for thoſe perſons who can ſee diſtant objects more diſtinctly than near ones; on the contrary, near ſighted people who cannot ſee diſtant objects diſtinctly, muſt have a concave lens, *s*, turned up before the ſide, *a b*, of the priſm, and, *r*, turned down out of the way.

The priſm being brought ſo near the eye, may be very ſmall; *fig.* 7, is the ſection of it at the full ſize, and the whole inſtrument packs in a box 2 inches wide, 8 long, and half an inch thick, outſide meaſure.

DELINQUENT, a perſon who has committed ſome fault, or offence.

It is the buſineſs of a magiſtrate to be ſevere in puniſhing delinquents.

DELIQUESCENCE, in *Chemiſtry*, is the ſpontaneous liquefaction of any ſaline ſubſtance, by means of the moiſture which it attracts from the air.

DELIQUIATED Potash, is applied generally to the ſub-carbonate of potaſh or ſalt of tartar, when run into a liquid by expoſure to a damp air.

DELIRIUM, in *Medicine*, an alienation of mind connected with fever.

This is the ſenſe in which delirium is commonly underſtood; but by ſome writers, as Hoffman, Sauvages, &c. delirium is the term employed to denote the whole claſs of mental derangements, including the different forms of mania, melancholy, febrile delirium, and ſo forth.

Etymologiſts have derived the term delirium from *de* and *lira*, *i. e.* departing from the right way; *lira* ſignifying a ſtraight furrow carried through a field. Others have preferred a derivation from ληρος, *leræ*, or *liræ*, trifles, or abſurdities. Van Swieten, ad Aph. 700.

Boerhaave defines delirium, "the production of ideas not correſponding with external cauſes, but with an internal diſpoſition of the brain, attended with an erroneous judgment, the reſult of theſe ideas." Aph. 700. Dr. Darwin expreſſes the ſame notion in other terms. "The ideas in delirium conſiſt of thoſe excited by the ſenſation of pleaſure or pain, which precedes them, and the trains of other ideas aſſociated with theſe; and not of thoſe excited by external irritations, or by voluntary exertion." Zoonomia, vol. ii. claſs ii. ord. i. gen. 7. Both theſe definitions point out the diſtinguiſhing character of febrile delirium; namely, that it originates from a certain phyſical condition of the brain: but they are perhaps both, in ſome degree, incorrect, in excluding external impreſſions from among the cauſes of the delirious ideas. It is true, indeed, that the internal ſenſations, and eſpecially thoſe ariſing from the peculiar condition of the circulation in the brain, or of the brain itſelf, are the primary cauſes of delirium; and, accordingly, delirium firſt occurs between ſleeping and waking, eſpecially in the dark; under which circumſtances external impreſſions on the ſenſes are in a conſiderable degree excluded. In this early period, or incipient degree of delirium, when the full opportunity is afforded by the patient awaking completely, and by the return of light, for the operation of external impreſſions, ſince the power of judgment ſtill remains, the morbid aſſociations are corrected, and delirium ceaſes; until the ſenſes are again deprived of their acuteneſs and activity by an imperfect ſleep. But when the morbid condition of the brain is much increaſed, by the increaſe of the febrile diſeaſe, the faculty of judgment is diminiſhed, and the powers of aſſociation and imagination are morbidly increaſed, inſomuch that the external impreſſions on the ſenſes, when they are attended to by the mind, become alſo the cauſes of a train of delirious ideas. Hence the room, in which the patient lies, is not known to him, but is conceived to be a church or a priſon, &c. according to the aſſociations, which particular impreſſions at different times excite; the perſons about him are not known, or viewed partly in their true character, and partly in a fictitious one, as morbid aſſociations are connected with correct impreſſions of their perſons, in an incongruous manner.

Delirium, then, may be conſidered as a ſort of waking dream, in which the faculties of aſſociation and imagination are morbidly excited, in conſequence of a peculiar condition of the brain and nervous ſyſtem, connected with fever.

The nature of delirium may be illuſtrated, therefore, by comparing it with our common dreams; and its various degrees may be traced, from the unpleaſant or frightful dreams occaſioned by a loaded ſtomach, or a ſlight ephemeral feveriſhneſs, up to the moſt violent frenzy, accompanying inflammation of the brain. In our ordinary dreams, when the acceſs of external impreſſions is prevented, the ſenſes being, as it were, ſhut up, and the powers of judgment and volition ſuſpended, the internal ſenſations, with their aſſociations, alone excite the train of ideas. This train runs on, upon the principle of aſſociation alone, from ſcene to ſcene, and from ſubject to ſubject, connecting thus the moſt incongruous aſſemblage of ideas; which, if uttered aloud, would be as apparently unconnected as thoſe of the moſt delirious perſon; but which, under this ſuſpenſion of external ſenſe and volition, excite no ſurpriſe to the dreamer, by their extreme incongruity, becauſe no compariſon is made, no act of judgment is exerted. As the faculty of aſſociation is the leading principle in carrying on theſe trains of our ſleeping ideas, their continuance is endleſs; and in like manner there is a perpetual flow of ideas in delirium, continuing with more rapidity under the increaſed excitement of the brain and nervous ſyſtem. The facility, with which various trains of ideas are aſſociated, in dreams, with particular corporeal ſenſations, may be illuſtrated by the experience of almoſt every individual. Mr. Stewart, in his "Philoſophy of Natural Hiſtory," relates, that he was diſtreſſed by a dream, in which he ſuppoſed himſelf hung up by the throat, upon hooks, in the infernal regions, and ſurrounded by all the ſuppoſed tortures, aſſociated with that idea; and, on waking, he found himſelf ſuffering under the irritation of a ſore throat, the pain of which had excited this ſingular train of ideas. In the ſame way an oppreſſion about the præcordia, ariſing from a loaded ſtomach, or an uneaſy poſture, during ſleep, excites the ideas of thoſe horrible figures, ſitting or lying on the breaſt of the dreamer, which perſons attacked with *incubus*, or night-mare, are ſaid to experience. And again, when the ſleep is leſs complete, and the ſenſes, as of hearing, touch, and ſmell, are more open to impreſſion, noiſes, and other irritations, imperfectly and indiſtinctly perceived, mingle, nevertheleſs, with our dreams, and become the cauſes of different trains of aſſociation. See Dreams.

When a ſlight febrile action is induced, as from a common cold; from an over doſe of ſome ſtimulant, as wine, or ſpirits; or from ſome narcotic medicine, ſuch as opium; a ſtate of the brain and nervous ſyſtem is produced, which greatly increaſes this diſpoſition to aſſociate various trains of ideas, with the ſenſations and irritations of the different parts of the body; and the dreams are inceſſant and various. If the ſenſations are pleaſurable, the dreams are agreeable; if, on the contrary, as is generally the caſe, the ſenſations approach to pain, the aſſociated ideas are of a diſagreeable nature, and imaginary objects of terror and danger are brought before the mind.

If

If the febrile condition is more completely eſtabliſhed, the ſenſations of the body become more generally painful, the whole nervous ſyſtem is in a diſturbed ſtate, and the brain itſelf is particularly excited; ſo that the mind is engroſſed, as it were, by the internal ſenſations, which, in this ſenſitive condition of the brain, make the greater impreſſion, and thoſe of external objects excite little of its attention; or, when they are perceived, combine with the others to produce the delirious dreams of the patient.

As the excitement ſtill farther increaſes, he utters his dreams aloud, and his words, of courſe, are characterized by all the incongruity of the ideas, which they repreſent. When the excitement proceeds to a ſtill higher pitch, and eſpecially when it amounts to inflammation of the brain, the train of delirious ideas becomes ſtill more rapid and incongruous, it calls the paſſions forth, and is combined with great reſtleſſneſs of the muſcles, and impatience of reſtraint; which conſtitute frenzy, and with certain other ſymptoms mark the exiſtence of phrenitis.

The delirium, when arrived at this degree, (the *delirium ferox* of writers) is evidently the conſequence of an increaſed action of the arteries of the brain, and therefore of an increaſed quantity and impetus of the blood in that organ. The appearances of external inflammation teach us, that the ſenſorial functions of every part are increaſed by an increaſed quantity and impetus of the blood, which circulates through it. Hence the pain, the acute ſenſibility, of a common boil or whitlow. And that ſuch is the condition of the brain, where there is violent delirium, we have evidence both from the accompanying ſymptoms, and from examinations after death. The ſymptoms accompanying violent delirium, are generally redneſs of the countenance, pain in the head, ſtrong arterial pulſations, a ferrety redneſs of the eyes, which are acutely ſenſible to light, &c.; and on diſſection, a redneſs has been obſerved in different parts of the brain, and in its membranes, on which coagulable lymph has been poured out, adheſions formed, pus collected, and ſo forth. Various degrees of this delirium, then, are connected with more or leſs of a morbid determination of blood to the brain.

A delirium, however, occurs under other circumſtances of the brain, which is different in its character, and is called a low delirium, *delirium mite*. This is generally conſidered by writers as the reſult of a circulation through the brain too languid to ſupport its functions. The ideas flow leſs rapidly than in the acute delirium; and the patient lies on his back, muttering to himſelf, and altogether inattentive to what is paſſing around him; in ſhort in a ſtate approaching rather to ſtupor, than to active thought. From this he can at firſt be rouſed for a few moments, and be made ſenſible to external impreſſions, even to queſtions put to him; but he ſpeedily relapſes into inattention; and, as the diſordered ſtate or atony of the brain is increaſed, this degenerates into complete ſtupor; he becomes inſenſible to all the calls of nature, ſo that he feels not even the thirſt, which parches his throat, and the urine and fæces are evacuated unconſciouſly. If the diſeaſe ſtill proceeds, *ſubſultus tendinum*, tremors, convulſions, and death enſue.

With this ſpecies of delirium, the concomitant ſymptoms mark a deficiency of nervous energy, and of the impetus of the circulation. It occurs in the laſt ſtages of low fevers, ſometimes in the cold ſtage at the commencement. (Cullen.) The pulſe is ſmall and feeble, the countenance pale and ſunk, the general ſtrength much impaired, and giddineſs is ſometimes obſerved, on aſſuming the erect poſture. The pain of the head is dull and heavy, not acute, as in the former ſpecies of delirium. And, it may be added, that the former ſpecies is ſometimes converted into this, when the ſtrength of the patient is greatly ſunk. It muſt be obſerved, however, that the brain and nervous ſyſtem are affected, in fevers, in a way not altogether to be accounted for, from the ſtate of the circulation; as there is often, from the commencement, a remarkable proſtration of the animal powers.

Delirium of either ſpecies, when exiſting in any conſiderable degree, affords an unfavourable prognoſis, as to the event of the fever: but the exiſtence of the low delirium is conſidered as leſs unfavourable than that of the acute. For although both imply a morbid derangement of the functions of one of the moſt important organs of life; yet the atonic ſtate, if we may uſe the term, is leſs liable to occaſion irremediable injury to the brain, and is more eaſily removed, than the ſtate of high excitement, which accompanies the violent delirium.

The occurrence of delirium may be often anticipated from an obſervation of the other ſymptoms. When the head-ache is very acute, when there is great reſtleſſneſs and indiſpoſition to ſleep, when the eyes are acutely ſenſible to light, or other ſymptoms of a particular determination of blood to the head are preſent, delirium may be expected to follow. Huxham has remarked, on the ſame principle, that a ſtrong pulſation of the carotid arteries, in the advanced ſtage of fever, although the pulſe at the wriſt may be ſmall, nay even ſlow, "is a certain ſign of an impending delirium, and generally proceeds from ſome conſiderable obſtruction in the brain." (Eſſay on Fevers, p. 94.) Many ſymptoms of impending delirium are enumerated by Hippocrates, in his book on prognoſtics, ſome of which, however, ſeem to be fanciful, and others to apply rather to inſanity than to febrile delirium.

As delirium is of two ſpecies, and connected with two oppoſite conditions of the ſenſorium, it is obvious that the remedies by which it muſt be combated, muſt be varied according to its nature, and the concomitant ſymptoms. When it is of the acute ſpecies, and evidently connected with an increaſed action in the brain, the indication will be to diminiſh the arterial action, and thus to leſſen the quantity and impetus of the blood, ſent to that organ. This indication may be accompliſhed by the local abſtraction of blood from the head; as by the application of leeches, or the cupping-glaſſes, to the temples or neck; by ſhaving the head, and reducing its temperature, by waſhing with cold water, or water and vinegar; or by applying a bliſtering plaſter over the ſcalp, or on the neck. And where there is, at the ſame time, a great general increaſe of the arterial action, theſe operations may be aided by whatever tends to diminiſh the general fever. Hence the general affuſion of cold water, the uſe of the ſhower-bath, or waſhing the whole ſurface by means of a ſponge, is often extremely efficacious in removing delirium. At the ſame time, the general antiphlogiſtic regimen, the free uſe of diluent drinks, laxative medicines, and cool air, ſhould be enjoined; and every ſource of irritation whatever, ſuch as ſtrong light, noiſes, converſation of viſitors, motion or exertion of the body, &c., ſhould be ſtudiouſly avoided. In this ſtate of excitement of the brain and nervous ſyſtem, circumſtances which ordinarily have little or no influence, irritate to a pernicious degree. Hence if the bowels are loaded, the removal of the irritating fæces by a laxative will ſometimes remove the delirium; and the abſtraction of other irritations diſtant from the brain, will often have a ſimilar beneficial effect.

In the low delirium, occurring in fevers with great debility, where the heat of the ſkin is not increaſed, and there are no marks of active determination to the head, a different plan of treatment is required. The patient muſt be ſupported by the frequent adminiſtration of cordial medicines, of which wine is perhaps the beſt. Where there is much watching

and

and reſtleſsneſs, an opiate will often contribute greatly to correct the delirium, by inducing ſleep, and ſoothing the nervous ſyſtem, which it renders leſs ſenſible to the little irritations of the febrile ſtate. Small quantities of liquid nutriment ſhould be frequently adminiſtered, in aid of the ſupport afforded by the cordials. If the ſtrength ſinks rapidly, the more powerful ſtimulants of alcohol, æther, and the volatile medicines will be requiſite. See Gregory Conſpectus Medicinæ Theoret. Van Swieten. ad Aph. 700 et ſeq. Cullen, Firſt Lines, 45.

DELITZSCH, anciently Deliz, *Delitium*, in *Geography*, a ſmall town of Saxony, in the circle of Leipzig, on the river Löber; 12 miles N. of Leipzig, on the road to Deſſau; was built in the tenth century by the Vandals, and has a royal palace and garden. It contains 3000 inhabitants, and is remarkable for its manufacture of worſted ſtockings, and a printing preſs, which has been eſtabliſhed here above 120 years. The town is encircled by double rows of lime and willow trees, which afford very pleaſant walks.

DELIVER, *To*, to give freedom, or to releaſe any one from confinement, captivity, or bondage, to relieve the mind oppreſſed with care, anxiety, or trouble, or to ſurrender or give up any place or property. It is alſo uſed for utterance, as to ſpeak, or deliver a diſcourſe. In midwifery it means to bring a child into the world.

DELIVERANCE, in *Law*, a term uſed when a criminal is brought to trial, and the clerk in court aſks him whether he is guilty, or not guilty, to which he replies not guilty, and puts himſelf on God and his country; and the clerk wiſhes him "a good deliverance."

Deliverance, *a writ of ſecond*, a judicial writ, iſſuing out of the original record, allowed by the ſtatute of Weſtm. 2. c. 2. to the plaintiff, who is reſtrained by it, when non-ſuited, from ſuing out any freſh replevin, ſo called becauſe he has the ſame diſtreſs again delivered to him, on giving the like ſecurity as before. If the plaintiff be a ſecond time non-ſuit, or if the defendant has judgment upon verdict or demurrer in the firſt replevin, he ſhall have a writ of "return irreplevisable;" after which no writ of ſecond deliverance ſhall be allowed. (2 Inſt. 340.) But in caſe of a diſtreſs for rent arrere, the writ of ſecond deliverance is in effect taken away by ſtatute 17 Car. II. c. 7., which directs another proceſs. 1 Vent. 64.

Deliverance, *Cape*, in *Geography*, a cape on the coaſt of New Guinea, in the Eaſt Indian ocean. S. lat. 11° 30'. E. long. 157° 50'.

DELIVERY, in *Midwifery*, the act of parturition, or of bringing into the world a full grown fœtus. See Labour.

Delivery, in *Law*, is an eſſential requiſite of a valid deed, which is done by the party himſelf, or his attorney, lawfully authoriſed, and expreſſed in the atteſtation. This delivery is either abſolute, *i. e.* to the party or granter himſelf; or conditional to a third perſon to hold, till ſome conditions be performed on the part of the granter. See Deed.

Delivery, in *Oratory*. See Pronunciation.

DELIUM, or Delion, in *Ancient Geography*, a town of Greece, in Bœotia, ſituated on the ſea-coaſt, on the frontiers of the territory of Tanagra and Attica, N. of the mouth of the Aſopus. It had a temple dedicated to Apollo. In the time of Pauſanias it had two ſtatues, one of Diana, and another of Latona.

DELIUS, Christopher Traugott, in *Biography*, was born at Wallhauſen in Thuringia. Being of a noble and wealthy family, he was brought up for the army, in which he ſerved a long time. He afterwards applied himſelf with much diligence to the ſciences, embraced the Catholic religion, and obtained a place in the eſtabliſhment of the Hungarian mines, where he roſe to the poſt of profeſſor in the academy of mines at Chemnitz. Having ſuſtained this character with much reputation he was at length invited to Vienna, where he was employed in the department of the mines and the mint. He died at Florence in January 1779. in the fifty-firſt year of his age As an author he bears a very reſpectable character. His works are, "A Diſſertation on the Origin of Mountains, and of the different kinds of Veins found in them; alſo of the mineralization of Metals, and particularly of Gold." "An Introduction to the art of Mining, both in theory and practice, together with a treatiſe on the principles of the economy of Mines." The latter was tranſlated into French, by the order and at the expence of the king of France.

DELKENHEIM, or Telkenheim, in *Geography*, a ſmall town of the grand duchy of Heſſe Darmſtadt, in Germany, ſituated in the diſtrict of Epſtein.

DELKIRAS, a town of Aſiatic Turkey, in the province of Natolia; 40 miles W. of Tocat.

DELLAMCOTTA, a fortreſs of Aſia, in the country of Bootan, which commands the principal paſs over the ſouthernmoſt ridge of the Bootan mountains, that riſe nearly 1½ mile perpendicular above the plains of Bengal, in a horizontal diſtance of only 15 miles. This fort was taken by ſtorm in 1773, by a detachment under the command of capt. John Jones; the fame of which exploit made the Thebetians ſue for peace. It is 50 miles diſtant from Taſſaſudon, and 175 N. from Moorſhedabad.

DELLE, a ſmall town of France, in the department of the Upper Rhine, chief place of a canton, in the diſtrict of Befort, with a population of 810 individuals, 6 miles N. W. of Porentruy. The canton has an extent of 192½ kiliometres, 27 communes, and 8952 inhabitants.

Delle, *Cape*, a cape of Africa, in the Mediterranean, on the coaſt of Algiers. N. lat. 37° 15'. E. long. 4° 13'.

DELLYS, or Teddeles, a ſea-port of Africa, in the country of Algiers; 15 leagues E. of Algiers.

DELME, a ſmall town of France, in the department of the Meurthe, chief place of a canton, in the diſtrict of Chateau-Salins. It has only 374 inhabitants. Its canton has a population of 5215 individuals, diſperſed in 22 communes, upon a territorial extent of 127 kiliometres and a half. —Alſo, a ſmall river of Germany, in the county of Delmenhorſt.

DELMENHORST, a town of Germany, in the duchy of Holſtein Oldenburg, chief place of the county of the ſame name, ſituated on the river Delme not far from the Weſer, 9 miles S. W. of Bremen, and 21 miles S.E. of Oldenburg. N. lat. 53° 10'. E. long. 8° 11'. This county and Oldenburg belonged to Denmark till the year 1773, when both were exchanged againſt the duchy of Holſtein.

DELMONT, Deodato, in *Biography*, an hiſtorical painter, was born at St. Tron in 1581, of a good family, who gave him a liberal education, and placed him with Rubens to learn deſign and colouring. Being the intimate friend, as well as diſciple of this illuſtrious painter, he accompanied him to Italy, and at Rome ſo diligently and ſo ſucceſsfully proſecuted his ſtudies in painting, ſtatuary, and architecture, that he obtained the reputation of being an excellent painter and architect. At the court of Newburgh, where he was employed for a long time, he was ennobled in token of his merit. Several excellent paintings of this maſter are preſerved in the churches and convents of Italy; and at Antwerp there are three capital performances; *viz.* the Transfiguration in the church of Notredame, Chriſt carrying his croſs in the Jeſuits' church, and the Adoration of the Magi, in a cloiſter. In all his ſubjects the compoſition is elevated,

elevated, the deſign correct, and the colouring and pencilling excellent. The praiſe of Rubens is of itſelf ſufficient to immortalize this artiſt, who died in 1634. Pilkington.

DELOS, in *Ancient Geography*, an iſland of the Ægean ſea, or Grecian Archipelago, ſituated nearly in the centre of the *Cyclades* (which ſee) and placed by Pliny, (l. iv. c. 12.) at the diſtance of 15 miles from Myconus, 18 from Naxos, and 50 from Icaria. But theſe diſtances are undoubtedly erroneous, as Myconus is diſtant from Delos only 3 miles, and Naxos 40. This iſland was known to the ancients by the names of Cynethos or Cynthos, Aſteria, Pelaſgia, Chlamydias, Lagia, Pyrpilis, Scythias, Mydia, and Ortygia, It was named Ortygia and Lagia, from two Greek words, *ortyx* and *lagos*, the former ſignifying a quail, and the latter a hare, the iſland formerly abounding with both theſe animals. The name Delos is derived by the Etymologiſts from a Greek verb ſignifying to *appear*, but they differ as to the reaſon of its being appropriated to this iſland. Pliny, after Ariſtotle, pretends that the name was given to this iſland, becauſe it roſe unexpectedly out of the ſea, and appeared floating on the water. Some ſay that it was called Delos or manifeſtation, becauſe it was the birth-place of Apollo, the ſymbol of the ſun, and becauſe the beams of this luminary enlighten the whole earth. The poets pretend that this iſland was named Delos, becauſe Latona, being delivered of Apollo and Diana, ſhowed herſelf firſt here, not having dared to appear before, for fear of Juno. The fable reports that it floated at the mercy of the winds; but Herodotus examined it with attention, and denies the fact. Some fabulous writers ſay that it was fixed by the voice of Neptune, and others pretend that it was raiſed by a blow of his trident from the bottom of the ſea, in order to accommodate Latona, the miſtreſs of Jupiter, with a place for the birth of her children, when ſhe was perſecuted by Juno. Strabo repreſents it as an iſland of ſmall extent; and, according to Pliny, it was not more than 5 miles in compaſs; but Tournefort aſſigns it a circuit of 7 or 8 miles. The native deities, Apollo and Diana, had three very magnificent temples erected for them in this iſland. That of Apollo was, according to Strabo, (lib. x.) begun by Eryſiapthus, the ſon of Cecrops, who is ſaid to have poſſeſſed this iſland 1558 years B.C.; but it was afterwards much enlarged and embelliſhed at the general charge of all the Grecian ſtates. But Plutarch ſays, that it was one of the moſt ſtately buildings in the univerſe, and deſcribes its altar, as deſerving a place among the ſeven wonders of the world. The inſcription in this temple, as Ariſtotle informs us, (Ethic. l. i. c. 9.) was as follows: "Of all things the moſt beautiful is juſtice; the moſt uſeful is health; and the moſt agreeable is the poſſeſſion of the beloved object." The trunk of the famous ſtatue of Apollo, mentioned by Strabo and Pliny, has been for ages an object of admiration to travellers; its ſize was gigantic, though cut out of a ſingle block of marble, the ſhoulders being ſix feet broad, and the thighs nine feet round. Round the temple of Apollo were magnificent porticoes, built at the charge of various princes, as appears from the ſtill legible inſcriptions. To this temple the neighbouring iſlands ſent yearly a company of virgins to celebrate with dancing the feſtival of Apollo, and his ſiſter Diana, and to make offerings in the name of their reſpective cities.

Delos was held in ſuch reverence by moſt nations, that even the Perſians, after having laid waſte the other iſlands, and every where deſtroyed the temples of the gods, ſpared Delos; and Datis, the Perſian admiral, forbore to anchor in that harbour. This iſland was celebrated both by the poets and hiſtorians of antiquity: the poets, it is ſaid, by Callimachus, preſented in this place the firſt tribute of their ſervices; for the favour of Apollo could not be obtained any where elſe. Pieces of muſic and poetry were diſtributed at the games celebrated here in honour of Apollo. See DELIAN *Games*. The Athenians made an annual proceſſion to the iſland of Delos. The author of this ceremony was Theſeus, who being ſent with other Athenian youths into Crete (ſee CRETE,) to be devoured by the Minotaur, made a vow to Apollo, that if he granted them a ſafe return, they ſhould make a ſolemn voyage to his temple in Delos every year. We learn from Strabo and Callimachus, that this iſland was watered by the river Inapus. Pliny calls it a ſpring, and adds, that its waters ſwelled and abated at the ſame time with thoſe of the Nile, as if there had been a communication between the Nile and the Inapus. The iſland has now no river, but one of the nobleſt ſprings in the whole Archipelago, being twelve paces in diameter, and encloſed partly by rocks, and partly by a wall. This iſland was anciently governed by kings; for Virgil mentions a king named Anius, who reigned here in the time of the Trojan war. He was both king and high-prieſt of Apollo, and entertained Æneas with great kindneſs. This prince was deſcended from Cadmus, and had by his wife Dorippe three daughters, who are feigned by the poets to have derived from Bacchus the power of changing whatever they touched into wine, wheat-ſeed, or oil; alluding to the great quantity of wine, wheat, and oil, which accrued to their father from the offerings made to Apollo. Joſhua, it is ſaid, in the 15th century before Chriſt, having driven the Phœnicians from the land of Canaan, they paſſed into the iſlands of the Ægean ſea, and eſtabliſhed themſelves in theſe iſlands, and particularly in that of Delos. Thucydides ſays, that theſe people, blended with the Carians, practiſed piracy. The Athenians, who afterwards made themſelves maſters of Delos, were commanded by an oracle, as Herodotus informs us, (lib. i. c. 64). to purify the iſland, which he did by cauſing all the dead bodies to be taken up, and removed from all places within the proſpect of the temple. In the 6th year of the Peloponneſian war, the Athenians, by the advice of an oracle, purified it anew, by carrying all the dead bodies to the iſland of Rhenæa, where they were interred. Having then cleared it from ſepulchres, in order to preſerve it from pollution, they publiſhed an edict, enacting that for the future no perſon ſhould be ſuffered to die, nor any woman to be brought to bed in the iſland; but when death or parturition approached, they ſhould be carried over into Rhenæa. In memory of this purification, the Athenians inſtituted a ſolemn feaſt, which was celebrated every fifth year, (ſee DELIA;) people aſſembling on that occaſion to Delos from the neighbouring iſlands, and all parts of Greece. A few years after, the Athenians, to complete the purification of the iſland, expelled all the ancient inhabitants, whom they pretended to be polluted, on account of a crime committed by them in former times, but not mentioned by our hiſtorians. The Athenians were driven out by Mithridates the Great, who plundered the rich temple of Apollo, and obliged the Delians to take part with him. Mithridates, in his turn, loſt it to the Romans, who granted many privileges to the inhabitants, and exempted them from all kinds of tribute and taxes. The lands are now ſo covered with ruins and rubbiſh, as to admit of no ſort of culture; yet the inhabitants of Myconi hold it, by paying ten crowns land-tax to the grand Signior.

The oracle of Apollo, in Delos, was one of the moſt famous oracles in the world, not only for its antiquity, but for the richneſs of the ſacred preſents dedicated to the god, and the numbers of perſons that reſorted hither from all parts for advice; in which reſpect it ſurpaſſed not only all the oracles of other gods, but thoſe of Apollo himſelf, that of Delphi alone excepted. Some writers ſay, that the iſland had the

name

name of Delos, from the clear and ſimple terms in which the anſwers were here given by the oracle, contrary to the ambiguity obſerved in other places; but it was conſulted only while Apollo made Delos his ſummer reſidence, for his winter abode was at Patara, a city of Lycia. The preſents offered by the votaries to Apollo, were laid in the altar already mentioned, which altar, as ſome ſay, was erected by Apollo himſelf, when he was only four years old, and formed of the horns of goats, killed by Diana, on mount Cynthus. It was preſerved pure from blood and every kind of pollution, as offenſive to Apollo. The whole iſland was an aſylum, which extended to all living creatures, dogs excepted, which were not ſuffered to be brought on ſhore, and therefore it abounded with hares.

Delos, the capital of the iſland of the ſame name. It occupied, as its magnificent ruins evince, that ſpacious plain which reaches from one coaſt to the other, and extends eaſtward as far as the Iſthmus. It was the richeſt city in the Archipelago, eſpecially after the deſtruction of Corinth; merchants being allured hither from all parts, by the immunities they enjoyed, and by its convenient ſituation between Europe and Aſia. Strabo calls it one of the moſt frequented emporiums of the world; and Pliny tells us, that all the commodities of Europe and Aſia were ſold, purchaſed, or exchanged there. It contained many noble and ſtately buildings; *viz.* the temples of Apollo, Diana, and Latona, and alſo thoſe of Neptune and Hercules; the porticoes of Philip of Macedon, and of Dionyſius Eutyches: a gymnaſium, an oval baſon, about 48 toiſes in diameter, made at an immenſe expence, for teaching the inhabitants to ſwim, and for the exhibition of ſea-fights; and a magnificent theatre of white marble, 250 feet in diameter; and a citadel.

Delos, or Deli, in *Geography*, an iſland of the Grecian Archipelago, formerly famous, as we have ſeen in the preceding article, is now little more than a deſert rock, covered with ruins and uninhabited. Under the plural name Deli, are comprehended two iſlands, *viz.* Little Delos, 7 miles in compaſs, and Great Delos, which is included within a circuit of 18 miles, known to the ancients by the name of Rhenæa, which at ſome diſtance ſeems to be joined to Delos. It is now the refuge of pirates. Every where, ſays Olivier, ſchiſtous or granitical, it exhibits no trace of a volcano, and nothing that can explain, by the laws of phyſics, the wonders which the Greeks have tranſmitted to us reſpecting it; near it is mount *Cynthus*; which ſee.

DELPHI, or Delphos, now called *Caſtri*, the capital of Phocis, in Greece, ſituated in a valley towards the S.W. of the foot of one of the brows of mount Parnaſſus, ſo famous in antiquity and ſacred to the Muſes and Apollo; and anciently much celebrated for its temple and oracle of Apollo. It was alſo called *Pytho*, particularly by the poets; deriving this name, as ſome have ſaid, from the ſerpent Python, which Apollo killed in this place. Pauſanias, however, ſays that this name Pytho was given to the city of Delphos, by Pythis, ſon of Delphus, and grandſon of Lycorus. The Greek hiſtorians give to this city the name of Delphos, which ſome ſuppoſe to have been ſo called from αδελφοι, brethren, becauſe Apollo and his brother Bacchus were both worſhipped there; and others, with greater probability, derive the name from δελφος, ſingle, or ſolitary, referring to the retired ſituation of the city among the mountains. Delphos was only 7 ſtadia in circuit, and the rocks that encompaſſed it formed its natural fortifications. One of the ſummits of Parnaſſus covered it on the north; another craggy rock, called "Cirphis," defended it on the ſouth. Juſtin queries, which was moſt worthy of admiration, the fortification of the place, or the majeſty of the god, who here delivered his oracles. "Incertum, utrum loci, an majeſtas dei plus hic admirationis habeat." This city was built in the form of a kind of amphitheatre, and was divided into three parts, one riſing, as it were, above the other. Strabo places Delphos in the middle of Greece, and ſome of the ancients conceiving it to be in the middle of the world, called it the navel of the earth; the poets pretending that Jupiter, in order to aſcertain the middle of the earth, let fly two eagles; or according to Pindar, two crows, the one from the eaſt and the other from the weſt, and that they met in this place. It had, however, ſo convenient a harbour, and was ſo well ſituated, being rather in the heart of Greece than of the world, that it became in time the place where the Grecian ſtates aſſembled, and where the court of the Amphictyons ſat. At preſent the town of Caſtri does not conſiſt of above 200 houſes, and thoſe very ill built. It ſtands between Salene and Livadia, about 10 miles diſtant from the latter, on the ſouth ſide of mount Parnaſſus. The temple of Apollo occupied, according to Pauſanias, a large ſpace, and many ſtreets met here. The firſt diſcovery of the oracle, which laid the foundation of the extraordinary veneration in which this place was held, and of the riches accumulated in the temple, is ſaid to have been as follows: it was occaſioned by ſome goats which were feeding on mount Parnaſſus, near a deep and large cavern, with a narrow entrance. Theſe goats having been obſerved by the goat-herd, called Coretas by Plutarch, to friſk, and leap after a ſtrange manner, and to utter unuſual ſounds immediately upon their approach to the mouth of the cavern, he had the curioſity to view it, and found himſelf ſeized with the like fit of madneſs, ſkipping, dancing, and foretelling things to come. At the news of this diſcovery, multitudes flocked thither, many of whom were poſſeſſed with ſuch phrenetic enthuſiaſm, that they threw themſelves headlong into the opening of the cavern; inſomuch, that it was neceſſary to iſſue an edict, forbidding all perſons to approach the cavern. This ſurpriſing place was treated with ſingular veneration, and ſoon covered with a kind of chapel, which Pauſanias tells us was originally made of laurel boughs, and reſembled a large hut. This, if we may credit the Phocian tradition, was ſurrounded by one of wax, and raiſed up by the bees. After this a third was built of ſolid copper, ſaid to have been the workmanſhip of Vulcan. This laſt was deſtroyed, as ſome ſay, by an earthquake, or, according to others, by a fire, which melted the copper; and then a ſumptuous temple, altogether of ſtone, was erected by Trophimus and Agamedes, two excellent architects. This edifice was deſtroyed by fire in the 58th Olympiad, 548 years B. C. The Amphictyons propoſed to be at the charge of building another; but the Alcmeonides, a rich family of Athens, came to Delphos, obtained the honour of executing the building, and made it more magnificent than they had at firſt propoſed. The riches of this temple, amaſſed by the donations of thoſe who frequented it and conſulted the oracle, expoſed it to various depredations. At length the Gauls, under the conduct of Brennus, came hither for the ſame purpoſe, about 278 years B. C.; but they were repulſed with great ſlaughter. Laſt of all, Nero robbed it of 500 of the moſt precious ſtatues.

It has not been aſcertained at what time this oracle was founded. It is certain, however, that Apollo was not the firſt who was conſulted here. Æſchylus, in his tragedy of the Eumenides, ſays, Terra was the firſt who iſſued oracles at Delphi: after her Themis, then Phœbe, another daughter of Terra, and, as it is ſaid, mother of Latona, and grandmother to Apollo. Pauſanias ſays, that before Themis, Terra and Neptune had delivered oracles in this place, and ſome ſay that Saturn had alſo been conſulted here. At length the oracle of Apollo became eſtabliſhed

and permanent; and ſuch was its reputation, and ſuch were the multitudes from all parts that came to conſult it, that the riches which were thus brought into the temple and city became ſo conſiderable as to be compared with thoſe of the Perſian kings. About the time when this oracle was firſt diſcovered, the whole myſtery requiſite for obtaining the prophetic gift was to approach the cavern and inhale the vapour that iſſued from it; and then the god inſpired all perſons indifferently; but at length ſeveral enthuſiaſts, in the exceſs of their fury, having thrown themſelves headlong into the cavern, it was thought expedient to contrive a prevention of this accident, which frequently occurred. Accordingly, they placed over the hole, whence the vapour iſſued, a machine which they called "a tripod," becauſe it had three feet, and commiſſioned a woman to ſeat herſelf in this ſort of chair, where ſhe might imbibe the vapour without danger, becauſe the three feet of the machine ſtood firmly upon the rock. This prieſteſs was named "Pythia," from the ſerpent Python, ſlain by Apollo, or from the Greek πυθεσθαι, ſignifying to inquire, becauſe people came to Delphi to conſult this deity. The females firſt employed were virgins ſelected with great precaution; but the only qualification neceſſary was to be able to ſpeak and repeat what the god dictated. The cuſtom of chooſing young virgins continued for a long time, till one of them, who was extremely beautiful, was diſhonoured by a young Theſſalian. An expreſs law was then enacted, that none ſhould be choſen but women above 50 years old. At firſt there was only one prieſteſs; but afterwards, there were two or three. The oracles were not delivered every day; but ſacrifices were in ſome caſes preſented for a long time, and even for a whole year; and it was once a year in the month βοσιον, which anſwered to the beginning of ſpring, that Apollo inſpired the prieſteſs. Except on this day, ſhe was forbidden, under pain of death, to go into the ſanctuary to conſult Apollo. Alexander, before his expedition into Aſia, came to Delphi on one of thoſe days when the ſanctuary was ſhut, and intreated the prieſteſs to mount the tripod, which ſhe ſteadily refuſed, alleging the law which forbade her. The prince, naturally impetuous, became impatient, and drew the prieſteſs by force from her cell, and whilſt he was conducting her to the ſanctuary, ſhe took occaſion to exclaim, "My ſon, thou art invincible." As ſoon as theſe words were pronounced, Alexander cried out that he was ſatisfied, and would have no other oracle. Great preparations were made for giving myſteriouſneſs to the oracle, and for commanding the reſpect that was paid to it. Among other circumſtances relating to the ſacrifices that were offered, we may obſerve that the prieſteſs herſelf faſted three days, and before ſhe aſcended the tripod, ſhe bathed herſelf in the fountain of Caſtalia. She drank water from that fountain, and chewed laurel-leaves gathered near it. She was then led into the ſanctuary by the prieſts, who placed her upon the tripod. As ſoon as ſhe began to be agitated by the divine exhalation, her hair ſtood on end, her aſpect became wild and ghaſtly, her mouth began to foam, and her whole body was ſuddenly ſeized with violent tremblings. In this condition ſhe attempted to eſcape from the prophets, who detained her by force, while her ſhrieks and howlings made the whole temple to reſound, and filled the by-ſtanders with a ſacred horror. At length, unable to reſiſt the impulſe of the god, ſhe ſurrendered herſelf to him, and at certain intervals uttered from the bottom of her ſtomach, or rather from her belly, according to the expreſſion εγγαστριμυθος, ſome unconnected words, which the prophets ranged in order, and put in form of verſe, giving them a connection which they had not when they were delivered by the prieſteſs. The oracle being pronounced, ſhe was taken off the tripod, and conducted back to her cell, where ſhe continued ſeveral days to recover herſelf from her conflict. Lucan tells us, (Pharſal. lib. v.) that ſpeedy death was frequently the conſequence of her enthuſiaſm. The oracles pronounced by the prieſteſs were generally delivered to the poets who attended on the occaſion, and who put them into wretched verſe, which gave occaſion to the raillery, that Apollo the prince of the muſes was the worſt of poets. Sometimes the prieſteſs herſelf pronounced her oracles in verſe; but in later times they contented themſelves with delivering them in proſe; and this Plutarch reckons to have been one cauſe of the declenſion of the oracle. The general characteriſtic of this as well as other oracles was obſcurity and ambiguity; ſo that the ſame anſwer might be differently interpreted and applied; though it has been ſaid that the anſwers of this oracle were more plain and determinate than thoſe of ſome others. Theſe, however, were on many occaſions equivocal. Thus, when Crœſus was about to invade the Medes, he conſulted this oracle upon the ſucceſs of the war, and received for anſwer, that by paſſing the river Halys, he would win a great empire. But he was left to conjecture, or to determine by the event, whether this empire was his own or that of his enemies. Such was alſo the ſame oracle's anſwer to Pyrrhus,

"Aio te, Æacida, Romanos vincere poſſe."

Under the cover of ſuch ambiguities, the god eluded all difficulties, and was never in the wrong. The prieſts and prieſteſſes, to whoſe conduct the reſponſes of the oracle were committed, were frequently guilty of fraud and impoſture. Many inſtances might be mentioned; the Delphic prieſteſs was not ſuperior to corruption. Hence ſhe perſuaded the Lacedæmonians to aſſiſt the people of Athens in the expulſion of the 30 tyrants. Hence alſo ſhe cauſed Demaratus to be diveſted of the royal dignity to make way for Cleomenes; and ſupported the impoſtor Lyſander, when he endeavoured to change the ſucceſſion to the throne of Sparta. It is not improbable, that Themiſtocles, who well knew the importance of acting againſt the Perſians by ſea, inſpired the god with the anſwer he gave, "to defend themſelves with walls of wood." Demoſthenes, convinced that the oracles were frequently ſuggeſted by paſſion or intereſt, and ſuſpecting, with reaſon, that Philip had inſtructed them to ſpeak in his favour, boldly declared, that the Pythia *philippized*, and bad the Athenians and Thebans remember, that Pericles and Epaminondas, inſtead of liſtening to, and amuſing themſelves with, the frivolous anſwers of the oracle, thoſe idle bugbears of the baſe and cowardly, conſulted only reaſon in the choice and execution of their meaſures. See ORACLE.

DELPHIN, in *Literary Hiſtory*. See DAUPHINS.

DELPHINIA, in *Antiquity*, feaſts which the inhabitants of Egina celebrated in honour of Apollo, ſurnamed Delphinius, ſo called, as it is pretended, becauſe he aſſumed the form of a dolphin to conduct Caſtalius and his colony from the iſle of Crete to the *Sinus Criſſæus Delphinium*, one of the courts of judicature of the Athenians; ſo called from the proximity of the place, where they held their aſſemblies, to the temple of Apollo Delphinius.

DELPHINIUM, in *Botany*, (Δελφινιον of the ancient Greeks, "becauſe," ſays Dioſcorides, "the ſlender ſegments of its leaves reſemble dolphins;" a reſemblance rather to be found, according to the vulgar idea of that fiſh, between the curvature of its body and the horned nectary of the flower; and Dodonæus ſuggeſts, on good authority, that the paſſage is ſo to be underſtood.) Linn. Gen. 274. Schreb. 367. Willd. Sp. Pl. v. 2. 1226. Juſſ. 234. Gærtn. t. 65. Claſs and

and order, *Polyandria Trigynia*. Nat. Ord. *Ranunculaceæ*, Juſſ. *Multiſiliquæ*, Linn. Larkſpur.

Gen. Ch. *Cal.* none, unleſs we, with Juſſieu, take the petals for ſuch. *Cor.* Petals five, unequal, placed in a circle, of which the upper one is extended at the baſe into a long, ſtraight, blunt, tubular ſpur: the two lateral ones are broadeſt, and the two lowermoſt leaſt of all. Nectary of two leaves, combined or diſtinct; its fore part ſurrounded by the petals; its tubular ſpur encloſed in that of the uppermoſt petal. *Stam.* Filaments numerous, 15—30, ſmall, awl-ſhaped, dilated at the baſe, aſcending towards the upper petal. Anthers erect, roundiſh, two-lobed, ſmall. *Piſt.* Germens three or one, ovate-oblong. Styles ſhort. Stigmas obtuſe, reflexed. *Peric.* Capſules equal in number to the germens, cylindrical, ſtraight, of one valve and one cell, burſting longitudinally along their inner edge. *Seeds* ſeveral, roundiſh, angular.

Eſſ. Ch. Calyx none. Petals five; the upper one ſpurred. Nectary cloven, with a poſterior ſpur.

The lower leaves are digitate or palmate; the upper ſometimes undivided. Flowers looſely ſpiked or panicled, terminal, various in colour, but never yellow. Juſſ.

Nine ſpecies of Larkſpur are enumerated in the 14th edition of Linn. Syſt. Veg. publiſhed by Murray, fourteen in Willdenow.

* *Capſules ſolitary.*

D. *Conſolida*, Sm. Fl. Brit. 577. Engl. Bot. t. 1839; "Capſule ſolitary. Nectary of one leaf. Stem ſubdivided;" is one of the annual ſpecies, abundant in the open fields of Cambridgeſhire, &c. and known in gardens by the name of Branching Larkſpur. Its Latin denomination aroſe from a miſtaken opinion of its healing or conſolidating virtues. The reverſe would be nearer the truth, its juices being, like thoſe of many kinds of *Ranunculus*, *Anemone*, and *Clematis*, ſo acrid as more or leſs to bliſter the ſkin. The flowers, naturally of a brilliant though deep blue, and forming with alum a blue pigment, are occaſionally white, pink, or elegantly variegated with pink and blue. D. *Ajacis*; "Capſule ſolitary. Nectary of one leaf. Stem ſimple;" is the more common Garden Larkſpur, ſo frequently double and ſo various in colour. Upon what foundation Linnæus and others have taken this for the hyacinth of the poets does not appear. The late profeſſor Martyn, and his ſon, the learned editor of Miller, contend, with great probability, that *Lilium Martagon* was the plant intended, on account of the letter-like marks on its petals, and profeſſor Heyne aſſents to this opinion. See Hyacinthus, Lilium, and Scilla. D. *aconiti*; Linn. Mant. 77. Vahl. Symb. v. 1. t. 13; "Capſule ſolitary. Nectary of one leaf, with four teeth in front. Ultimate branches ſingle-flowered." A very remarkable ſpecies on account of its minute petals and large nectary, found by Tournefort and Forſkall in the Levant, was referred by the latter to *Aconitum*.

** *Capſules Three to each Flower.*

Of this ſection the moſt remarkable are, D. *grandiflorum*, Mill. Ic. t. 250. f. 1.; Nectary two-leaved, with an undivided lip. Leaves in numerous linear acute ſegments. Root perennial. Flowers very large, of a rich deep blue. Capſules hoary. A native of Siberia, one of the fineſt of its genus. D. *elatum*, the common Bee Larkſpur, and D. *exaltatum*, the brilliant American Larkſpur, are both hardy perennials, frequent in our gardens, which may be made to bloſſom twice in one ſeaſon if cut down cloſe to the root after their firſt flowering. D. *Staphiſagria*, Staveſacre, Woodv. Med. Bot. t. 154, a native of the South of Europe, though a flower of great beauty, is chiefly known for its ſeeds as a vulgar remedy to expel lice. It is a biennial, rather difficult of culture.

Delphinium, in *Gardening*, compriſes plants of the herbaceous, flowery, hardy, annual, and perennial kinds; of which the ſpecies moſtly cultivated are the upright larkſpur (D. *ajacis*), the great flowered bee lark-ſpur (D. *grandiflorum*), and the tall bee lark-ſpur (D. *elatum*): Of which the firſt is annual, and has the ſtalks eighteen inches and more in height, ſeldom branched; the leaves are finely divided, commonly by threes, on broad petioles; the ſegments are linear, quite entire, and channelled above; the ſpikes of flowers erect, denſe, and of different colours.

There are varieties with ſingle and double blue flowers; with ſingle and double purple flowers; with ſingle and double ſilver-coloured flowers; with ſingle and double violet-coloured flowers; with ſingle and double aſh-coloured flowers; with ſingle and double ſtriped flowers; large rocket lark-ſpur, and dwarf or rocket lark-ſpur.

The ſecond ſort has a perennial root, which puts out two or three branching ſtalks every ſpring, riſing about a foot and a half high; the leaves are ſmooth and of a light green colour above, and hoary beneath, compoſed of many narrow ſegments, which terminate in ſeveral acute points; the flowers come out towards the upper part of the ſtalks ſingly, each on a long naked peduncle, are large, and of a fine azure colour. They appear in June and July, and the plant is a native of Siberia.

The laſt ſort riſes to the height of from five to ſix feet; the root is perennial; the leaves ſlightly villoſe, becoming ſmooth by age, half-five-lobed, petioled; lobes acute, often half-three-lobed, ſharply ſerrate. The ſpikes of flowers very long and handſome, of a deep blue colour, with a wrinkled ſpur. It is a native of Switzerland, &c. flowering from June to September.

Method of Culture.—Theſe plants, in all the ſorts and varieties, are propagated by ſowing the ſeeds in the early ſpring, as in February, March, and the following month, or in the autumn, immediately after the ſeeds become ripe, in the clumps, borders, or other places where the plants are to remain, as they do not ſucceed ſo perfectly by tranſplanting, in patches of eight or ten in a place, covering the ſeed into the depth of nearly half an inch, the mould being previouſly rendered fine.

Where the annual ſort and varieties are cultivated for a large ſhow, the ſeed may be ſown thinly in drills on beds four feet broad, at a foot diſtance, covering it into the above depth. They are ſometimes ſown in other forms, for the purpoſe of appearance.

The autumn ſowings of theſe ſeeds ſhould be marked, by placing ſmall ſticks in the places, to prevent their being diſturbed by the ſpring digging of the ground.

The only culture the plants in general require after they appear, is that of thinning them in a proper manner, according to circumſtances, and keeping them free from weeds. And in the perennial ſorts, removing the ſtems in the autumn.

Theſe plants afford much ornament and variety in the different compartments of pleaſure-grounds, and they ſucceed in moſt ſoils and ſituations, being of hardy growth.

Delphinium, in *Ancient Geography*, a maritime town of the iſle of Chios, ſituated eaſtward, and towards the middle of the iſland. It was taken by Callicratides, commander of the Lacedæmonians towards the ſecond year of the 93d olympiad, 407 years B. C.

DELPHINUS, the *Dolphin*, in *Aſtronomy*, a conſtella-

tion of the northern hemiſphere; whoſe ſtars, according to Ptolemy, are 10; according to Tycho, as many; according to Hevelius, 14; and, according to Mr. Flamſteed, 18.

Delphinus, in *Zoology*, the laſt genus of the cetaceous or fiſh-formed tribe of mammalia, the character of which conſiſts ſimply in having teeth in each jaw. By this means, it is at once diſtinguiſhed from the whale tribe, which have no teeth in either jaw, from the monodon, which have them only in the upper jaw, and the phyſeter, in which they occur only in the lower one. Theſe are the four genera of cetaceous animals. The ſpecies of the delphinus genus, four in number, are defined as follows.

Phocæna. Body ſub-conic, back broad, ſnout bluntiſh. Linn. Fn. Suec. *Turſio*, Pliny. *Meerſchwein oder tunin*, Mart. *Niſer ou le marſouin*, Egede. Porpoiſe, or Porpeſſe.

The upper part of the body in this kind is blueiſh black, and the lower white; the head obtuſe, with ſmall eyes and teeth (the latter of which are acute), and the vent ſomewhat bilobate. The porpeſſe inhabits the European ſeas, and not unfrequently in warm ſeaſons aſcends the entrance of large rivers, in purſuit of the ſhoals of fiſhes, which are proceeding in their migratory courſe from the ſea to the freſh waters. The porpeſſe lives chiefly on the ſmaller kinds of fiſh, and is obſerved, when in queſt of food, to turn up the ſand and mud at the bottom of the water like the hog: it is often ſeen, likewiſe, darting and tumbling over in the water like the dolphin, and this uneaſineſs of the animal, in the opinion of ſome, is to be regarded as the preſage of ſtormy weather.

Porpeſſes are obſerved to aſſemble occaſionally in vaſt numbers, and to purſue ſhoals of herrings, mackarel, and other fiſh, which they drive into the bays and cloſe receſſes, and prey upon with great voracity. This animal is remarkably fat, and being covered immediately under the ſkin with a very thick coat of lard, affords an abundance of oil. The porpeſſe was once conſidered as a ſumptuous article of food in this country, and was oftentimes introduced to the tables of the Engliſh nobility, even ſo lately as the reign of queen Elizabeth. It was eaten with a ſauce compoſed of the crumbs of fine bread with ſugar and vinegar. In the preſent day, the porpeſſe is an object of capture only for the ſake of its oil.

Delphinus. Body oblong, roundiſh; ſnout narrow and ſharp. Artedi. *Delphinus*, Pliny. *Porcus marinus*, Sibbald. *Delphin*, Crantz. Dolphin.

The dolphin bears a great reſemblance to the porpeſſe, but has a ſnout more elongated and acute, and the ſhape of the body throughout is rather more ſlender; and it alſo grows to a much larger ſize, the porpeſſe ſeldom exceeding three or four feet, and the dolphin meaſuring in common eight or ten feet; the colour is rather ſimilar in both. The dolphin is found in the Mediterranean and Indian ſeas, and ſeems to be generally confounded by navigators with the former. It preys on various kinds of fiſh, and is ſaid to be ſometimes ſeen attacking and wounding even the larger kinds of whales. The ſeamen conſider its appearance as the prelude of an approaching ſtorm.

The celebrity which the dolphin obtained among the ancients, from its ſuppoſed attachment towards the human race, is ſufficiently known. "The dolphin," ſays Pliny, "is friendly to man, and pleaſed with muſic. He does not fly from the ſight of mankind, but of his own accord meets their ſhips, gamboling before them, and accompanying their courſe, as if through a ſpirit of emulation, and always outſtripping them, even when ſailing with the moſt favourable wind." The voice of the dolphin, according to the ſame writer, is a ſound reſembling a human groan. Theſe and other particulars related by poets and hiſtorians of antiquity, have excited ſentiments of veneration in vulgar minds towards this uncouth inhabitant of the waters: as poetic allegories, thoſe tales are not diſpleaſing; but as matters of fact are altogether diſcountenanced by the obſervations of later writers.

From the teſtimony of Gronovius, it appears, that the porpeſſe conſtantly ſwims in an incurvated poſture; and this very naturally leads to a concluſion that the dolphin, whoſe form is ſtrikingly ſimilar, may ſwim in the ſame poſition; a circumſtance tending to prove that the repreſentations of the dolphin, tranſmitted to us by the ancients, are not ſo greatly exaggerated as might otherwiſe be imagined.

Orca. Snout turning upward; teeth obtuſe. *Delphinus orca, roſtro ſurſum repando, dentibus latis ſerratis*, Linn. Mant. *Orca*, Pliny. *Butſkopf*, Marten. *Buts-kopper*, Egede. Grampus.

This animal grows to the length of twenty-five feet, and is of an extremely fierce and predatory diſpoſition, feeding on larger fiſhes, and even on the dolphin and the porpeſſe. It is found in the Mediterranean and Atlantic ſeas, as well as in both the polar regions. This ſpecies often attacks the whales, whence Fabricius denominates it *balænarum tyrannus*. Seals are its more common food; theſe it frequently ſurpriſes while ſleeping on the rocks, diſlodging them by means of its back fin, and, having precipitated them into the water, ſeizes upon and devours them without difficulty.

Leucas. Snout conic, obtuſe, and inclining upwards; no dorſal fin. Pallas. *Beluga*, Penn. *Bieluga*, Steller. *Wittfiſch oder Weiſſfiſch*, Anderſon. *Weiſſfiſch*, Crantz.

A native of the arctic regions, deſcribed by Fabricius, Pallas, and other late writers, for it does not appear to have been diſtinctly known till within a few years. Its form is not inelegant, and its colour, when full grown, milk-white, or white, tinged with pale roſy. The ſpecies is gregarious, and is often obſerved ſwimming in large ſhoals, the young accompanying the parents, and the whole, from their unuſual colour, forming an intereſting ſpectacle. The head of this ſpecies is rather ſmall, and has the ſpiracle at the ſummit; the eyes very ſmall and blueiſh; the gape moderate; the teeth ſmall, blunt, and not very numerous, amounting to about ten on each ſide in both jaws. The neck is ſhort, and the body thickeſt in the middle. The tail is ſlightly lobed, the pectoral fins thick and fatty, and are marked at the edge into five ſlight diviſions: theſe contain the bones of the five fingers which may eaſily be felt within the fin. The ſkin, on every part, is ſmooth and ſlippery, and the animal in general very fat.

According to Pallas, when this animal ſwims, the tail is bent inwards, in the manner of the craw-fiſh, and is enabled to move in the water with amazing velocity by the alternate incurvation and extenſion of that part. It bears ſuch a ſtrong affinity with the ſeals, that the Samoieds conſider it as a kind of aquatic quadruped. This animal produces only one at a birth; this is at firſt blueiſh, grey, or inclining to blackiſh, and acquires the pure and beautiful milky white appearance of the parent as it advances in age.

DELPHOS. See Delphi.

DEL-REY, in *Geography*, a captainſhip, or province, in the ſouthern part of Brazil; which ſeems to be rather regarded as a frontier diſtrict towards the Spaniſh poſſeſſions, than as a regular ſettlement.

DELRIO, Martin-Anthony, in *Biography*, a learned Jeſuit, born at Antwerp in the year 1551. Having attained

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to a competent knowledge of the claſſics, he went to Paris to be inſtructed by able profeſſors in rhetoric and philoſophy. From Paris he proceeded to Douay and Louvain to ſtudy the law, and thence he travelled to Spain, where, in 1574, he had the degree of doctor conferred on him by the univerſity of Salamanca. On his return into the Low Countries he filled ſome civil offices of honour and emolument; but upon the breaking out of the wars in Flanders, he took another journey into Spain, when he entered himſelf among the Jeſuits at Valladolid, in the year 1580. In a few years he was ordered by his ſuperiors into the Low Countries, to teach philoſophy, the languages, and theology. At Louvain he contracted an intimacy with the celebrated Juſtus Lipſius. Here he died in October 1608. As an author he is chiefly known by his "Diſquiſitiones Magicæ," in three vols. 4to. publiſhed in 1599 and 1601. He publiſhed likewiſe commentaries on various parts of the Old and New Teſtaments; and treatiſes in defence of the genuineneſs of the books attributed to Dionyſius, the Arcopagite, againſt the criticiſms of Scaliger. In the early part of life he publiſhed notes on Claudian, on the tragedies of Seneca, together with ſome treatiſes on law. Moreri.

DEL Spiritu Santo, in *Geography*, a river which falls into the gulf of Mexico, at the N. W. end of the peninſula of Florida.

DELTA, the name given to a conſiderable part of Lower Egypt, on account of its triangular figure, which reſembles the Greek *delta*, Δ. The triangle which formed the delta was anciently compriſed between two branches of the Nile, and the Mediterranean ſea. At ſome diſtance to the north of Memphis, or at a place where formerly ſtood the town of "Cerceſura," now called "Batn el Bakara," or the cow's belly, the Nile ſeparated into two principal branches, *viz.* the Canopic branch to the weſt, which falls into the ſea near Roſetta, and the Peluſian to the eaſt, which diſcharges itſelf into the ſea near Damieta. The former of theſe branches taking a north and north-weſt courſe, bore the name of "Agathosdæmon flumen," or the river of the good genius; and terminated to the eaſt of Canopus, after having watered Schedia, which was ſituated at the mouth called "Canopicum Oſtium." The latter branch, whoſe courſe was north-eaſt, was called "Athribiticus fluvius," becauſe it watered the town of "Athribis," and diſcharged itſelf into the ſea, near Peluſium, at the mouth denominated "Peluſiacum Oſtium." The ſpace comprehended between theſe two branches was divided into two others; one called Delta, which compriſed the territory between the Agathoſdæmon and the continuation of the Athribiticus, paſſing by Xoïs, Buſiris, &c. to Thumiathis, where was the mouth called "Phatmeticum Oſtium." The other part, comprehended between this branch and that which turned towards the eaſt from the north of Athribis as far as Peluſium, was called "Delta parvus." The firſt of theſe Deltas contained the towns of Proſopitis, Taula, Saïs, Buſiris, Xoïs, Sebenythus, Onuphis, Pachnamunis, Butus, and Metelis, which gave name to as many different nomes, beſides other conſiderable towns; the Parvus Delta contained the towns of Leontopolis, Mendes, Panephyſis, Tanis, and Sethrum, together with ſome others which were not the capitals of nomes. Conſidering, ſays major Rennell in his "Geographical Syſtem of Herodotus examined and explained," the extreme flatneſs of the Delta; the quality of its ſoil which is totally different from that of the adjacent countries; its form which projects ſo far into the ſea, beyond the general line of the coaſt, on the one hand, and on the other, filling up a ſpace which, reaſoning from appearances, looks like a bay or gulf of the ſea: one can hardly doubt, that the ſpace which it occupies was originally a part of the ſea, from the neighbourhood of Peluſium, or of mount Caſius, to that of Alexandria; and ſouthward to the foot of the hills of the pyramids, and of Mokattam; which is allowing little more for the depth of the bay, from the ſuppoſed line of the coaſt, than the lower point of the Delta now advances beyond it. Without doubt when we carry back our ideas to the time when the ſea waſhed the baſe of the rock, on which the pyramids of Memphis ſtand, the preſent baſe of which is waſhed by the inundation of the Nile, at an elevation moſt probably of 70 or 80 feet above the ſurface of the ſame ſea; we are loſt in the contemplation of the vaſt interval of time that muſt neceſſarily have elapſed ſince the foundation of the Delta was firſt laid. To the natural progreſs of alluvion, the depoſitions acquire a maſs capable of ſeparating the parent river into different channels, by an apex; while, the ſides ſpreading wider as they recede from this point, the newly emerged land aſſumes a triangular form. Its baſe gradually enlarges by new depoſitions; the maſs, as it acquires a firmer conſiſtence, confines the river to fewer channels; and the apex of the Delta changes its poſition by receding farther from the ſource. In this way M. Rennell ſtates grounds for ſuppoſing that the apex of the Delta of Egypt was once ſituated to the ſouthward of the ſite of Memphis: and he produces leſs equivocal teſtimony of a change of poſition towards the north, in times poſterior to that diſtant and doubtful era. The ſite of the centre of ancient Memphis is placed by Mr. Rennell in 29° 53′. The Canopic, or moſt weſtern branch of the Nile, is ſuppoſed to have gradually forſaken its bed, and to occupy the Bolbitine channel, which was originally an artificial one. By this change, the Delta has been contracted about 18 miles of the weſtern part of its baſe; and this is become as barren a deſert as the adjoining one of Libya. The opinion above ſtated, that the Delta has been formed by the accumulation of ſlime or ſoil in conſequence of the periodical inundations of the Nile, is now very generally received by naturaliſts; though it is liable to ſome very ſtrong objections from chronology, which are not eaſily ſolved. If the ſea ever waſhed the rock on which the pyramids ſtand, it muſt have been at a period much anterior to the building of Memphis by Menes; ſince the gradual depoſition of the river had even then produced the Delta. Yet Menes muſt have lived only a few centuries ſubſequent to the flood. Another phyſical objection occurs of ſtill greater weight. There was a time when the rock of the pyramids was nearly on a level with the ſea; it is now 80 feet above that level, not by the retroceſſion of that element, but by the acceſſion of height gained by the land in conſequence of the depoſitions of the Nile, according to the opinion above ſtated. Let us ſuppoſe, then, that when the city of Memphis and the pyramids were founded, the ſite was 40 feet above the level of the ſea; in this caſe, Memphis, the pyramids, and of courſe, many of the cities of ancient Egypt, would now be 40 feet under ground;—a ſuppoſition not warranted by fact. In the time of Moeris, who is ſaid to have lived 500 years before the Trojan war, the Delta appeared in its infancy. Eight cubits were then ſufficient to overflow it in its whole extent. Boats paſſed over it from one extremity to the other, and its towns, built on artificial elevations, reſembled the iſlands of the Ægean ſea. (Herodotus, Euterpe. Strabo, lib. xvii.) When Herodotus viſited Egypt, 15 cubits were neceſſary to cover all the Lower Egypt, but the Nile then overflowed the country for the ſpace of two days' journey, to the right and left of the Delta. Under the Roman empire, 15 cubits produced the ſame effect. In the time of the domination of the Arabs, their writers ſpeak of 17 cubits as the moſt favourable height. Eighteen cubits are at this time

time the meaſure of abundance; but the inundation no longer extends over the Lower Egypt, but its progreſs is ſtopped at Grand Cairo, and in the neighbouring country. The Nile, however, ſometimes riſes to 22 cubits. The mud accumulated for ſo many years on the iſland, which aroſe from out of its boſom, is the cauſe of this phenomenon. Art has alſo contributed towards it, either by the banks raiſed to protect the lands moſt expoſed to the action of the river, or by multiplying its outlets, and by cutting a great number of canals, which give a free paſſage to the waters. The Delta, which is ninety leagues in circumference, is at preſent in the moſt favourable ſtate for agriculture. Waſhed on the eaſt and weſt by two rivers formed by the diviſion of the Nile, and interſected by innumerable rivulets, it preſents to the eye an immenſe garden, all the different compartments of which may be eaſily watered. During the three months that the Thebais is under water, the Delta poſſeſſes fields covered with rice, barley, vegetables, and winter fruits. It is no longer, as in former times, the Ægean ſea with the Cyclades; rich harveſts now cover an extenſive plain; it is now overſpread with groves of date-trees, of oranges, and ſycamores; here are perpetually running ſtreams, and a verdure that is conſtantly varied and renewed; it is, in ſhort, ſays M. Savary, (Letters on Egypt, vol. i.) a picture of abundance, that delights the eye, and aſtoniſhes the imagination. By loſing the inundation, this iſle has gained every year, the three months during which the Thebais is under water. It is alſo the only part of Egypt, where the ſame field produces two crops of grain within the year, one of rice, the other of barley. The length of the Delta, as well as its height, has increaſed. (Strabo. lib. xvii.) Under the reign of Pſammetichus, the Mileſians, with 30 veſſels, landed at the mouth of the Bolbitine branch, now called that of Roſetta, where they fortified themſelves. They there built a town called "Metelis," the ſame as Faoüe. This town, formerly a ſea-port, is at preſent 9 leagues diſtant from it, and this is the ſpace by which the Delta has lengthened, from the time of Pſammetichus to our day. Moreover, the new town of Alexandria is at ſome diſtance to the north of the ruins of the old town, and the ſea has retired. (See ALEXANDRIA and PHAROS.)

Some Arabs divide the Delta into two parts "Al Rif," and "Al Bahriya;" the former, being the weſtern part, is ſuppoſed by Bochart to be the Rahab of the Scriptures, and was ſo called becauſe of its form, reſembling a pear; which the Egyptians call Rib, or Ribi. Al Bahriya is the eaſtern part of the Delta, in the opinion of many; though Sicard more truly places Al Bahriya, or as he writes it, Beheiré, beyond the weſtern branch of the Nile. Delta, as Savary informs us, is divided into two provinces, in which two Beys reſide. Menouf is the capital of the Upper, and Mehallé el Kebire of the lower province; the former is called Menoufié, and the latter Garbie.

DELTA, a town of Egypt, in the greater Delta, according to Ptolemy.—Alſo, a name given to a quarter of Alexandria.

DELTA *of the Ganges*, that part of the province of Bengal which lies near the mouth of the Ganges, commencing about 220 miles from the ſea, or 300 by the windings of the river, and comprehending conſiderably more than twice the area of that of the Nile.

The two weſternmoſt branches, named the Coſſimbuzar and Jellinghy rivers, unite, and form what is afterwards called the Hoogly river; which forms the port of Calcutta, and the only branch of the Ganges that is commonly navigated by ſhips. That part of the Delta, which borders on the ſea, is compoſed of a labyrinth of rivers and creeks, all of which are ſalt except thoſe that immediately communicate with the principal arm of the Ganges. This tract, known by the name of the "Woods," or "Sunderbunds," is in extent equal to the principality of Wales; and is ſo completely inveloped in woods, and infeſted with tigers, that if any attempts have ever been made to clear it, they have hitherto miſcarried. Its numerous canals are ſo diſpoſed as to form a complete inland navigation throughout and acroſs the lower part of the Delta; without either the delay of going round the head of it, or the hazard of putting to ſea. Here ſalt, ſufficient for the whole conſumption of Bengal and its dependencies, is made and tranſported with equal facility; and here is alſo formed an inexhauſtible ſtore of timber for boat-building. The breadth of the lower part of this Delta is upwards of 150 miles; to which, if we add that of the two branches of the river that bound it, we ſhall have about 200 miles for the diſtance to which the Ganges expands its branches at its junction with the ſea. In tracing the ſea-coaſt of the Delta, there are found no leſs than eight openings; each of which, without heſitation, one pronounces to have been in its time the principal mouth of the Ganges. Nor is the occaſional deviation of the principal branch, probably, the only cauſe of fluctuation in the dimenſions of the Delta. The deltas of moſt capital rivers, the tropical ones eſpecially, are obſerved to encroach upon the ſea. This circumſtance is probably owing to the mud and ſand brought down by the rivers, and gradually depoſited, from the remoteſt ages down to the preſent time. The rivers, it is known, are loaded with mud and ſand at their entrance into the ſea; and it is alſo known, that the ſea recovers its tranſparency at the diſtance of 20 leagues from the coaſt; which muſt be owing to the waters having precipitated their earthy particles within that ſpace. As a ſtrong preſumptive proof of the wandering of the Ganges from one ſide of the Delta to the other, major Rennell obſerves, that there is no appearance of *virgin* earth, between the Tiperah hills on the eaſt, and the province of Burdwan on the weſt; nor on the north till we arrive at Dacca and Bauleah. In all the ſections of the numerous creeks and rivers in the Delta, nothing appears but ſand and black mould in regular ſtrata, till we arrive at the clay, that forms the lower part of their beds. There is not any ſubſtance ſo coarſe as gravel, either in the Delta, or nearer the ſea than 400 miles, at Oudanulla, where a rocky point, a part of the baſe of the neighbouring hills, projects into the river: but in places remote from the great rivers, the ſoil is either red, yellow, or of a deep brown. Rennell's Memoir, Phil. Tranſ. vol. lxxi. p. 92, &c.

DELTA *of the Indus*, a part of the province of Sinde, formed by the mouths of the river Indus or Sinde, near its entrance into the ſea, and projecting into the ſea, inſtead of receding from it. We learn from major Rennell, that during great part of the S.W. monſoon, or at leaſt in the months of July, Auguſt, and part of September, which is the rainy ſeaſon in moſt other parts of India, the atmoſphere in the Delta of the Indus is generally clouded; but no rain falls, except very near the ſea. Indeed, very few ſhowers fall during the whole ſeaſon.

The Ava or Pegue river forms likewiſe a delta of conſiderable extent. Thus alſo the Kiſtnah and Godavery rivers, however remote at their fountains, approach within 80 miles of each other, in the lower parts of their courſe; and form an extenſive tract of country, compoſed of rich vegetable mould, ſuch as is uſually found at the mouths of large rivers. By comparing this tract with the Deltas of Egypt and Bengal, and reaſoning from analogy, it will be readily ſuppoſed, that the whole, or the greateſt part of the territory included between Samulcotta and Pettapolly, about 150 miles in length

length along the ſea-ſhore, and from 40 to 50 wide, is in reality a gift of the two fore-mentioned rivers. The ſame appearances may be obſerved at the mouths of the Cattack and Tanjore rivers; but the Kiſtnah and Godavery, by draining a much greater extent of country, that is, from the 15th to the 21ſt degree of latitude, have collected materials for a greater quantity of new land. Within this new-formed land, and about mid-way between the Godavery and Kiſtnah, the ſoil forms a hollow ſpace, which in its loweſt part is a lake at all ſeaſons; and in all the other parts an extenſive inundation, during the ſeaſon of the periodical rains; being then a lake of 40 or 50 miles in extent, and called the *Colair* Lake; which ſee. For an account of a ſimilar delta, ſee ZAMBEZI.

DELTHANII, in *Ancient Geography*, a town of the Peloponneſus, placed by Steph. Byz. between Laconia and Meſſenia.

DELTOIDES, in *Anatomy*, one of the large muſcles of the arm, ſo called becauſe its form is triangular, and therefore reſembles that of the capital delta of the Greek alphabet; (from δελτα, and ειδος, *form.*) It is a thick and fleſhy muſcle, forming the upper and outer part of the ſhoulder; ariſing by its broadeſt portion, which correſponds to the baſe of the triangle, from the ſcapula and clavicle, ſtretching over the head of the humerus, and, after gradually contracting in breadth, ending by a pointed inſertion into the humerus. Its origin takes place, by a mixture of tendinous and fleſhy fibres, from the whole length of the inferior margin of the ſpine of the ſcapula; from the outer convex edge of the acromion; and from one-third of the anterior margin of the clavicle; in that part which is towards the ſcapula. From theſe different points the fibres all deſcend, and converge to one inſertion; the poſterior portion paſſes very obliquely forwards, the middle of the muſcle is firſt bent over the head of the humerus, and then deſcends in a ſtraight courſe; and the anterior part proceeds obliquely backwards. The inſertion takes place, by means of a ſtrong tendon, more viſible on the inner than on the outer ſurface, into a large tuberoſity ſituated on the external, and rather above the middle part of the humerus. It extends about an inch and a half from above downwards, and is included by the bifurcation of the brachialis internus. The deltoid muſcle is covered on its external ſurface for the moſt part by the ſkin; but throughout a ſmaller portion, near its upper and anterior part, by the latiſſimus colli. On the inſide it is in contact behind with the infra-ſpinatus, tores minor, and the long head of the triceps near its origin; towards the middle, with the tendon of the ſupra-ſpinatus, the coraco-acromial ligament, the capſule of the ſhoulder-joint, the upper part of the humerus, and the circumflex veſſels and nerves; on the front, with the coracoid proceſs of the ſcapula, the tendon of the pectoralis minor, the biceps, coraco-brachialis, ſub-ſcapularis, and tendon of the pectoralis major. The cephalic vein of the arm lies along its anterior edge, being placed between it and the correſponding margin of the pectoralis major.

The fibres of the deltoid muſcle are arranged in large faſciculi, ſeparated from each other on the ſurface of the muſcle, and terminating in a pointed form below. Between the capſule of the humerus, the under ſurface of the acromion, and the deltoid, a large burſa mucoſa is found, which becomes particularly neceſſary here, on account of the friction created by the numerous and extenſive motions of the os humeri.

This muſcle will move the humerus or the ſcapula, according as the one or the other of theſe parts is the moſt moveable. The latter muſt in the great majority of inſtances be regarded as the fixed point. Suppoſing the arm to hang by the ſide of the body, the deltoid will raiſe it; either ſo as to bring it to a right angle with the ſide, or to carry it towards the front or back part of the trunk, according as the middle, the anterior or poſterior fibres are employed in the elevation. When the arm has been raiſed, the clavicular fibres will carry it towards the ſternum, and the ſcapular fibres towards the back: the latter at the ſame time depreſs the arm, if it has been carried upwards beyond the level of the ſpine of the ſcapula. When the arm is drawn up from the ſide in the mid direction between the anterior and poſterior, the elevation begins by the middle fibres of the deltoid, for the anterior and poſterior portions then acting together would draw the arm ſtill cloſer to the ſide; and either of theſe parts, being employed ſeparately, would incline the limb forwards or backwards. But, as the elevation proceeds, more and more of the fibres come into action; until at laſt the whole muſcle is employed. In elevating the arm, the deltoid is aſſiſted by the ſupra-ſpinatus muſcle, which ſee. When the humerus is fixed, the deltoid will draw the ſcapula towards that bone; and, as the latter part is united by various muſcles to the trunk of the body, the deltoid will concur in moving the trunk upon the upper limbs.

DELTOIDEUM FOLIUM. See LEAF.

DELTOTON, a conſtellation, the ſame as the *Northern* TRIANGLE, which ſee.

DELUBRUM, in *Roman Antiquity*, a temple with a large ſpace of conſecrated ground round it. See TEMPLE.

DELVE, in *Agriculture*, a term ſometimes employed to ſignify to dig with a ſpade.

DELUGE, DILUVIUM, in *Natural Hiſtory*, a flood, or inundation of water, covering the earth, either in the whole or part.

We meet with divers accounts of deluges in ancient hiſtory, both ſacred and profane: that which happened in Greece, in the time of Deucalion, called diluvium Deucalioneum, is famous: this deluge only overflowed Theſſaly. Its date is fixed to the year before Chriſt 1529, being the third year before the Iſraelites' coming out of Egypt, according to the computation of Petavius, Rat. Temp. par. i. lib. i. cap. 7. or according to Blair's Tables, about 1503 years B. C. See DEUCALION.

The deluge of Ogyges happened about 269 years before that of Deucalion, 1020 years before the firſt Olympiad, and 1796 before Jeſus Chriſt, according to the ſame author, Rat. Temp. par. i. lib. i. cap. 4. par. ii. lib. ii. cap. 5. or according to Blair, 1764 years B. C. (See OGYGES.) This only ravaged Attica.

Theſe two deluges are frequently mentioned, in ancient Greek authors, under the denomination of cataclyſmus prior and poſterior. Deucalion's flood in Theſſaly, and alſo thoſe of Ogyges in Attica, and of Prometheus in Egypt, have been thought the ſame with that of Noah.

Of the like kind were the deluge in Syria, which, in 1095, drowned a prodigious number of people; a deluge in Frieſland, which, in 1164, covered the whole environs of the coaſts, and drowned ſeveral thouſands of the inhabitants; another inundation in 1218, which deſtroyed 100,000 men; the inundations in the Netherlands, which, in 1727, overwhelmed and covered with ſea all that part now called the Gulf Dollart, in the United Netherlands; and in 1421, all that part between Brabant and Holland.

But the moſt memorable deluge is that which we particularly, by way of eminence, call the deluge, or the univerſal deluge, or Noah's flood; recorded in Scripture as a general inundation ſent by God to puniſh the corruption of the world,

world, at that time, by deſtroying every thing (Noah and his family, and what was ſhut up with him in the ark, only excepted) from the face of the earth.

This flood makes one of the moſt conſiderable epochas in chronology. Its hiſtory is given by Moſes, Gen. ch. vi. and vii. Its time is fixed by the beſt chronologers to the year from the creation 1656, anſwering to the year before Chriſt 2348. On the 10th day of the ſecond month, which was on Sunday November the 30th, God commanded Noah to enter into the ark with his family, &c.; and on Sunday December 7th, it began to rain, and rained 40 days, and the deluge continued 150 days. On Wedneſday May 6th, B. C. 2348, the ark reſted on mount Ararat. The tops of the mountains became viſible on Sunday July the 19th, and on Friday December the 18th, Noah came forth out of the ark with all that were with him; he built an altar and ſacrificed to God for his deliverance. (Blair's Chronology.) From this flood, the ſtate of the world is divided into diluvian, or poſtdiluvian, and antediluvian.

The account given by Moſes of this cataſtrophe, is confirmed by the concurrent teſtimonies of ſeveral of the moſt ancient writers and nations in the world; and as the poſſibility of it cannot be denied, we need not recur to the hypotheſis of an ingenious biblical critic (ſee Geddes's Crit. Rem. p. 72.) who ſuggeſts, "that a good deal of the fabulous is mixed with the hiſtory of Noah's flood." Although the hiſtory of this event has been varied, and modelled according to the notions and traditions that prevailed in different countries and different ages, yet the ground-work was always eſtabliſhed on the foundation of truth; and the event was for a long time univerſally commemorated. Joſephus, who ſeems to have been a perſon of extenſive knowledge, and well acquainted with the hiſtories of nations, ſays, that this great occurrence was to be met with in the writings of all perſons who treated of the firſt ages. He mentions Beroſus of Chaldæa, Hieronymus of Egypt, who wrote concerning the antiquities of Phœnicia; alſo Mnaſeas, Abydenus, Melon, and Nicolaus Damaſcenus, as writers, by whom it was recorded; and adds, that it was taken notice of by many others. From Beroſus, a Chaldæan by birth, who lived in the time of Alexander the Great, we learn, that Chronus or Saturn appeared to Xiſuthrus, the tenth or laſt of the Chaldæan kings, in a dream, and warned him, that on the 15th of the month Deſius, mankind would be deſtroyed by a flood; he therefore commanded him to write down the original, intermediate ſtate, and end of all things, and bury the writings under ground in Sippara, the city of the Sun; he likewiſe directed him to build a ſhip, and go into it with his relations and deareſt friends, having firſt furniſhed it with proviſions, and taken into it fowls and four-footed creatures; and told him, that when he had provided every thing, and was aſked whither he was ſailing, he ſhould anſwer, "to the Gods, to pray for happineſs to mankind." Xiſuthrus accordingly built a veſſel, whoſe length was five furlongs, and breadth two furlongs. He put on board all that he was directed to provide, and went into it with his wife, children, and friends. The flood being come, and ſoon ceaſing, Xiſuthrus let out certain birds, which, finding no food nor place to reſt upon, returned again to the ſhip. After ſome days he ſent forth the birds again, but they came back to the ſhip, having their feet daubed with mud; but when they were ſent away the third time, they returned no more: a circumſtance from which Xiſuthrus underſtood that the earth had appeared again. He now made an opening between the planks of the ſhip, and ſeeing that it reſted on a certain mountain, came out with his wife, his daughter, and his pilot; having worſhipped the earth, and raiſed an altar, and ſacrificed to the gods, he, and thoſe who went out with him, diſappeared. They who were left behind in the ſhip, finding Xiſuthrus, and the perſons that accompanied him did not return, went out to ſeek for him, calling him aloud by his name; but Xiſuthrus was no more ſeen by them; only a voice, iſſuing from the clouds, enjoined them to be religious, declaring that Xiſuthrus, on account of his piety, was gone to dwell with the gods; and that his wife, and daughter, and pilot, were partakers of the ſame honour. It alſo directed them to return to Babylon, and taking the writings from Sippara, to communicate them to mankind; and finally told them, that the place where they were was the country of Armenia. Thus informed, they offered ſacrifices to the gods, and immediately repaired to Babylon, dug up the writings at Sippara, built many cities, raiſed temples, and rebuilt Babylon. Abydenus alſo gives a ſimilar relation. It is ſaid that Xiſuthrus or Siſithrus, Ogyges, and Deucalion, are all names ſignifying the ſame thing in other languages, as Noah does in the Hebrew, in which Moſes wrote. (Vide Alexander. Polyhiſtor. ex Beroſo, apud Syncell. p. 30, 31. et apud Cyrill. contra Julian. l. 1. p. 8. Abydenus ex eodem, apud Syncell. p. 38, 39, et apud Euſeb. de Præp. Evang. l. ix. c. 12.) The Indians and Perſians had alſo traditions concerning the deluge. Accordingly, an eaſtern writer tells us, that ſome of thoſe who embrace the Magian religion, are ſaid to deny the flood, or at leaſt the univerſality of it; pretending that it reached no farther than a cliff near Hulwan, a city of Irak, bordering on Curdiſtan. Nevertheleſs the orthodox among them acknowledge this general deſtruction by water, ſent by God to puniſh the crimes of mankind: one of whom, named Malcus, was a monſter of wickedneſs and impiety. One odd circumſtance mentioned by them is, that the firſt waters of the deluge guſhed out of the oven of a certain old woman, named Zala Cuſa: and Mahomet has borrowed this circumſtance, and inſerted it in his Koran; the commentators on which ſay, that it was the ſign by which Noah knew the flood was coming. (Al Koran, cap. xi. D'Herbelot. Bib. Orient. Hyde de Rel. Vet. Perſ. c. x.) Lord's account of the religion of the Perſes, p. 9.

Plutarch (De Solert. Anim. v. ii. p. 968.) mentions the Noachic dove, and its being ſent out of the ark; and its going out was to Deucalion a ſign of fine weather, as its return denoted the reverſe. Melo, or Melon, who wrote a treatiſe againſt the Jews, (ſee Euſeb. Præp. Evang. l. ix. c. 19.) takes notice, among other things, of the perſon who ſurvived the deluge, retreating with his ſons, after the calamity from Armenia; and he ſuppoſes that they came to the mountainous parts of Syria, inſtead of the plains of Shinar. This writer ſeems to repreſent the deluge as topical, and not to have reached Armenia.

That the Egyptians were no ſtrangers to the deluge appears, not only from ſeveral circumſtances in the hiſtory of Oſiris and Typhon, particularly the very day when it began, or when Oſiris, (who is taken for Noah) was ſhut up in the ark, and the name of Typhon, which, according to ſome learned men, ſignifies a deluge or inundation; but alſo from the teſtimony of Plato, who ſays, that a certain Egyptian prieſt recounted to Solon, out of their ſacred books, the hiſtory of the univerſal flood, which happened long before the particular inundations known to the Grecians. It is the tradition of the Egyptians, as we learn from Diodorus Siculus (lib. i.) that the univerſal deluge was that of Deucalion. But the moſt particular hiſtory of the deluge, and the neareſt of any to the account given by Moſes, is to be found in Lucian. (De Dea-Syria, vol. ii. p. 882.) He was a native of Samoſata, a city of Comagene upon the Euphrates; a part of the world where memorials of the deluge were particularly preſerved, and where a reference to that hiſtory is continually to be obſerved in the rites and worſhip of the country.

try. His knowledge was therefore obtained from the Aſiatic nations, among whom he was born. He deſcribes Noah under the name of Deucalion, and ſays, that "the preſent race of mankind are different from thoſe who firſt exiſted; for thoſe of the antediluvian world were all deſtroyed. The preſent world is peopled from the ſons of Deucalion having increaſed to ſo great a number from one perſon. In reſpect to the former brood, they were men of violence, and lawleſs in their dealings. They regarded not oaths, nor obſerved the rites of hoſpitality, nor ſhewed mercy to thoſe who ſued for it; on this account they were doomed to deſtruction; and for this purpoſe there was a mighty eruption of waters from the earth, attended with heavy ſhowers from above, ſo that the rivers ſwelled, and the ſea overflowed, till the whole earth was covered with a flood, and all fleſh drowned. Deucalion alone was preſerved to re-people the world. This mercy was ſhewn to him on account of his juſtice and piety. His preſervation was effected in this manner: he put all his family, both his ſons and their wives, into a vaſt ark, which he had provided; and he went into it himſelf. At the ſame time animals of every ſpecies, boars, horſes, lions, ſerpents, whatever lived upon the face of the earth, followed him by pairs, all which he received into the ark, and experienced no evil from them; for there prevailed a wonderful harmony throughout, by the immediate influence of the Deity. Thus were they wafted with him, as long as the flood endured." After this he proceeds to mention, that upon the diſappearing of the waters, Deucalion went forth from the ark, and raiſed an altar (altars, according to Gen. vi. 20.) to God: but he tranſpoſes the ſcene to Hierapolis in Syria, where the natives pretended to have very particular memorials of the deluge. Moſt of the authors, who have tranſmitted to us theſe accounts, inform us at the ſame time, that the remains of the ark were to be ſeen in their days upon one of the mountains of Armenia. Abydenus ſays, that the people of the country uſed ſmall pieces of the wood as amulets; and Beroſus ſays the ſame of the aſphaltus, with which it was covered, and which they ſcraped off.

The learned Bryant, in his "Analyſis of Ancient Mythology," (vol. ii.) has traced out a reference to Noah and the deluge, and a reſemblance of the ark, in many of the religious rites and ceremonies of ancient nations. The well-known ſhip of Iſis, among the Egyptians, was, as he conceives, a ſacred emblem; in honour of which theſe people celebrated an annual feſtival. It was, in after-times, admitted among the Romans, and ſet down in their calendar for the month of March. The temple of Oſiris (or Seſoſtris) at Theba was built after the model of a ſhip, 280 cubits in length; and both the city, ſaid to be the moſt ancient in Egypt, as well as the province, was denominated from the ark, called תבה, Theba, by the ſacred writer. The ſame memorial is to be obſerved in other countries, where an ark, or ſhip, was introduced in their myſteries, and often carried about upon their feſtivals; and many inſtances of emblematical repreſentations are cited by Bryant, which related to the hiſtory of the deluge, and the conſervation of one family in the ark. This hiſtory was pretty recent, when works of this kind were executed in Egypt, and when the rites to which they belonged were firſt eſtabliſhed; and this learned writer imagines, that in early times moſt ſhrines among the Mizraim were formed under the reſemblance of a ſhip, in memory of this great event. He adds further, that both ſhips and temples received their names from hence; being ſtyled by the Greeks, who borrowed largely from Egypt, Ναυς and Ναος, and Mariners Ναυται, Nautæ, in reference to the Patriarch, who was variouſly ſtyled Noas, Naus, and Noah. Plutarch (Iſis and Oſiris, vol. i. p. 366, 367.) gives us a remarkable account of Oſiris being expoſed in an ark. He ſays, that it was on account of Typhon; and that it happened on the 17th of the month Athyr, when the ſun was is Scorpio. "This in my judgment;" ſays Bryant, "was the preciſe time, when Noah entered the ark, and when the flood came; which in the Egyptian mythology was termed Typhon." From theſe, and many other circumſtances that might be recited, it ſufficiently appears, that the hiſtory of the deluge was no ſecret to the Gentile world. They held the memory of it very ſacred; and many colonies which went abroad, ſtyled themſelves Thebeans, in reference to the ark; and many cities of the name of Theba occur, not in Egypt only and Bœotia, but in Cilicia, Ionia, Attica, Phthiotis, Cataonia, Syria, and Italy.

The tradition of the deluge has, indeed, ſpread throughout the world, and is preſerved in the memory of all nations; in the continent of America, as well as Aſia, in the Eaſt and Weſt Indies, among the Africans and Europeans. (See Burneti Telluris Theor. Sacra. l. i. c. 3)

We are told, indeed, (ſee Code of Gentoo Laws, Pref. p. 38.) that the Gentoo ſcriptures make no mention of the deluge; and that the Bramins affirm, that the deluge never took place in Hindooſtan. If this be true, it may well excite aſtoniſhment, ſince the deluge is an event ſo ſingular in its nature, that ſuppoſing it to have happened, the memory of it could never have been extinguiſhed amongſt the generality of nations which inhabit the earth; and more eſpecially, ſince learned men have abundantly proved that a tradition concerning a deluge has prevailed in every quarter of the globe; not only amongſt the Romans, Grecians, Egyptians, Babylonians, Perſians, Scythians, but amongſt the Iroquois, Mexicans, Braſilians, Peruvians, and other nations of America. Moreover, we are informed by one of the navigators to the Southern Hemiſphere, that the inhabitants of Otaheite being aſked concerning their origin, ſimply anſwered, that their ſupreme god a long time ago, being angry, dragged the earth through the ſea, and their iſland being broken off was preſerved. Now, if a tradition concerning a deluge has prevailed in almoſt every part of the globe, except in India, and, as ſome ſay, in China, may we not heſitate a little till we know more of thoſe countries, before we poſitively affirm, that they have no ſuch tradition? For it deſerves to be remarked, that what is ſaid in the preface to the code of Gentoo laws, relative to the want of a tradition concerning a deluge in the Gentoo Shaſters (or Scriptures) is contradicted by an author who lived in India, and wrote his account of the Banians about 150 years ago; for he expreſsly ſays, that he made his collections, by the help of interpreters, from the Shaſter, and he has the following words:—"As if the world needed cleanſing of its defilement and pollution, there came a flood, that covered all nations in the depths—and ſo concluded the firſt age of the world according to the tradition of the Banians." (Lord's Diſcovery of the Banian Religion, c. 6.) Sir William Jones, than whom there could not be a more competent judge, and one on whoſe teſtimony we may more ſecurely rely, affirms, "that a tradition concerning a deluge does certainly ſubſiſt in Hindooſtan," and that in the oldeſt mythological books there is ſuch an account of the deluge as ſufficiently correſponds with that of Moſes. (See Biſhop Watſon's Diſcourſe to the Clergy, &c. in his Sermons and Tracts, p. 220.) The learned prelate (p. 229.) has recorded a very curious paſſage, quoted in the "Flora Saturniſans" of Henckel (Paris ed. 1760) from the works of Rammazini, concerning the primitive ſtate of the earth, and the ſubſequent deluge, taken, as it is ſaid, from the moſt ancient an-

nals of Ethiopia. The account bears a great reſemblance to the hypotheſis of Dr. Burnet. It muſt be owned, however, that ſeveral of the deluges which tradition records, were merely topical inundations; and they ſhould be carefully diſtinguiſhed from that of Noah; though ancient and modern writers frequently confound them together. Moreover, natural, as well as civil, hiſtory bears a ſtrong teſtimony to Moſes's account of the deluge; and ſhews that it muſt have been univerſal, or nearly ſo, however difficult it may be for us, either to find ſources ſufficiently ample for ſo great a body of waters, or methods for removing them. The preſent external ſurface of the earth, its internal conſtitution, the arrangements of its various ſtrata, the remains of marine animals and petrified ſhells found at great diſtances from their original habitation, incorporated with the earth, or on eminences far elevated above the level of the ſea, and other circumſtances that preſent themſelves to the ſagacious naturaliſt in his ſurvey and examination of various parts of the terreſtrial globe, have been alleged as exiſting monuments of a deluge, and evidences of its univerſality. In vindication of the Moſaic account of the deluge, we might further allege the paucity of mankind, and the vaſt tracts of uninhabited land, which are mentioned in the hiſtories of the firſt ages, which ſhew that mankind were lately ſprung from a ſmall ſtock, and even ſuit the time aſſigned by Moſes for the flood. Moreover, the great number of ſmall kingdoms, and petty ſtates in the firſt ages, and the late riſe of the great empires of Egypt, Aſſyria, Babylon, &c. concur to the ſame purpoſe. We might add, the invention and progreſs of arts and ſciences, which alſo favour the Moſaic hiſtory of the antediluvians. As to the objections urged againſt the deluge from the ſize of the ark and the number of animals contained in it: ſee ARK.

The deluge has been, and remains, a ſubject of much enquiry and diſpute among naturaliſts, critics, &c. The points chiefly controverted may be reduced to three; firſt, its extent: *viz.* whether it were *general*, or *partial*; ſecondly, its natural cauſe; and, thirdly, its effects.

1. The immenſe quantity of water requiſite to furniſh an univerſal deluge, has occaſioned ſeveral authors to ſuſpect it only partial. An univerſal deluge, they think, had been unneceſſary, conſidering the end for which it was brought; *viz.* to extirpate the wicked inhabitants. The world was then but new, and the people not very many; the holy Scriptures making only eight generations from Adam to Noah. It was but a ſmall part of the earth that could be yet inhabited; the country about the Euphrates, which is ſuppoſed to have been the ſcene of the firſt antediluvian inhabitants, was ſufficient to bear them all. Now Providence, ſay they, which ever acts wiſely, and frugally, would never have diſproportioned the means to the end, ſo far as to overflow the whole globe, only to drown a little corner of it. They add, that, in the Scripture-language, the *whole earth* expreſſes no more than *all the inhabitants*; and on this principle advance, that an overflowing of the Euphrates and Tigris, with a vehement rain, &c. might anſwer all the phenomena of the deluge. Others pretend, that the deluge was confined to Judæa alone and the adjacent regions; or perhaps to the tract of land which lies between the four ſeas, the Perſian, Caſpian, Euxine, and Mediterranean; or, at moſt, that it reached no farther than the continent of Aſia, This, they ſay, would anſwer the purpoſe of deſtroying mankind, which was the primary object of this cataſtrophe. Indeed, Bedford, in his "Scripture Chronology," ſuppoſes that all mankind did not periſh in the deluge; and he has endeavoured to prove, from a peculiar expoſition of the curſes of Cain and Lamech, that the Africans and Indians are of their poſterity. But, if we advert to the language of ſcripture, we muſt conclude that the deluge was univerſal. God declared to Noah, Gen. vi. 17. that he was reſolved to deſtroy every thing that had breath under heaven, or had life on the earth, by a flood of waters; ſuch was the menace; ſuch the execution. The waters, Moſes aſſures us, covered the whole earth, buried all the mountains, and were no leſs than fifteen cubits above the higheſt of them: every thing periſhed therein; birds, beaſts, men, and all that had life, excepting Noah, and thoſe with him in the ark, Gen. vii. 19, &c. Can an univerſal deluge be more clearly expreſſed? If the deluge had only been partial, there had been no neceſſity to ſpend a hundred years in the building of an ark, and ſhutting up all the ſorts of animals therein, in order to re-ſtock the world: they had been eaſily and readily brought from thoſe parts of the world not overflowed, into thoſe that were: at leaſt, all the birds would never have been deſtroyed, as Moſes ſays they were, ſo long as they had wings to bear them to thoſe parts where the flood did not reach. If the waters had only overflowed the neighbourhood of the Euphrates and Tigris, they could not be 15 cubits above the higheſt mountains; they could not have riſen to that height, but they muſt ſpread themſelves, by the laws of gravity, over the reſt of the earth; unleſs, perhaps, they had been retained there by a miracle; and, in that caſe, Moſes, no doubt, would have related the miracle, as he did that of the waters of the Red ſea, and the river Jordan, which were ſuſtained in a heap, to give paſſage to the Iſraelites, Exod. xiv. 22. and Joſh. iii. 16. Add, that, in regions far remote from the Euphrates and Tigris, *viz.* in Italy, France, Switzerland, Germany, England, &c. there are frequently found in places many ſcores of leagues from any ſea, and even in the tops of high mountains, whole trees ſunk deep under ground; as alſo teeth and bones of animals, fiſhes entire, ſea-ſhells, ears of corn, &c. petrified; which many naturaliſts are agreed could never have come there but by the deluge, unleſs we ſuppoſe with others that theſe organic remains were of a prior race, and that the ſtrata of the earth (ſee STRATA) were formed previouſly to the deluge:—to which may be added the almoſt univerſal traditions of this great event in all countries of the globe.

2. The deluge allowed to be univerſal, the philoſophers are ſolicitous to find water to effect it.

Moſes brings it from two ſources: *the fountains of the great deep were broken up; and the windows of heaven were opened: and the rain was upon the earth* 40 *days and* 40 *nights.* Dr. Burnet, in his "Telluris Theoria Sacra," ſhews, that all the waters of the ocean were not near enough to cover the earth fifteen cubits above the tops of the higheſt mountains. According to his computation, no leſs than eight oceans were required. Suppoſing the ſea, therefore, drained quite dry, and all the clouds of the atmoſphere diſſolved into rain, we ſhould ſtill want much the greateſt part of the water of a deluge.

To get clear of this embarraſſment, many of our beſt naturaliſts, as Steno, Burnet, Woodward, Scheuchzer, &c. adopt Des Cartes' ſyſtem of the formation of the earth. That philoſopher will have the primitive world to have been perfectly round and equal, without mountains or vales; and accounts for its formation on mechanical principles, by ſuppoſing it at firſt in the condition of a thick turbid fluid, replete with diverſe heterogeneous matters which, ſubſiding by ſlow degrees, formed themſelves into different concentric ſtrata, or beds, by the laws of gravity; and thus, at length, left a dry ſolid earth. Dr. Burnet improves on this theory: he ſuppoſes the primitive earth to have been no more than an orbicular cruſt, ſmooth, regular, and uniform, without mountains, and without a ſea, inveſting the face of the abyſs,

or

or deep, which being heated by the ſun became dry and chinky, and by the rarefaction and expanſion of the encloſed vapours, clave, burſt, and fell down into the water, and ſo drowned its inhabitants.

The ſame theoriſt adds, that by this cataſtrophe, the globe of the earth was not only ſhaken, and broken in a thouſand places, but the violence of the ſhock it then underwent ſhifted its ſituation; ſo that the earth, which before was placed directly under the zodiac, or had the plane of the equator coincident with the plane of the ecliptic, ſo that the ſun in its diurnal motion would ſeem to move always in the equator, became henceforth oblique to the ſame. Whence aroſe the difference of ſeaſons, which did not belong to the antediluvian earth.

Thoſe maſſes of the earth which fell into the abyſs of waters, carried with them, according to this author, vaſt quantities of air, daſhed againſt each other, and accumulated and divided ſo irregularly, that great cavities filled with air, were left between them. The waters gradually opened paſſages into theſe cavities, and in proportion as the cavities were filled with water, the ſurface of the earth began to diſcover itſelf in the moſt elevated places; and, at laſt, the waters appeared nowhere but in thoſe extenſive vallies which contain the ocean. Thus our ocean is a part of the ancient abyſs, the reſt of it remains in the internal cavities, with which the ſea has ſtill a communication. Iſlands and ſea-rocks are the ſmall fragments; and continents are the large maſſes of the ancient cruſt. As both the rupture and fall of this cruſt were effected in a confuſed manner, it is not ſurpriſing that the ſurface of the preſent earth ſhould be full of mountains, gulfs, plains, and irregularities of every kind.

Dr. Burnet's hypotheſis is very elegantly recited, and has by ſome been called a romance: but it is utterly inconſiſtent with the ſacred text above cited, which expreſsly mentions mountains as the ſtandard of the height of the water; or with that other paſſage, Gen. viii. 22. where God, promiſing not to bring any more deluges, but that every thing ſhould be reſtored to its ancient ſtate, ſays, that *ſeed-time and harveſt, and cold and heat, and ſummer and winter, and day and night, ſhall ceaſe no more.*

It alſo contradicts the phyſical principles of nature, as Keill has ſhewn in his "Examination of Dr. Burnet's Theory of the Earth," p. 116, &c. ed. 2. This author, having ſhewn that the axis of the primitive earth was inclined to the plane of the ecliptic as it is at preſent, concludes, that it was ſubject to the ſame variety of ſeaſons and alterations of heat and cold as it is now; and, therefore, that all the arguments drawn from the great heat and ſtrong action of the ſun upon the antediluvian earth are of no avail, ſince there was then no greater heat of the ſun than there is at preſent. Beſides, judging from experience, the heat of the ſun does not penetrate far into the earth, and accordingly its beams could reach but a little way into the imaginary cruſt of the theoriſt; and within the bowels of the earth there is no ſenſible difference between the heat of the ſun when its action is ſtrongeſt, and when it is weakeſt. Since then the heat of the ſun does not penetrate the earth ſo as to be ſenſible for the ſmall ſpace through which we are able to dig, how can we imagine it poſſible that it ſhould ever reach the abyſs, through the whole exterior cruſt of the earth, ſo as to be able to heat the water and raiſe it into vapour? But even allowing that the heat of the ſun had reached the abyſs, and had raiſed the vapours ſo that the cruſt of the earth fell down and was broken into pieces, we cannot infer that the conſequence would be an univerſal deluge, or indeed any deluge at all. Admitting the author's own principles, all the water contained in the abyſs was long before the time of the deluge drawn out of the abyſs, and placed on the ſurface of the earth; and in this caſe how can he conſiſtently explain an univerſal deluge by the fall of the outward cruſt of the earth upon the abyſs? This fall would have been ſo far from being the cauſe of a deluge, that it would have proved the moſt effectual method of reſcuing the earth from a deluge of waters which were then upon it. For all the water which was in the abyſs, being drawn up on the ſurface of the land, and the earth being of a ſpheroidical and oval ſhape, without hills and mountains, upper and lower grounds, but exactly of the ſame figure which its gravity and centrifugal force formed it into, when it was fluid; the great maſs of water which was then upon the earth muſt have ſettled itſelf alſo in the ſame figure, as it had no banks to retain it within its channel, or mountains to keep it within bounds; and the true effect of the fall of the cruſt muſt have been to have diſcovered the land, and the waters would have run from the ſurface of the earth into the abyſs, and there would have formed a ſea, and made that land appear which before was covered with waters. But ſuppoſing that all the water, which is now in the ocean, was in the abyſs at the time of the deluge, and that the cruſt of the earth was broken and had fallen down on the ſurface of the abyſs, yet how could this fall produce an univerſal deluge, and make the waters ſwell above the tops of the higheſt mountains? For Dr. Burnet himſelf calculates, that it would require eight oceans of waters to cover the face of the whole earth, and raiſe the waters to a height ſufficient for drowning the world. As there is but one ocean of water in the abyſs, the fall of the cruſt could only produce a partial and topical deluge. Beſides, if the abyſs contained water ſufficient for covering the face of the whole earth at once, yet it is not poſſible to conceive how ſuch a flood of waters that was raiſed by the fall of the cruſt could laſt for ſo long a time, as the Scriptures inform us Noah's flood did, which was 150 days without abating on the face of the earth.

Other authors, ſuppoſing a ſufficient fund of water in the abyſs, or ſea, are only concerned for an expedient to bring it forth: accordingly, ſome, as Mr. Ray, &c. have recourſe to a ſhifting of the earth's centre, which, drawing after it the water out of its channel, overwhelmed the ſeveral parts of the earth ſucceſſively. But this could only occaſion a partial deluge in that part of the globe towards which the centre of gravity was tranſlated: nor can the poſſibility of ſuch a tranſlation be allowed, ſince the centre of gravity is the neceſſary reſult of the materials compoſing our globe, and not alterable whilſt the parts remained in the ſame poſition.

Dr. Hook's opinion of the compreſſion of a ſhell of earth into a prolate ſpheroid, thereby preſſing out the water of an abyſs under the earth, may very well account for the waters overflowing two oppoſite zones of the globe; but the middle zone being by much the greater part of the earth's ſurface, muſt by this means be raiſed higher from the centre, and conſequently ariſe more out of the water than before.

In Hook's "Diſcourſe of Earthquakes," written about the year 1688, there is mention made of the bottom of the ſea having been raiſed by ſubterraneous fires; and he accounts for the ſhells which are found on mountains from that principle, and thinks it not improbable, that earthquakes were inſtrumental in occaſioning the deluge. "The Alps and divers other high mountains, on whoſe tops are found ſuch numbers, and ſuch varieties of ſea-ſhells, may have been heretofore raiſed up from the bottom of the ſea—it is not improbable but in the flood of Noah, the Omnipotent might

make uſe of this means (earthquakes) to produce that great effect."

Dr. Halley aſcribes the deluge to the ſhock of a comet, or ſome other ſuch tranſient body, whereby the polar and diurnal rotation of the globe would be inſtantly changed. The great agitation that muſt have been occaſioned by it in the ſea, he obſerves, would be ſufficient to account for all thoſe ſtrange appearances of heaping vaſt quantities of earth and high cliffs upon beds of ſhells, which were once the bottom of the ſea, and raiſing up mountains where none were before. Such a ſhock as this, impelling the ſolid parts, would occaſion the waters, and all fluid ſubſtances that were unconfined, as the ſea is, to run violently with an impetus towards that part of the globe where the blow was received, and that with force ſufficient to take with it the very bottom of the ocean, and remove it to the land. In this caſe, it is much more difficult to ſay, how Noah and his family could be preſerved, than how all other creatures were deſtroyed: ſuch a ſhock would change the length of the day and year, by altering the axis of the globe, according to the obliquity of the incidence of the ſtroke. It is objected to this ſyſtem, that ſuch a ſhock muſt have brought on the deluge inſtantaneouſly, and not gradually, as it is ſaid to have happened. Phil. Tranſ. N° 383. p. 120, or abr. vol. vii. p. 1, &c.

The inquiſitive Mr. Whiſton, in his "New Theory of the Earth," has a very ingenious hypotheſis, ſimilar to that ſuggeſted by Dr. Halley, with reſpect to the primary cauſe of the deluge, but much more largely applied and explained. He ſhews, from ſeveral remarkable coincidences, that a comet, deſcending in the plane of the ecliptic towards its perihelion, paſſed juſt before the earth on the firſt day of the deluge; the conſequences whereof would be, firſt, that this comet, when it came below the moon, would raiſe a prodigious, vaſt, and ſtrong tide, both in the ſmall ſeas, which, according to his hypotheſis, were in the antediluvian earth, for he allows no great ocean there, as in ours; and alſo in the abyſs, which was under the upper cruſt of the earth; and that this tide would riſe, and increaſe all the time of the approach of the comet towards the earth; and would be at its greateſt height when the comet was at its leaſt diſtance from it. By the force of this tide, and alſo by the attraction of the comet, he judges, that the abyſs muſt put on an elliptic or rather an exactly oval figure, whoſe ſurface being conſiderably larger than the former ſpherical one, the outward cruſt of the earth, incumbent on the abyſs, muſt accommodate itſelf to that figure, which it could not do while it remained ſolid and conjoined together. He concludes, therefore, that it muſt of neceſſity be extended, and at laſt broke, by the violence of the ſaid tides, and attraction; and have innumerable fiſſures made quite through it; out of which, the included water iſſuing, was a great means of the deluge; this anſwering to what Moſes ſpeaks of the *fountains of the great deep being broken open.* Again, the ſame comet, he ſhews, in its deſcent towards the ſun, muſt have paſſed ſo cloſe by the body of the earth as to involve it in its atmoſphere, and tail, for a conſiderable time; and of conſequence, it muſt have left a vaſt quantity of its vapours, both expanded and condenſed, on its ſurface; a great part of which, being rarefied by the ſolar heat, would be drawn up again into the atmoſphere, and afterwards deſcend in violent rains upon the earth: and this he takes to be what Moſes intimates *by the windows of heaven being opened;* and particularly by the *forty days rain.* For as to the following rain, which, with this, made the whole time of raining an hundred and fifty days, Mr. Whiſton attributes it to the earth coming a ſecond time within the atmoſphere of the comet, as the comet was on its return from the ſun. From the comet's atmoſphere and tail he derives one-half of the water, which ſerved for the deluge; the other half, he ſuppoſes, was deduced from the ſubterraneous abyſs, the fluid of which, he ſays, was forced upon the ſurface of the earth by the prodigious preſſure of the incumbent water that was derived from the comet's atmoſphere and tail, which, he ſuppoſes, would preſs downwards with a mighty force, and endeavour to ſink the outward cruſt of the earth into the abyſs; by the preſſure of which vaſt quantities of the ſubterraneous fluid would be forced and raiſed upon the ſurface of the earth, through the cracks and fiſſures that were made in the cruſt by the violence of the tide in the abyſs. By this method, Mr. Whiſton ſuppoſes that water enough would be obtained on the ſurface to cover the face of the whole earth to the perpendicular height of three miles, that is, above the tops of the higheſt mountains. But he further ſuppoſes, that neither that water which was derived from the comet, nor that which was forced up from the bowels of the earth, was pure elementary water, but rather a thick and muddy fluid, which, he ſays, being heavier than water, ſunk to the bottom and covered the earth to the depth of 166 feet. Laſtly, to remove this vaſt orb of waters again, he ſuppoſes a mighty wind to have ariſen, which dried up ſome, and forced the reſt into the abyſs again through the clefts by which it came up: only a good quantity remained in the alveus of the great ocean, now firſt made, and in leſſer ſeas, lakes, &c.

To the credit of this theory, it muſt be obſerved, that it was at firſt only propoſed hypothetically: that is, the author only ſuppoſed ſuch a comet, merely as it would account well, and philoſophically, for the phenomena of the deluge; without any aſſurance, that there really was any comet ſo near the earth at that time; and the hypotheſis pleaſed even under ſuch circumſtances: but, upon further conſideration, he has ſince, he thinks, proved, that there actually was a comet near the earth at that time, or 28th November, in the 2365th year of the Julian period, or the 2349th year before Chriſt, to which time he aſſigns the beginning of the deluge, *viz.* the ſame great comet which appeared again in 1680. The author no longer, therefore, looks upon it as an hypotheſis, but has republiſhed it in a particular tract, intitled, "The Cauſe of the Deluge demonſtrated."

Mr. Keill, in his "Remarks on Mr. Whiſton's Theory," acknowledges that it is much more philoſophical than many others, and that he has rendered probable the approach of a comet at the preciſe time of the deluge. He objects, however, to his explications of ſeveral phenomena of the deluge, as not agreeable to the laws of mechanics and philoſophy; although it is certain, that a comet, when it paſſed by the earth, would raiſe a very ſtrong tide in the ſeas that were then on the ſurface; yet it is very far from being evident, that ſuch an effect would be produced in the abyſs, which, he ſuppoſes, to be a denſe and heavy fluid encompaſſed on all ſides with a thick and ſolid cruſt of earth lying cloſely upon it. Hence, if there was no tide in the abyſs, it could make no cracks and fiſſures in the earth. Mr. Whiſton, in explaining the great rains, which fell on the earth during the time of the deluge, aſſumes a propoſition ſcarcely capable of proof; *viz.* that after the earth was involved in the comet's atmoſphere and tail, and had acquired a prodigious quantity of condenſed and expanded vapours that fell on its ſurface, a great part of them being much rarefied would be drawn up again into the air, and afterwards deſcend in violent rains. If we conſider the incredible velocity with which thoſe vapours deſcended, being at the rate of 868 miles in a minute, and the great reſiſtance they met with

with in their deſcent through the air, and the force with which they fell on the ground; we muſt admit their condenſation and converſion into water, by ſuch a reſiſtance and fall. Hence, it is evident, that all ſuch vapours as deſcended from the comet muſt have been condenſed into water long before they ever touched the earth. Since then, they deſcended on the earth in the form of water, and the heat of the ſun was not ſufficient to raiſe them up again immediately, it is plain they could never riſe up ſo as to produce the 40 days rain mentioned in Scripture. Mr. Keill alſo objects to Mr. Whiſton's account of the effect of the preſſure of the waters, that had deſcended from the comet, on the cruſt of the earth, ſo as to occaſion the aſcent of the waters of the abyſs through the cracks and fiſſures on the ſurface of the earth. He thinks it is demonſtratively evident, that by no ſort of preſſure of the incumbent fluid the abyſs could be forced upwards to ſpread itſelf on the ſurface of the earth. Mr. Keill further examines Mr. Whiſton's method of drawing from the earth the waters neceſſary for the deluge, which he attributes partly to a drying wind, and partly to the deſcent of the waters through the fiſſures of the earth. But he previouſly eſtimates the quantity of waters that would be neceſſary to cover the whole earth above the tops of the higheſt mountains. Dr. Burnet, as we have already mentioned, ſtates it to be about eight oceans of water, ſuppoſing the ſurface of the ſea to be equal to the land, and to be every where, at an average, a quarter of a mile deep. Keill thinks it to be about three times as much. In order to aſcertain this point, he aſſumes the perpendicular height of the higheſt mountain above the level of the ocean to be above three miles. Upon this ſuppoſition, the waters muſt be raiſed more than three miles in perpendicular height that they may be as high as the tops of the hills. It is eaſy to calculate how much water would be neceſſary to raiſe the ſurface of the ſea to ſuch a height. The ocean being by hypotheſis a quarter of a mile deep, there muſt not be leſs than twelve oceans of water lying on the ſurface of the ſea, that it may be of the ſame height with the water which covered the land. Mr. Keill, by purſuing his calculation, on the ſuppoſition that the ſurface of the earth is beſet with mountains, each of which is three miles perpendicularly high, eſtimates the whole quantity of water that would be neceſſary for an univerſal deluge at 22 oceans, beſides the waters that compoſe the preſent ocean, or in the whole 23 oceans. But if the height of the mountains be greater, more water will be required to anſwer the purpoſe. (See the ſequel of this article.) Although ſuch a quantity of water may be ſuppoſed to be derived from the atmoſphere of a comet, yet it will not be eaſy to contrive a method for removing it again from the earth; that which Mr. Whiſton propoſes by evaporation and by deſcent into the abyſs, being very inſufficient for the purpoſe.

3. But the great difficulty ſtill remains. The orderly ſtrata, or layers of the earth, with the exuviæ, or remains of fiſhes, as their teeth, bones, ſhells, &c. both marine, and fluviatile, found in the bodies even of the moſt ſolid ſtrata, and in flints, marbles, &c. are not yet accounted for. Thoſe who adhere to Des Cartes' ſyſtem, as Steno, &c. take the finding of the parts of terreſtrial, and aquatic animals, branches of trees, leaves, &c. in the beds, or ſtrata of ſtone, to be a direct proof of the primitive fluidity of the earth. But then they are obliged to have recourſe to a ſecond formation of ſtrata, much later than the firſt; becauſe, at the time of the firſt there was neither plant nor animal in being. Steno, therefore, maintains ſecond formations, occaſioned at different times by extraordinary inundations, earthquakes, volcanoes, &c. But Burnet, Woodward, Scheuchzer, &c. chooſe rather to attribute a ſecond general formation to the deluge; without excluding, however, the particular ones of Steno. But the great objection againſt this ſyſtem of fluidity, is mountains; for the whole globe being liquid, whence ſhould ſuch inequalities ariſe? Mr. Scheuchzer, rather than part with a ſyſtem which ſeems ſo promiſing, gives into the opinion of thoſe who hold, that, after the deluge, God, to remit the waters into their ſubterranean reſervoirs, broke and diſplaced, with his own almighty hand, a great number of ſtrata, that were before horizontal, and raiſed them above the ſurface of the earth, which was originally land; whence it is, that the ſtrata in mountains, though concentrical, are never horizontal. Hiſt. de l'Acad. 1708. p. 32. Piſcium Querelæ, &c. and Phyſica Sacra.

Dr. Woodward, taking the ſeveral ſtrata for the ſediments of a deluge, and conſidering the circumſtances of thoſe fiſhes, ſhells, and other exuviæ, found in them, draws ſeveral inferences, which very much illuſtrate the effects of the deluge. As, firſt, that theſe marine bodies, and other ſpoils of ſalt-water fiſhes, were borne forth out of the ſea, by the univerſal deluge; and, on the return of the water back again, were left behind upon the land. Secondly, that while the flood covered the globe, all the ſolid matters, as ſtones, metals, minerals, and foſſils, were totally diſſolved, and the cohéion of their corpuſcles deſtroyed; and that their corpuſcles, with thoſe of the leſs ſolid bodies, as earth, fleſh of animals, and vegetables, were ſuſtained promiſcuouſly in the water, and made one common maſs. Thirdly, that all the maſs, thus ſuſtained, was at length precipitated to the bottom; and that, according to the laws of gravity, the heavieſt ſettled firſt, and the reſt in order. And that the matters, thus ſubſiding, conſtituted the ſeveral ſtrata of ſtone, earth, coal, &c. Fourthly, that theſe ſtrata were originally all parallel, even, and regular, and rendered the ſurface of the earth perfectly ſpherical; and that the whole maſs of water lay upon them, and conſtituted a fluid ſphere encompaſſing the globe. Fifthly, that after ſome time, by the force of an agent ſeated within the earth, theſe ſtrata were broken on all ſides of the globe, and their ſituation varied; being elevated in ſome places, and depreſſed in others; whence mountains, vallies, grottos, &c. with the channel of the ſea, iſlands, &c. In one word, the whole terraqueous globe was put, by this diſruption, and diſlocation of the ſtrata, into the condition we now behold it in. Sixthly, that upon the diſruption of the ſtrata, and the depreſſion of ſome and elevation of other parts, which happened towards the end of the deluge, the maſs of water fell back again into the depreſſed and loweſt parts of the earth, into lakes, and other cavities, and the channel of the ocean, and through the fiſſures, whereby this communicates with the abyſs, which it filled till it came to an equilibrium with the ocean. Nat. Hiſt. of Earth, p. 1. and 2.

To this ſyſtem it has been objected, that it is abſurd to ſuppoſe, that, before the deluge, there were no mountains, ſince we are expreſsly told, that the waters roſe 15 cubits above the tops of the higheſt mountains: on the other hand, it is not ſaid that the waters deſtroyed or diſſolved the mountains. On the contrary, the mountains remained firm in their original ſituation, and the ark reſted upon that which was firſt deſerted by the waters. Beſides, it cannot be reaſonably imagined, that, during the ſhort time of the deluge, the waters could diſſolve the mountains, and the whole fabric of the earth. Can we ſuppoſe, that, in the

ſpace of 40 days, the hardeſt rocks and minerals were diſſolved by ſimple water, and yet that ſhells, bones, and other productions of the ſea, were able to reſiſt a menſtruum to which the moſt ſolid materials had yielded?

Dr. Woodward aſſerts, that the materials of the different ſtrata are arranged according to their ſpecific gravities. To this it has been objected, that we every day ſee ſolid rocks placed above clay, ſand, pit-coal, bitumen, and other comparatively light bodies. If, indeed, it were uniformly found, through the whole earth, that the upper ſtratum was bitumen, followed ſucceſſively by ſtrata of chalk, marl, clay, ſand, ſtone, marble, and metals, it would, in that caſe, be probable, that all theſe materials had been precipitated at once; and this Mr. Woodward confidently affirms. Whereas, the moſt ſuperficial obſerver need only open his eyes to convince himſelf, that heavy ſtrata are often found above light ones; and, conſequently, that theſe ſediments could not be depoſited at the ſame time, but muſt have been tranſported and depoſited, as M. Buffon ſays, by the ocean at ſucceſſive periods. See STRATA.

M. de la Pryme has advanced another ſyſtem for ſolving the phenomena of petrified exuviæ.

The antediluvian world, according to this author, had an external ſea, as well as land, with mountains, rivers, &c. and the deluge was effected by breaking the ſubterraneous caverns, and pillars thereof, with dreadful earthquakes, and cauſing the ſame to be for the moſt part, if not wholly, abſorbed and ſwallowed up, and covered by the ſeas that we now have. Laſtly, this earth of ours aroſe out of the bottom of the antediluvian ſea, and in its room; juſt as many iſlands are ſwallowed down, and others thruſt up in their ſtead.

This ſyſtem, it has been ſaid, is very agreeable to Scripture, and eaſily ſolves the great difficulties that clog all the other ſyſtems. It is no longer a wonder, that ſhells, and ſhell-fiſh, and the bones of fiſhes, and four-footed creatures, with fruits, &c. ſhould be found in beds and quarries, in mountains and vallies, and the very bowels of the earth: for here they bred in the antediluvian ſea; thither they were elevated with the hills and mountains, in the time of the deluge; and there they fell into, were abſorbed, and buried in chaſms, and holes and clefts, that would neceſſarily happen in the extruſion of the earth. Phil. Tranſ. N° 266.

Mr. King has more lately adopted an hypotheſis reſembling this laſt. He aſcribes the deluge to ſubterraneous fires found within the bowels of the earth, which, at the appointed time, burſt forth with great violence under the ſea, and raiſed up the bottom of the ocean, ſo as to pour out the waters over the face of what was before dry land, which by that means became the ſea, and has ſince continued, and that which was before the bottom of the ſea became dry land. An earthquake thus occaſioned will account, he ſuppoſes, for the acceſs of the deluge and the confuſed diſpoſition of marine productions in the poſtdiluvian earth. Phil. Tranſ. vol. lvii. p. 44, &c.

Mr. King's hypotheſis has been much enlarged by M. de Luc. According to this hypotheſis the ancient continents muſt have exiſted in thoſe tracts now covered by the Atlantic and Pacific oceans. It has been objected to this theory, that it is inconſiſtent with the Moſaic account of the deluge, which account theſe philoſophers, however, admit. Moſes aſcribes the deluge to two principal cauſes, a rain of 40 days and the eruption of the waters of the great abyſs. Now to what purpoſe, it has been queried, a rain of 40 days to overwhelm a continent, that was to be immerſed under a whole ocean? He informs us that the waters increaſed on the continents for a certain number of days, reſted thereon another period of days, and then returned. Do not theſe expreſſions imply a permanent ground on which they increaſed and reſted, and from which they afterwards retreated? As the retreat followed the advance, is it not clear that they retreated from the ſame ſpace on which they had before advanced and reſted?

M. de Luc replies, that in the 13th verſe of the ſixth chapter of Geneſis it is ſaid the earth ſhould be deſtroyed, and that Michaelis ſo tranſlates it. But from the obſervations already made, it is plain that Moſes did not underſtand ſuch a deſtruction as ſhould cauſe it to diſappear totally and for ever: he tells us that the waters ſtood 15 cubits over the higheſt mountains; and as he has no where mentioned the antediluvian mountains, but has taken notice of the poſtdiluvian, it is plain that his narrative relates to theſe, and theſe, he ſays, were at the time of the deluge covered with water, and uncovered when the waters diminiſhed: he never diſtinguiſhed the poſtdiluvian from the antediluvian, and therefore muſt have conſidered them as the ſame. Beſides, Noah himſelf did not believe that the ancient continents were deſtroyed, for he took the appearance of an olive-branch to be a ſign of the diminution of the flood; that he certainly believed to have grown on the ancient continent, and could not expect it to have ſhot up from the bottom of the ſea. M. de Luc indeed ſays, that this olive grew on an antediluvian iſland, and that theſe iſlands being part of the antediluvian ocean, were not flooded: but it is plain from the hiſtory, that Noah thought otherwiſe, or elſe he could not have inferred that the appearance of the olive was a ſign of the abatement of the waters. But where is it mentioned, or what renders it neceſſary to conclude that iſlands exiſted before the flood? If iſlands did exiſt, and were to eſcape the flood, ſo might their inhabitants alſo, in direct contradiction to the ſacred hiſtory. Would it not have been much more convenient for Noah, his family and animals, to have taken refuge in one of them, than to have remained pent up in the ark? Moreover, Moſes informs us, that at the ceſſation of the flood the fountains of the deep were ſtopped or ſhut up; therefore, in his apprehenſion, inſtead of the ancient continents ſinking into the deep, the waters of the abyſs flowed from their ſources upon thoſe continents, and again returned. See Kirwan's Remarks, *ubi infra*.

Mr. Whitehurſt in his "Inquiry into the Original State and Formation of the Earth," &c. (4to. 1786) has attempted to account for the univerſal deluge in the following manner. "It is a truth," he ſays, "univerſally known that all bodies expand with heat: and that the force or power of that law is unlimited; now, as ſubterraneous fire gradually increaſed, ſo in like manner its expanſive force increaſed, until it became equal to the incumbent weight. Gravity and expanſion being equally balanced, and the latter continuing to increaſe, every day, more and more, became ſuperior to the incumbent weight, and diſtended the ſtrata as a bladder forcibly blown. Now, if fire thus generated was ſurrounded by a ſhell or cruſt, of equal thickneſs, and of equal denſity, the incumbent weight muſt have been equal: on the contrary, if the ſurrounding ſhell, or cruſt, was unequally denſe, the incumbent weight muſt have been unequal. But ſince the primitive iſlands were protuberances gradually aſcending from the deep, the incumbent weight muſt have been unequal; for as the ſpecific gravity of ſtone, ſand, or mud, is ſuperior to that of water, we may thence conclude that the incumbent weight of the former muſt have been greater than that of the latter. Now the incumbent weight of the iſlands being greater than that of the ocean, the bottom of the ſea would conſequently aſcend by the expanſive force below, ſooner than the iſlands. The bottom of the ſea being thus elevated, the

CONFIRMATION.

CONFIRMATION, in *Law*, denotes the conveyance of an eſtate, or right *in eſſe*, which a perſon hath in or to lands, &c. from one man to another that hath the poſſeſſion or ſome eſtate in it, whereby a voidable eſtate is made ſure and unavoidable, or a particular eſtate is increaſed, or poſſeſſion made perfect: and it is particularly uſed for the ſtrengthening or homologating an eſtate of one already in poſſeſſion of it by a voidable title. Thus, if a biſhop grant his chancellorſhip by patent, for term of the patentee's life; this is no void grant: yet it is avoidable by the biſhop's death, except it be ſtrengthened alſo by the confirmation of the dean and chapter. 1 Inſt. 295.

CONFIRMATION is alſo defined to be the approbation or aſſent to an eſtate already created: which as far as it is in the power of the confirmer, makes it good and valid; ſo that the confirmation doth not regularly *create an eſtate*, yet ſuch words may be blended in the confirmation as may create and enlarge an eſtate; but this takes place by the force of ſuch words as are foreign to the buſineſs of confirmation, and by their own force and power, tend to create the eſtate. Gilb. Ten. 75. A confirmation, ſays judge Blackſtone, is of a nature nearly allied to a releaſe; and the words of making it are theſe "have given, granted, ratified, approved, and confirmed." (Litt. § 515. 531.) An inſtance of the firſt branch of the above definition is, if tenant for life leaſeth for 40 years, and dieth during that time; here the leaſe for years is voidable by him in reverſion; yet, if he hath confirmed the eſtate of the leſſee for years, before the death of the tenant for life, it is no longer voidable but ſure. (Litt. § 516.) The latter branch, or that which tends to the increaſe of a particular eſtate, is the ſame in all reſpects with that ſpecies of releaſe, which operates by way of enlargement.

Madox ſays, that moſt ancient confirmations, made after the conqueſt, often run like feoffments; and are diſtinguiſhable from them, chiefly by ſome words inſerting a former feoffment or grant. In former times, when feoffees were frequently diſſeiſed of their lands upon ſome ſuggeſtion or other, charters of confirmation ſeem to have been in great requeſt. Poſſeſſors of lands, &c. ſeemed not to have thought themſelves ſecure againſt the king, or the great lords who were their feoffors, or in whoſe lands their fees lay, unleſs they had repeated confirmations from them, their heirs or ſucceſſors. And theſe ancient confirmations ſeem to have been ſometimes made, either by precept or writ from the king, or other lords, to put the feoffees, or their heirs or ſucceſſors into ſeiſin, after they had been diſſeiſed, or to keep them in their ſeiſin undiſturbed, or elſe by charter of expreſs confirmation. Confirmation is "*perficiens*, *creſcens*, or *diminuens*:" *perficiens*, as if feoffee upon condition make a feoffment, and the feoffor confirm the eſtate of the ſecond feoffee;—*creſcens*, which always enlarges the eſtate of a tenant; as tenant for years to hold for life, &c.;—and *diminuens*, as when the lord of whom the land is holden, confirms the eſtate of his tenant, to hold by a leſs rent. 9 Rep. 142.

The lord may diminiſh the ſervices of his tenant by confirmation; but not reſerve new ſervices, ſo long as the former eſtate in the tenancy continues; and therefore if he confirm to the tenant, to yield him a hawk, &c. yearly, it is void. (Litt. § 539. 1 Co. Inſt. 296.) Leaſes for years may be confirmed for part of the term, or for part of the land, &c.; but an eſtate of freehold, being entire, cannot be confirmed for part of the eſtate. (5 Rep. 81.) There may be a confirmation implied by law, as well as expreſs by deed; where the law by conſtruction confirms a grant made to another purpoſe: and a confirmation may enlarge an eſtate, from an eſtate held at will to term of years, or a greater eſtate, from an eſtate for years to an eſtate for life; from ane ſtate for life, to an eſtate in tail, or in fee; and from an eſtate in tail to an eſtate in fee-ſimple. (1 Inſt. 305. 9 Rep. 142. Dyer. 263.) But if the confirmation be made to leſſee for life or years, of his term or eſtate, and not of the land, this doth not increaſe the eſtate; though if the leſſee confirm the land, to have and to hold to the leſſee and his heirs, this will enlarge the eſtate, and ſo of the reſt. Co. Litt. 299. Plowd. 40.

In every good confirmation, there may be a precedent rightful or wrongful eſtate in him to whom made, or he muſt have the poſſeſſion of the thing as a foundation on which the confirmation is to be eſtabliſhed; the confirmer muſt have ſuch an eſtate and property in the land, that he may thereby be enabled to confirm the eſtate of the confirmee; the precedent eſtate muſt continue till the confirmation come, ſo that the eſtate to be increaſed comes into it; and it is required that both theſe eſtates be lawful. Co. Litt. 296. 1 Rep. 146. Dyer. 109. 5 Rep. 15. If tenant for life make a leaſe for years to one perſon, and afterwards leaſe the land to another perſon for years; and he in reverſion confirms the laſt leaſe, and after that the firſt leaſe, this is not good; the ſecond leſſee hath an intereſt before by the confirmation of him in reverſion. But in a like caſe, confirmation of the firſt leaſe, after the ſecond was confirmed, has been held good; for the leaſe takes no intereſt by the confirmation, but only to make it durable and effectual. Moor. c. 180. 1 Inſt. 296. Plowd. 10. If a diſſeiſee confirm the land to the diſſeiſor but for one hour, one week, a year, or for life, &c. it is a good confirmation of the eſtate for ever; and if he confirm the eſtate of the diſſeiſor without any word of heirs, he hath a fee-ſimple; and if a diſſeiſee make a gift in tail, and the diſſeiſee doth confirm the eſtate of the donee, it ſhall enure to the whole eſtate. (Co. Litt. 291, 297, 299.) But where the eſtate is divided it is otherwiſe; and if there be an eſtate for life, the remainder over, there the confirmation may be of either of the eſtates; and if the leſſee of a diſſeiſor of a leaſe for 20 years, make a leaſe for 10 years, the diſſeiſee may confirm to one of them and not to the other. (1 Cro. 472. 5 Rep. 81.) The tenant in tail of land hath a reverſion in fee expectant; in this caſe, the confirmation of the eſtate tail will not extend to the reverſion: &c. (Co. Litt. 297, 298.) If leſſee for years, without impeachment for waſte, accept a confirmation of his eſtate for life, he hath by this loſt the privilege annexed to his eſtate for years. (8 Rep. 76.) Acceptance of rent in ſome caſes makes a confirmation of a leaſe. (2 Danv. 128, 129.) What a perſon may defeat by his entry, he may make good by his confirmation. (Co. Litt. 300.) But none can confirm, unleſs he hath a right at the time of the grant: he who hath but a right in reverſion cannot enlarge the eſtate of a leſſee. (2 Danv. 140, 141.) As confirmation is to bind the right of him who makes it, but not alter the nature of the eſtate to him to whom made, it ſhall not diſcharge a condition. (Poph. 51. 1 Rep. 147.) A confirmation will take away a condition annexed by law; and by confirmation, a condition after broken in a deed of feoffment is extinguiſhed. (1 Co. Rep. 146.) Confirmations may make a defeaſible eſtate good; but cannot work upon an eſtate that is void in law. (Co. Litt. 295.)

A confirmation of letters patent, which are void as they are againſt law, is a void confirmation. (1 Lil. Abr. 295.)

Grants and leaſes of biſhops, not warranted by the ſtat. 32 Hen. VIII. c. 28. muſt be confirmed by dean and chapter;

the poſſibility and reality of the deluge, proceeds in his endeavours to trace its origin, progreſs, and ſtill permanent conſequences. That it originated in and proceeded from the great ſouthern ocean below the equator, and thence ruſhed on the northern hemiſphere, he takes to be a natural inference from the facts which he has adduced. Theſe facts are as follow: 1. The ſouthern ocean is the greateſt collection of waters on the face of the globe. 2. In the northern latitudes beyond 45° and 55° we find the animal ſpoils of the ſouthern countries, and the marine exuviæ of the ſouthern ſeas; but in the ſouthern latitudes we find no remains of animals, vegetables, or ſhells belonging to the northern ſeas, but thoſe only that belong to the neighbouring ſeas. 3. The traces of a violent ſhock or impreſſion from the ſouth are as yet perceptible in many countries. 4. The very ſhape of the continents, which are all ſharpened towards the ſouth, where they are waſhed by the Southern ocean, indicate that ſo forcible an impreſſion was made upon them as nothing but the mountains could reſiſt; ſuch are the Cape of Good Hope, Cape Comorin, the ſouthern extremity of New Holland, and that of Patagonia. To theſe geological proofs, Mr. Kirwan adds the tradition of the orthodox Hindoos, that the globe was divided into two hemiſpheres, and that the ſouthern was the habitation of dæmons, who made war upon the gods. (Aſiatic Reſearches, vol. iii.) This war is commonly thought to be an allegorical deſcription of the flood; and hence the olive-branch, denoting a diminution of the flood, became a ſymbol of peace. Did not Noah, our author adds, reſide on the borders of the ſouthern ocean, otherwiſe he could not ſee that the great abyſs was opened? And did not an inundation from the ſouth-eaſt drive the ark north-weſt to the mountains of Armenia? Theſe conjectures are at leaſt conſiſtent with the moſt probable notions of the primitive habitation of man, which Mr. Kirwan takes to be near the ſources of the Ganges (as Joſephus expreſsly mentions), the Bourampooter, and the Indus, from which, as the temperature grew colder, mankind deſcended to the plains of India.

This unparalleled revolution, as Moſes informs us, was introduced by a continual rain of 40 days; by which, our author conceives, the ſurface of the earth muſt have been looſened to a conſiderable depth, and the effects of which were in many inſtances deſtructive. This looſening and opening of the earth occurred in many places where the marine inundation ſtagnated; and thus ſhells and other marine exuviæ were introduced into the ſoil, which rendered it more fertile. This rain alſo diluted the ſalt-water, and ſerved to prevent its pernicious effects both to the ſoil and the freſh-water fiſh. The deſtruction of animals contributed to the ſame purpoſe, and might, in many inſtances, be neceſſary to fertilize a ſoil produced by the decompoſition of primary mountains: from the animals thus deſtroyed the phoſphoric acid found in many ores may have originated. But the completion of this cataſtrophe was undoubtedly effected, as Moſes ſtates, by the invaſion of the waters of the great abyſs; moſt probably, as our author apprehends, that immenſe tract of ocean ſtretching from the Philippine iſlands, or rather from the Indian continent, on the one ſide, to Terra Firma on the other, and thence to the ſouthern pole, and again from Buenos Ayres to New Holland, and thence to the pole. Tracing its courſe on the eaſtern part of the globe, we ſhall ſee it impelled northwards with reſiſtleſs impetuoſity againſt the continent which at that time probably united Aſia and America. This appears to have been torn up and ſwept away (except the iſlands that ſtill remain), as far north as latitude 40°: its farther progreſs appears to have been ſomewhat checked by the lofty mountains of China and Tartary, and thoſe on the oppoſite American coaſt; here it began to dilate itſelf over the collateral countries; the part checked by the Tartarian mountains forming, by ſweeping away the ſoil, the deſert of Coby, while the interior or middle torrent paſſed forward to the pole; but the interior ſurge being ſtill more reſtricted by the contiguous, numerous, and elevated mountains of eaſtern Siberia and America, muſt at laſt have ariſen to a height and preſſure which overbore all reſiſtance, daſhing to pieces the heads of theſe mountains, as Patrin and Steller remark, and bearing over them the vegetable and animal ſpoils of the more ſouthern ravaged or torn-up continents, to the far-extended and inclined plains of weſtern Siberia, where its free expanſion allowed it to depoſite them. Hence the origin of the bones and tuſks of elephants, and rhinoceri found in the plains, or inconſiderable ſandy or marly eminences in the north-weſtern parts of Siberia, as Mr. Pallas rightly judges. If now we return to the ſouth, and contemplate the effects of this overwhelming invaſion on the more ſouthern regions of India and Arabia, we ſhall, where the coaſts were undefended by mountains, diſcover it excavating the gulfs of Nanquin, Tonquin, and Siam, the vaſt bay of Bengal, and the Arabian and Red ſeas. That the ſouthern capes, promontories, and headlands were extenuated to their preſent ſhape by the deluge, and not by tides or the currents ſtill obſerved in thoſe ſeas, may be inferred from the inefficacy of thoſe feebler powers to produce any change in them for many paſt centuries.

The chief force of the inundation, continues our author, ſeems to have been directed northwards in the meridian of from 110 to 200 E. of London. In the more weſtern tracts it appears to have been weaker. The plains of India are ſuſpected to have been leſs ravaged, or perhaps their ſubſequent fertility may have been occaſioned by their numerous rivers. As to thoſe of Arabia, their ſolid baſis, reſiſting the inundation, was obliged to yield its looſer ſurface, and remains even now a ſandy deſert, while the interior more mountainous tracts, intercepting, and thus collecting, the waſhed-off ſoil, are to this day celebrated for their fertility, as Niebuhr teſtifies. To a ſimilar tranſportation of the ancient vegetable ſoil, the vaſt ſandy deſerts of Africa, and the barrenneſs of moſt of the plains of Perſia may be attributed. The progreſs of the Siberian inundation was for ſome time ſtationary, on account of its confinement between the Altaiſchan elevation on the ſouth, and the Ouralian mountains on the weſt, and the circumpolar mountains on the ſide of Greenland. Hence ariſe the excavations obſerved on the northern parts of the former, and the abrupt declivities on the eaſtern flanks of the latter, while the weſtern diſcover none. The maſs of waters collected and ſpread over the arctic regions muſt have deſcended partly ſouthwards over the deſerts of Tartary, into countries with which we have not much acquaintance, ſo as to be able to trace its ravages; but from the oppoſition it muſt have met with in thoſe mountainous tracts, and the repercuſſion of their craggy ſides, eddies muſt have been formed, to which the Caſpian, Euxine, and other lakes may have owed their origin. Part alſo muſt have extended itſelf over the vaſt tracts of the Ourals, and then expanded more freely over the plains of Ruſſia and Poland, down to latitude 52°, where it muſt have been oppoſed by the inundation originating in the weſtern parts of the Pacific ocean, on this ſide of the Cape of Good Hope, and thence impelled northwards and weſtwards, in the ſame manner as the eaſtern inundation already deſcribed, but with much leſs force, and ſweeping the continents of South America (if then emerged), and of Africa, conveying to Spain, Italy, and France, and perhaps ſtill further

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further north, elephants and other animals and vegetables hitherto ſuppoſed partly of Indian and partly of American origin. That the courſe here aſſigned is not imaginary, appears from the ſhells, vegetables, and animal remains of thoſe remote climates, ſtill found in Europe, and from the diſcovery both of the European and the American promiſcuouſly mixed with each other at Fez. So alſo in Germany, Flanders, and England, the ſpoils of the northern climates, and thoſe of the ſouthern alſo, are equally found; thus the teeth of arctic bears, and bones of whales, as well as thoſe of animals of more ſouthern origin, have been diſcovered in thoſe parts.

The encounter of ſuch enormous maſſes of water in oppoſite directions muſt have produced a ſtupendous effect; ſuch as appears to have been ſufficient for ſhaking and ſhattering ſome of the ſolid vaults that ſupported the ſubjacent ſtrata of the globe. To this concuſſion Mr. Kirwan aſcribes the formation of the bed of the *Atlantic*, which ſee. The wreck of ſo conſiderable an integrant part of the globe muſt neceſſarily have convulſed the adjacent ſtill ſubſiſting continents previouſly connected with it, rent their ſtony ſtrata, burſt the ſtill more ſolid maſſes of their mountains, and thus in ſome caſes framed, and in others prepared, the inſular ſtate to which theſe fractured tracts were reduced. To this event our author, therefore, aſcribes the bold, ſteep, and abrupt weſtern coaſts of Ireland, Scotland, and Norway, and the numerous iſles that border them, as well as many of thoſe of the Weſt Indies. The Britannic iſlands ſeem to have acquired, ſays Mr. Kirwan, their inſular ſtate at a later period, though it was probably prepared by this event; but the baſaltic maſſes on the Scotch and Iriſh coaſts, and thoſe of Feroe appear to him to have been rent into pillars by this concuſſion. During this elemental conflict, and the craſh and ruin of the ſubmerged continent, many of its component parts muſt have been reduced to atoms, and diſperſed through the ſwelling waves that uſurped its place. The more liquid bitumens muſt by the agitation have intimately mixed with them. They muſt alſo have abſorbed the fixed air contained in the bowels of the ſunk continent; and farther, by this continental depreſſion, whoſe derelinquiſhed ſpace was occupied by water, the level of the whole diluvial ocean muſt have been ſunk, and the ſummits of the higheſt mountains muſt then have emerged. In this ſtate of things it is natural to ſuppoſe that if iron abounded in the ſubmerged continent, as it does at this day in the northern countries of Sweden, Norway, and Lapland adjacent to it, its particles may have been kept in ſolution by the fixed air, and the argillaceous, ſiliceous and carbonaceous particles may have been long ſuſpended. Theſe muddy waters mixing with thoſe impregnated with bitumen, the following combinations muſt have taken place. 1. If carbonic matter was alſo contained in the water, this uniting to the bitumen muſt have run into maſſes no longer ſuſpenſible in water, and formed ſtrata of coal. 2. The calces of iron by the contact of bitumen were in great meaſure gradually reduced, and together with the argillaceous and ſiliceous precipitated on the ſummits of ſeveral of the mountains not yet emerged, and thus formed baſaltic maſſes, that during deſiccation ſplit into columns; in other places they covered the carbonaceous maſſes already depoſited, and by abſorbing much of their bitumen rendered them leſs inflammable, and hence the connection which the ſagacious Werner obſerved between baſalts and coal. The fixed or oxygen air, erupting from many of them, formed thoſe cavities, which being filled by the ſubſequent infiltration of ſuch of their ingredients as were ſuperfluous to their baſaltic ſtate, formed chalcedonies, zeoliths, olivins, baſaltines, ſpars, &c. Hence moſt of the mountains of Sweden that afford iron, afford alſo bitumen. Hence alſo the aſphalt found with trap, and under baſalts, and in balls of chalcedony found in trap. This Mr. Kirwan conceives to be the laſt ſcene of this dreadful cataſtrophe; and hence no ſhells are found in theſe baſalts, thoſe having been previouſly depoſited, though ſome other lighter marine vegetable remains have ſometimes been found in them; ſome argillaceous or ſand-ſtone ſtrata may alſo have been depoſited at this period.

To the Moſaic account it has been objected, that the countries near Ararat are too cold to bear olive-trees. Tournefort, who firſt made this objection, ſhould have recollected, that at this early period the Caſpian and Euxine ſeas were joined, as he himſelf has proved. This circumſtance fitted a country lying in the 38th degree of latitude to produce olives, which now grow in much higher latitudes, at preſent chilled only by its diſtance from the ſea. (See ARARAT.) A more plauſible objection ariſes from the difficulty of collecting and finding all the various ſpecies of animals now known, ſome of which can exiſt only in the hotteſt, and others only in the coldeſt climates. But it is not neceſſary to ſuppoſe that any others were collected in the ark beſides thoſe moſt neceſſary for the uſe of man, and thoſe only of the graminivorous or granivorous claſſes; Mr. Kirwan ſuggeſting that the others were probably of ſubſequent creation. At this early period ravenous animals were not only not neceſſary, but would have been even deſtructive to thoſe who had juſt obtained exiſtence, and probably not in great numbers. They only became neceſſary when the graminivorous had multiplied to ſo great a degree that their carcaſſes would have ſpread infection. Hence our author is led to ſuppoſe that they were of poſterior creation; and to this circumſtance he alſo attributes the exiſtence of thoſe that are peculiar to America, and the torrid and frigid zones. Among the ſubſequent effects of the flood we may mention the following: the atmoſphere muſt have been exceedingly altered by its conſequences. Soon after the creation of vegetables, and in proportion as they grew and multiplied, great quantities of oxygen muſt have been thrown off by them into the atmoſphere without any proportional counteracting diminution from the reſpiration or putrefaction of animals, as theſe were created only in pairs and multiplied more ſlowly; hence it muſt have been much purer than at preſent; and to this circumſtance in a great meaſure Mr. Kirwan inclines to aſcribe the longevity of the antediluvians. After the flood the ſtate of things was reverſed; the ſurface of the earth was covered with dead and putrefying land animals or fiſh, which copiouſly abſorbed the oxygenous part of the atmoſphere and ſupplied only mephitic and fixed air: thus the atmoſphere was probably brought to its actual ſtate, containing little more than one-fourth of pure air, and nearly three-fourths of mephitic. Hence the conſtitution of men muſt have been weakened, and the lives of their enfeebled poſterity gradually reduced to their preſent ſtandard. In order to avoid theſe exhalations it is probable that the human race continued for a long time to inhabit the more elevated mountainous tracts. Domeſtic diſturbances in Noah's family, briefly mentioned in the ſacred writings, probably induced him to move with ſuch of his deſcendants as were moſt attached to him to the regions he inhabited before the flood, which Mr. Kirwan conceives to have been the vicinity of China, and to this circumſtance he attributes the early origin of the Chineſe monarchy.

After all, whatever might be the inſtrumental phyſical cauſe of the deluge, and whatever might be the mode of its operation, we muſt on this occaſion have recourſe to a divine interpoſition and energy. For though the waters which covered the earth at the creation might be ſufficient

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to cover it again, yet it is not eaſy to conceive or ſatisfactorily to explain, on any hypotheſis, how this could be effected by mere natural means. The waters, which were ſuſpended in the clouds, might, indeed, deſcend upon the earth, and that in cataracts, or ſpouts of water, as the Septuagint interprets "the windows of heaven," and thus a great inundation might be occaſioned in the lower grounds; but as the clouds could pour down no more water than they contained, which would ſoon be exhauſted, though it ſhould ſeem, from the long continuance of rain, that the ſhowers were rather moderate and gradual. The ſubterraneous ſtores would afford a more plentiful ſupply, but it is difficult to account for their being raiſed and perhaps more difficult afterwards to diſpoſe of and remove them. Whilſt we are unable to aſſign any natural cauſe that would be effectual for this purpoſe, we may reſolve it into the divine power, which might, on this occaſion, ſo far controul the uſual courſe of nature, as to effect this purpoſe. And, indeed, the event was ſo extraordinary, and the conſequences ſo conſiderable, that it is very reaſonable to believe, that God did, in a ſpecial manner interpoſe. Nevertheleſs, we can by no means adopt the opinion of M. Buffon, that to attempt an explanation of the univerſal deluge and of its phyſical cauſes; to pretend to give a detail of what paſſed during this great revolution; and to conjecture what effects have reſulted from it; indicate a preſumptuous deſire of ſcanning the power of the Almighty. The power of the Almighty was no leſs conſpicuouſly and miraculouſly diſplayed in the cataſtrophe of the deluge, though in accompliſhing his purpoſe, he directs and actuates the operation of phyſical cauſes or ſuſpends and controuls any of the eſtabliſhed laws of nature. The inquiry into the *modus operandi*, conducted with modeſty, and with a conſtant regard to the Moſaic account of this extraordinary event, by no means implies a doubt, much leſs a diſbelief of the agency of the omnipotent and all-wiſe ſovereign of nature, nor juſtifies thoſe charges of infidelity, that have been too freely and uncandidly made on thoſe who inveſtigate this diſpenſation of divine Providence. "It may ſtill be urged," ſays this ingenious writer, (Nat. Hiſt. by Smellie, vol. i. p. 131.) "that, as the univerſal deluge is an eſtabliſhed fact, is it not lawful to reaſon upon its conſequences? True. But you muſt commence with acknowledging that the deluge could not poſſibly be the effect of any phyſical cauſe; you muſt regard it as an immediate operation of the Deity; you muſt content yourſelf with what is recorded in Scripture; and you muſt, above all, avoid blending bad philoſophy with the purity of divine truth. After taking theſe precautions, which a reſpect for the counſels of the Almighty requires, what remains for examination, upon the ſubject of the deluge? Do the ſacred writings tell us, that the mountains were formed by the deluge? They tell us the reverſe. Do they inform us that the agitation of the waters was ſo great, as to raiſe the ſhells from the bottom of the ocean, and to diſperſe them over the face of the earth? No: the ark moved gently on the ſurface of the waters. Do they tell us, that the earth ſuffered a total diſſolution? By no means, the narration of the ſacred hiſtorian is ſimple and true; that of naturaliſts is complicated and fabulous." See *Theory of the* EARTH, and STRATA.

DELVIN, in *Natural Hiſtory*, a name ſometimes given by the miners in Cornwall to that ſort of talcy ſtone or ſlate, which they more generally call *killas*; but in ſome places, as at Lowancowiggan, they uſe it as the name of a coarſe, but very hard ſtone, in which the ore lies. The ore is tin, and is conſiderably rich there, but the hardneſs of the ſtone makes it difficult to be got out.

DELVIN, in *Geography*, a town of European Turkey, in the province of Albania; 36 miles S. W. of Delfino.

DELVING, in *Agriculture*, a word which implies the operation of digging, or turning up the ſoil by means of a ſpade.

DEMA, in *Geography*, a river of Ruſſia, which runs into the Bielaia, at Upha.

DEMADES, in *Biography*, an Athenian orator, originally a mariner, was taken priſoner by Philip of Macedon: he was a man of corrupt principles, but was far-famed for his eloquence and powers of perſuaſion. He checked king Philip in his immoderate exultation after the battle of Chæronea, charging him with acting the part of a Therſites, inſtead of imitating the more noble conduct of an Agamemnon. Philip took the rebuke in good part and made Demades his confidential friend. He ſided with the Macedonian party againſt Demoſthenes and the other patriots. When Alexander inflicted his vengeance upon Thebes, and demanded that the Athenians ſhould deliver up the orators and leading men who were his oppoſers, Demades completely diverted his wrath by obtaining a decree that the Athenians themſelves ſhould puniſh the guilty by their own laws, and he went at the head of an embaſſy to Alexander, who received them with great affability and admitted the Athenians to his favour. Demades was ſeveral times fined for propoſing edicts contrary to law, and was at one time declared infamous, and incapable of ſpeaking in the public aſſembly. He however recovered his authority, and was the means of carrying the decree by which Demoſthenes was condemned to death. So mercenary was Demades, that Antipater was accuſtomed to ſay, that of his two Athenian friends, he could get Phocion to accept of nothing, and could never ſatisfy Demades. He was as profuſe in ſpending, as rapacious in acquiring a fortune. He at length paid the penalty of his crimes: being ſuſpected of a traitorous correſpondence with the enemies of his country, his letters were intercepted, and himſelf was condemned to death, having previouſly had the mortification of ſeeing his own ſon killed. According to Cicero, Demades poſſeſſed in his ſpeeches more of the Attic ſalt than any other orator. He was extremely ready at extempore addreſſes and has occaſionally ſupported Demoſthenes when that prince of ſpeakers was thrown into confuſion by popular tumult. A ſpecimen of his ſtrong and pointed manner of ſpeaking is recorded upon the arrival of the news of Alexander's death. Demades refuſed to give any credit to the report; "for," ſaid he, "if Alexander were dead, the whole world would ſmell of the carcaſe." Univer. Hiſt.

DEMAIA, in *Geography*, a town of Egypt; 6 miles N. W. of Manſora.

DEMAIN, or DEMESNE, in its popular ſenſe, denotes the lord's manor-place, with the lands thereto belonging; which he and his anceſtors have from time to time kept in their own manual occupation. See MANOR.

DEMAIN, or *Demeſne*, in a law-ſenſe, ſignifies, according to Hottoman, patrimonium domini, the lord's patrimony; called alſo domain, and by the civilians, dominicum.

The ſame author proveth thoſe lands to be demain, which a man holdeth originally of himſelf; and thoſe to be feodum, which he holdeth of a ſuperior lord.

In England, no common perſon has any demain, ſimply underſtood; for all depends, either mediately or immediately, on the crown. When a man therefore, in pleading, would ſignify his land to be his own, he ſaith, that he is or was ſeiſed thereof in his demain, as of fee; whereby he means, that although his land be to him, and his heirs for ever, yet it is no true demain, but depends upon a ſuperior lord, and he

he holdeth by ſervice, or rent in lieu of ſervice, or by both ſervice and rent. Lit. l. i. c. 1.

DEMAIN is ſometimes alſo taken, more largely, for lands and tenements held for life, &c. and ſometimes more ſtrictly for ſuch only as are generally held in fee.

DEMAIN is ſometimes again uſed for a diſtinction between thoſe lands that the lord of the manor has in his own hands, or in the hands of his leſſee, demiſed upon a rent, for a term of years or life; and ſuch other lands pertaining to the ſaid manor which belong to the free, or copy-holders.

The reaſon why the copy-hold is accounted demain, is becauſe they, who are tenants to it, are judged in law to have no other right but at the will of the lord; ſo that it is reputed ſtill, after a ſort, to be in the lord's hands; and yet in common ſpeech that is ordinarily called demain, which is neither free nor copy-free.

DEMAIN, or *Demeſne*, again, is uſed in a more ſpecial ſignification, in oppoſition to frank-free lands.

Thus, thoſe lands, or manors, which were in the poſſeſſion of Edward the Confeſſor, or William the Conqueror, are called ancient demain, or demeſne; and all others are called frank-fee; and the tenants who hold any of thoſe former lands, are called tenants in ancient demain; and the others, tenants in frank-fee, and alſo tenants at common law. The reaſon is, becauſe tenants in ancient demain cannot be ſued out of the lord's court. The tenants of theſe lands, under the crown, were not all of the ſame order or degree. Some of them, as Britton teſtifies (c. 66.), continued for a long time pure and abſolute villeins, dependent on the will of the lord; and thoſe who have ſucceeded them in their tenures now differ from common copy-holders in only a few points. (F. N. B. 228.). Others were in great meaſure enfranchiſed by the royal favour; being only bound in reſpect of their lands to perform ſome villein ſervices of the better ſort, which were determinate and certain; as, to plough the king's land for ſo many days, to ſupply his court with ſuch a quantity of proviſions, or other ſtated ſervices; all which are now changed into pecuniary rents; and in conſideration of theſe, they had many immunities and privileges granted them (4 Inſt. 269.); as, to try the right of their property in a peculiar court of their own, called a court of ancient demeſne, by a peculiar proceſs denominated a writ of "right cloſe;" not to pay toll or taxes; not to contribute to the expences of knights of the ſhire; not to be put on juries; and the like. (F. N. B. 11. 14.) Theſe tenants therefore, though their tenure be abſolutely copyhold, yet have an intereſt equivalent to a freehold; and lands holden by this tenure are a ſpecies of copyhold, and as ſuch preſerved and exempted from the operation of the ſtatute of Charles II.; yet they differ from common copyholds, principally in the forementioned privileges; and they differ from freeholds by one ſpecial mark of villenage, noted by Bracton, and remaining to this day; *viz.* that they cannot be conveyed from man to man by the general common law conveyances of feoffment, and the reſt; but muſt paſs by ſurrender to the lord or his ſteward, in the manner of common copyholds; with this diſtinction however, that in the ſurrender of theſe lands in ancient demeſne, it is not uſed to ſay "to hold at the will of the lord" in their copies, but only "to hold according to the cuſtom of the manor."

DEMAIN, or *Demeſne*, lands of the crown, *terræ dominicales regis*, denote either the ſhare reſerved to the crown in the diſtribution of landed property, or ſuch as came to it afterwards by forfeitures or other means, which were anciently very large and extenſive; compriſing divers manors, honours, and lordſhips; the tenants of which had very peculiar privileges. At preſent they are contracted within a very narrow compaſs, having been almoſt entirely granted away to private ſubjects. This has occaſioned the parliament frequently to interpoſe; and, particularly, after king William III. had greatly impoveriſhed the crown, an act paſſed (1 Ann. ſt. 1. c. 7.) whereby all future grants or leaſes from the crown for any longer term than 31 years or three lives are declared to be void; except with regard to houſes, which may be granted for 50 years. And no reverſionary leaſe can be made, ſo as to exceed, together with the eſtate in being, the ſame term of three lives or 31 years; that is, when there is a ſubſiſting leaſe, of which there are 20 years ſtill to come, the king cannot grant a future intereſt, to commence after the expiration of the former, for any longer term than 11 years. The tenant muſt alſo be made liable to be puniſhed for committing waſte; and the uſual rent muſt be reſerved, or, where there has uſually been no rent, one-third of the clear yearly value. The rents and profits of the demeſne lands of the crown conſtitute one branch of the king's ordinary revenue.

DEMAND, in its proper ſenſe, denotes a calling for, or requiring one's due.

DEMAND in *Law*, has a more ſpecial ſignification, as contradiſtinguiſhed from plaint: for all civil actions are purſued either by demands or plaints; according to which the purſuer is called either demandant or plaintiff; *viz.* in real actions, demandant; and in perſonal actions, plaintiff.

Where the party purſuing is called demandant, the party purſued is called tenant; and where the former is called plaintiff, the latter is termed defendant.

There are two kinds of demands: the one in deed, *de facto*, as in every precipe; the other in law, *de jure*; ſuch is entry in land, diſtreſs for rent, &c.

As an entry on land, and taking a diſtreſs, are a demand in law of the land and rent, ſo the bringing of an action of debt for money due on an obligation is a demand in law of the debt. (1 Litt. 432. 1 Nelſ. Abr.) Debts, claims, &c. are to be *demanded* and made in time, by the ſtatute of limitations; (21 Jac. 1. c. 16.) and other ſtatutes; or they will be loſt by law. A demand muſt be legal, and made in ſuch a manner as the law requires: if it be for rent of a meſſuage and lands, it ought to be made at the meſſuage, at the fore door of the houſe, the moſt notorious place; where lands and woods are let together, the rent is to be demanded on the land, as the moſt worthy thing, and on the moſt public part thereof: if wood only be leaſed, the demand muſt be made at the gate of the wood, &c. (1 Inſt. 201. Poph. 58.)

If a man releaſe another from all demands, it is the beſt releaſe the releaſee can have, and ſhall redound moſt to his advantage: for all executions, and all freeholds, and inheritances, executory, are releaſed. A releaſe of facts is more large than of quarrels or actions; and a releaſe of demands more large and beneficial than either: by a releaſe of all demands to the diſſeiſor, the right of entry into the land, and all contained therein, is releaſed; and he that releaſeth all demands, excludes himſelf from all actions, entries, and ſeizures. But it is no bar to a writ of error to releaſe an outlawry. 8 Co. 153, 154.

DEMANDANT, PETENS, he who is actor, or plaintiff, in a real action; thus called, becauſe he demands lands, &c.

DEMANOVO, in *Geography*, a great cavern in a limeſtone rock, near the town of Pribilini in Hungary. This is the cave of which Bruchman, in his Epiſtola Itineraria, Ep. 77. aſſerts, that it is full of bones, and out of which was taken the ſkeleton of the dragon belonging to the king of Saxony at Dreſden. Townſon's Hungary.

DEMARATUS, in *Biography*, king of Sparta, ſucceeded his father Ariſto: and had, almoſt as ſoon as he aſcended

the throne, to encounter the violent meaſures of Cleomenes his colleague, who, in revenge, endeavoured to perſuade the Lacedæmonians that he was not the real ſon of Ariſto, and, of courſe, had no right to the crown which he wore. The oracle was applied to, to determine the queſtion, which Cleomenes had found means to corrupt. The deciſion was againſt Demaratus, and he was depoſed: he was, however, too much of a philoſopher to be greatly diſturbed at being reduced to the ſtate of a private life: he ſubmitted to his fate with becoming dignity, and was ever willing to ſerve his country in ſubordinate offices. Demaratus was alſo celebrated for his activity in athletic exerciſes, and is ſaid to have been the only ſovereign of Sparta who gained a prize at the Olympic races. Owing to ſome inſults which he met with from his ſucceſſor, he determined to quit Sparta, and retire into Aſia. He was received with kindneſs by Darius Hyſtaſpis, about the year 492, B. C. who treated him in a manner becoming his former royal rank, and made him great preſents. At the death of Darius, his friend and protector, he is ſaid to have aſſiſted Xerxes in the ſucceſſion: he was, however, ſtill ſo firmly attached to his country, that when he underſtood meaſures were taken by the Perſians to injure it, he communicated the buſineſs, by means of a pair of writing tables, on the wood of which he had cut an account of the fact, and covered the letters over with wax. Little more is known of Demaratus, except that his family flouriſhed in Perſia many generations with reſpect and honour. Another perſon of the ſame name was a citizen of Corinth, and is quoted by many of the ancients as the author of ſeveral treatiſes. Plutarch, in his own diſcourſe on rivers, refers to one on the ſame ſubject by Demaratus. Moreri.

DEMARCHUS, in *Antiquity*, the chief of a region, or diſtrict, in the country of Attica.

The Athenians divided their country into certain regions, or diſtricts, which they called δημοι, *i. e. people*; and eſtabliſhed a magiſtrate at the head of each, under the denomination of δημαρχος, *demarchos*, of δημος, and αρχη, *rule, government*.

It was alſo an appellation given to the chief magiſtrate of the city Neapolis.

DEMAVEND, in *Geography*, a town of Perſia, in the province of Irak; 170 miles E. of Amadan.

Demavend is alſo a range of mountains in Perſia, dividing Hyrcania from Parthia, according to Chardin; that is, in other words, the mountains of Mazendran. D'Anville marks Demavend due W. of Iſpahan, and it is repreſented as one of the chief elevations, which affords a proſpect of 50 farſangs, or 200 miles.

DEMBEA, a province of Abyſſinia, near a lake of the ſame name, ſituated between 11 degrees and 12 degrees N. lat. and 36 and 37 degrees E. long. below the mountains bounding Gueſqué and Kuara. This low province, and Woggora, a ſmall high province on the eaſt, are all ſown with wheat, and are the granaries of Abyſſinia. Dembea, according to Mr. Bruce, ſeems once to have been occupied entirely by the lake. It is called Atté-Kolla, the king's food, or maintenance; its produce being aſſigned for the ſupply of the king's houſehold. It is governed by an officer called Cantiba; whoſe poſt is lucrative; but he is not reckoned one of the great officers of the empire, and has no place in council.

Dembea, or Tzana, a lake of Abyſſinia, which is the largeſt expanſe of water known in that country. Its extent, however, ſays Mr. Bruce, (Travels, vol. iii. p. 387.) has been greatly exaggerated. Its greateſt breadth, from Dingleber to Lamgué, in a line nearly E. and W. is 35 miles; but it decreaſes much at each extremity, where it is not in ſome places above 10 miles broad. Its greateſt length is from Bab Baha to a little S. W. by W. of that part where the Nile, after having croſſed the end of it by a current always viſible, turns towards Dara, in the territory of Alata, which is 49 miles from N. to S. and which is the extent of this lake in length. In the dry months, from October to March, the lake very much ſhrinks in ſize; but after all the rivers on every ſide of it are filled, and have fallen into the lake, like radii drawn to a centre, it then ſwells, and extends itſelf into the plain country, and of courſe has a much larger ſurface. It contains, according to the fabulous reports of the Abyſſinians, 45 inhabited iſlands; but Mr. Bruce conceives the number to be about 11; the principal of which is Dek, or Daga, ſignifying a hill or high ground, nearly in the middle of the lake. Other iſlands are Halimoon nearer Gondar, and Briguida nearer Gorgona. All theſe iſlands were formerly uſed as priſons for the great people, or for a voluntary retreat on account of ſome diſguſt or great misfortune, or as places of ſecurity to depoſit their valuable effects, during troubleſome times. When Mr. Bruce was in Abyſſinia, 1300 ounces of gold, confided by the queen to Welleta Chriſtos, her governor of Dek, a man of extraordinary ſanctity, who had faſted for 40 years, was ſtolen away by that prieſt, who fled and hid himſelf; but the queen would not ſuffer him to be ſearched after or apprehended.

DEMEMBRE', in *Heraldry*, is when an animal is diſmembered, *i. e.* the limbs cut off its body.

DEMER, in *Geography*, a river of France, which has its ſource in the department of the Lower Meuſe, to the weſt of Maeſtricht, paſſes by Dieſt, Sickem, and Aerſchot, and falls into the Dyle, between Louvain and Malines. Timber and firewood are ſent by the Demer to Malines, Antwerp, and Bruſſels from Dieſt, but the boats or floats muſt be haled.

DEMERARA, a river of South America, in the country called Dutch Guiana or Surinam, which after a ſhort courſe diſcharges itſelf into the Eſquivo. The mouth of this river is defended by fort William Frederic; and the Dutch have formed a ſettlement on its banks, near which the inhabitants cultivate ſugar, cotton, and coffee. This river is about two miles wide at its mouth, oppoſite to the fort on its eaſt bank; and nearly a mile wide, 12 miles above the fort; its courſe is from S. to N., and it is navigable about 200 miles for veſſels that can paſs the bar at its mouth, which is a mud bank, not having above 24 feet at the higheſt water. The fort, properly ſupplied with men and ammunition, might be able effectually to guard its entrance. Staebroeck, the ſeat of government, is ſituated on the eaſt ſide of the river, 1½ mile above the fort. The diſtrict of Demerara, together with Eſſequibo, form one government, and have the ſame court of police, but each has a ſeparate court of juſtice. The two diſtricts contain about 3000 whites, and 40,000 ſlaves. The river paſſes through the diſtrict, and whilſt it was in the poſſeſſion of the Dutch, was uſually viſited by 40 or 50 large ſhips from Holland, which often made two voyages in a year, beſides more than 250 ſmaller veſſels, under the Dutch and other flags. The plantations are regularly laid out in lots along the ſhore, called façades, about one-fourth of a mile wide, and extending three-fourths of a mile back into the country. Each lot includes about 250 acres, containing, when fully cultivated, 120,000 cotton trees, yielding generally at an average half a pound each tree, and employing 120 negroes. The ſhores of the rivers and creeks are chiefly planted with coffee, to the diſtance of about 30 miles from the ſea; from thence to the diſtance of 30 miles further, the ſoil becomes clayey and more fit for ſugar. Beyond this, the fineſt kinds

of

of wood, for building, furniture, &c. are obtained. N. lat. 6° 40′. W. long. 57° 45′.

DEMEROSESA, in *Ancient Geography*, a town of the iſland of Albion, ſuppoſed by Gale to be Dumfries.

DEMERSUM Folium. See Leaf.

DEMESNE, in *Law*. See Demain.

DEMETÆ, in *Ancient Geography*, were inhabitants of South Wales, ſeated, according to Ptolemy, next to the Silures, and poſſeſſed that part of the country, which is now divided into Caermarthenſhire, Pembrokeſhire, and Cardiganſhire; to which Baxter thinks Brecknockſhire and Radnorſhire ſhould be added. This country is called by ſome of the moſt ancient of our monkiſh writers, Demetia, from the name of its inhabitants; and it is not improbable, that they and their country derived their name from "Deveit," or Defaid, which ſignifies ſheep, which very much abounded in thoſe parts. As neither Pliny, Tacitus, nor any ancient writer, except Ptolemy, mentions any other nation in South Wales but the Silures, it ſeems probable that the Demetæ were generally conſidered as a part of that nation, and were perhaps their Cangi, or the keepers of their flocks and herds. Admitting this conjecture, the Demetæ were perhaps that nation of Cangians that were ſubdued by Oſtorius Scapula, after he had defeated the Iceni. For the country of theſe Cangians reached to the Iriſh ſea, which very well agrees with the ſituation of Demetia, (Tacit. An. l. xii. c. 33). As the Demetæ did not reſiſt the Romans with much obſtinacy, and as their country lay in a remote corner, and was then, and long after, very wild and uncultivated, it ſeems to have been little frequented by theſe conquerors, who had very few towns or ſtations within its limits. As none of the journies of Antoninus lay through any part of the country of the Demetæ, no place in that country is mentioned in the Itinerary. Ptolemy takes notice of the promontory Octapitarum, now St. David's Head, at the mouth of the river Tobius, now the Towy in Caermarthenſhire, and of the towns Luentium or Luentinum, now Llan-Ddewy-Brevy, in Cardiganſhire, near which Roman coins and bricks have been found, and Maridunum, now Caermarthen. The country of the Demetæ was ſituated in the Roman province called Britannia Secunda.

DEMETRIA, Δημητρια, in *Antiquity*, a feſtival in honour of Ceres, called by the Greeks *demeter*, δημητηρ, of δη, *i. e.* γη, *earth*, and μητηρ, *mother*. It was uſual on this occaſion for the worſhippers to laſh themſelves with whips made of the bark of trees, and called μυροπτοι. Pott. Archæol. Græc. tom. i. lib. ii. cap. 20. p. 379.

Demetria was likewiſe the name of another feſtival celebrated by the Athenians in honour of Demetrius Poliorcetes, and was the ſame with that afterwards called Dionyſia. Pott. loc. cit.

DEMETRIAS, in *Ancient Geography*, a town of Greece, in Theſſaly.—Alſo, a name given to the town of Sicyonia.—Alſo, a town of Aſia, in Syria, ſituated near to and eaſt of the Mediterranean ſea.—Alſo, a town of Aſia, now *Kerkouk*, near the mountains and S.S.E. of Arbela. It is called *Corcura* by Ptolemy.

DEMETRIUM, a place of Theſſaly, near the Pelaſgian gulf, where was a grove ſacred to Ceres.—Alſo, a port in the northern part of the iſle of Samothrace, near the promontory of the ſame name.

DEMETRIUS I. in *Biography*, ſurnamed Poliorcetes, king of Macedon, was ſon of Antigonus, a captain under Alexander the Great, and one of his ſucceſſors. He was born about the year 340 B.C. In one of his firſt military eſſays he was unſucceſsful. Ptolemy having invaded Syria, Demetrius was ſent with an army to oppoſe him, and was completely defeated at Gaza. Soon after, another opportunity was given him of retrieving his character which he did by vanquiſhing Ptolemy's general, taking him priſoner, with his camp and military treaſures. Towards the conquered he behaved with much kindneſs and generoſity. Demetrius afterwards made an expedition into Arabia. He next drove Seleucus from Babylon, laid waſte the country, and, returning, obliged Ptolemy to raiſe the ſiege of Halicarnaſſus. A treaty was immediately entered into between Antigonus and the princes confederated againſt him, which was ſoon broken; and Demetrius from this time ſet himſelf to deliver Greece from the tyranny under which it had long laboured. He landed at Athens, and after various ſucceſs he aſſembled the people, and ſolemnly reſtored their ancient democratic government; giving them, at the ſame time, large preſents of corn, timber, and other things of which they ſtood moſt in need. The Athenians in return for this liberality inveſted their benefactors with the higheſt honours; rendering them the homage due to guardian deities, and appointing a prieſt to ſerve them. From Greece, Demetrius proceeded to carry on another war againſt Ptolemy. He raiſed an army in Cilicia, and aſſembling a numerous fleet, proceeded to Cyprus. Here he defeated Menelaus the brother of Ptolemy, and beſieged him in the town of Salamis. Ptolemy came with a large fleet in aid of his brother, and a naval engagement enſued, in which the whole force of Ptolemy was almoſt entirely deſtroyed, and he was obliged to return to Egypt with eight galleys only. The whole iſland, with all the warlike ſtores and magazines, fell into the hands of the victor: and Menelaus and his ſon were among the priſoners; but theſe, with a genuine greatneſs of mind, he liberated without a ranſom. Antigonus henceforth aſſumed the title of king, and gave it alſo to his ſon. Among the female captives was Lamia, a celebrated courtezan, who captivated the heart of Demetrius, and who long retained over him a complete aſcendency. His gallantry, however, never permitted him to forget the buſineſs of war. He was an able mechanician, and applied his knowledge to the conſtruction of military engines, that were particularly uſeful to him in the various ſieges which he undertook, and in which he was generally ſucceſsful; though at Rhodes his ſkill was baffled, and he was obliged to retire after he had continued before the place more than a year. From Rhodes he went again to the aſſiſtance of the Athenians againſt Caſſander. In this inſtance, as before, his ſucceſs was perfect, and he reſtored liberty to all the Greek ſtates ſouth of Thermopylæ. He then took up his quarters at Athens, where his good fortune, and the high reputation which he had acquired, drew from the citizens the moſt ſervile adulation, which incited him to all kinds of extravagance and the groſſeſt debauchery. His influence with the Athenians cannot be better ſhewn than by obſerving, that when he demanded to be initiated into their myſteries, which could only be done at certain periods of the year, they actually changed the names of two of their months to accommodate his wiſhes. Demetrius was called from Greece by his father, againſt whom a league was formed by Caſſander, Seleucus, and Lyſimachus. In the battle of Ipſus, B.C. 301, his impetuoſity led him into difficulties, and he was glad to retreat to Epheſus, from which place he embarked for Greece, intending to proceed to Athens, but that city, which but a ſhort time before had paid him a kind of adoration due only to a celeſtial being, refuſed him admittance, and diſmiſſed his wife with her retinue. This event affected him very much; and he blockaded Athens, which after enduring the horrors of famine ſubmitted. He treated the vanquiſhed city with an unexpected lenity, and preſented it with a large ſupply of corn.

corn. After other exploits he was applied to by Alexander, the ſon of Caſſander, lately dead, to aſſiſt him againſt his brother Antipater: whether he rendered him any effectual aid does not appear, but it is certain that at the inſtigation of Demetrius, Alexander himſelf was aſſaſſinated at a banquet; and the baſe action was rewarded by ſucceſſion to the throne of Macedon. In this high ſtation he acted ſo imprudently, and with ſo little attention to the intereſts of his ſubjects, that after ſix years he was obliged to abandon the robes of royalty, and the kingdom over which he had reigned. The changes to which Demetrius was ſubject during the remainder of his life were very great; ſometimes at the head of powerful armies, at others left without a ſingle attendant. At length he was made priſoner by Seleucus, who kept him under a ſtrict guard in a caſtle in the Syrian Cherſoneſus. In this ſituation he had the affecting conſolation of finding his own ſon, Antigonus, offering himſelf an hoſtage for the freedom of his father. Demetrius abandoned himſelf to drinking to diſpel the trouble and melancholy of captivity, which brought on diſeaſes that terminated his life in his fifty-fourth year. His remains were conveyed to Greece, where his funeral was celebrated with every circumſtance of ſolemn pomp. His poſterity filled the throne of Macedon till Perſes was conquered by the Romans. Demetrius was remarkable, as has been ſeen, for the ſplendour of his character, and the variety of his fortune. Univer. Hiſt.

Demetrius II. king of Macedon, grandſon of the former, and ſon of Antigonus, who, we have ſeen, offered himſelf a ranſom for his father's freedom. In his youth he was diſtinguiſhed for his valour, and when he aſcended the throne, he was chiefly occupied in war with barbarous nations on the frontiers of his own dominions. He died B. C. 232, leaving the crown to his ſon Philip, then an infant.

Demetrius I. king of Syria, ſurnamed *Soter*, ſon of Seleucus Philopater, was ſent hoſtage to Rome by his father, on whoſe death Antiochus Epiphanes, and after him his ſon Antiochus Eupator, the one the uncle, the other the couſin of Demetrius, uſurped the throne of Syria. Demetrius in vain ſought of the Roman ſenate liberty to return to his own country to aſſert his rights; what was refuſed to him as a right, he contrived to effect by ſtratagem; he made his eſcape from Rome with the aſſiſtance of Polybius the hiſtorian, and landed in Syria. He was acknowledged as ſovereign, and ſecured his crown by the death of Eupator, who fell into his hands. He freed the Babylonians from the tyrannical rule of two brothers, whom Antiochus had placed over them, on which account he was entitled *Soter*, or Saviour. He ſent his armies againſt the Jews, in order to make Alcimus high-prieſt, and in this conteſt Judas Maccabæus loſt his life. By his own conduct he united againſt him the kings of Cappadocia, Pergamus, and Egypt; in battle he was at firſt ſucceſsful, but his want of prudence rendered him obnoxious to his own ſubjects, who deſerted him in the hour of danger, and he loſt his life in battle, in the year B. C. 150.

Demetrius II. ſurnamed *Nicanor*, the ſon of the preceding, was placed on his father's throne by Ptolemy Philometor, king of Egypt, whoſe daughter Cleopatra he married. No ſooner had he obtained the quiet poſſeſſion of the crown, than he abandoned himſelf to every kind of diſſipation and licentiouſneſs, and left the management of his affairs to flatterers and paraſites. He afterwards formed an alliance with the Jews, and marched to the Eaſt, where he was taken priſoner by the king of Parthia, who beſtowed his daughter upon him in marriage, which ſo enraged Cleopatra, his former wife, that ſhe married her brother-in-law, who laid claim to, and obtained the throne for himſelf. Shortly after he fell in battle, when Demetrius recovered the kingdom of Syria. By the wickedneſs and cruelty of his conduct, he became univerſally hated, was driven from his throne, and at laſt put to death, by command of his wife Cleopatra, at Tyre, whither he had fled for refuge and ſafety. Univer. Hiſt.

Demetrius Phalereus, a philoſopher of the peripatetic ſect, and diſciple of Theophraſtus. About the year 317 B. C. he was appointed by Caſſander, king of Macedon, to the government of Athens, which he conducted for ten years with ſo much wiſdom and moderation, that he is ſaid to have obtained the honour of 360 brazen ſtatues, erected in remembrance of his juſtice and of the improvements introduced by him into the finances, and the public buildings with which he had ornamented the city. He afterwards fell into diſgrace, and his life being in imminent danger, he fled to the court of Ptolemy Soter, king of Egypt, who received him with marked reſpect; but diſapproving the advice he gave him, with reſpect to the choice of a ſucceſſor, the young prince, Philadelphus, retained a fixed enmity againſt him; ſo that upon the death of this king, Demetrius was baniſhed to a diſtant province, where he loſt his life by the bite of an aſp. He died about the year 284. Some have ſaid, without ſufficient authority, that he was librarian to Ptolemy Philadelphus, and that by his advice this prince gave orders for a verſion of the Jewiſh Scriptures from the Hebrew into the Greek language. He was author of a vaſt number of books in proſe and verſe, on philoſophy, hiſtory, politics, criticiſm, and rhetoric, but time has deſtroyed them all. The elegant piece, "De Interpretatione," which ſome have aſcribed to him, is probably a work of later date.

Demetrius Phalereus lived at a period ſucceeding that of Demoſthenes, when Greece loſt her liberty and eloquence, and of courſe languiſhing, relapſed again into the feeble manner introduced by the Rhetoricians and Sophiſts. However, he attained ſome character; but he is repreſented as a flowery, rather than a perſuaſive ſpeaker, who aimed at grace rather than ſubſtance. "Delectabat Athenienſes," ſays Cicero, "magis quam inflammabat." "He amuſed the Athenians, rather than warmed them." After his time we hear of no more Grecian orators of any note. Diogenes Laertius, lib. v. Brucker's Hiſt. Phil. by Enfield, vol. i.

Demetrius, a Cynic philoſopher, who flouriſhed at Corinth in the firſt century. During the reign of Caligula, he taught philoſophy at Rome, where he obtained the higheſt reputation for wiſdom and virtue. When Nero ſucceeded to the crown, Demetrius was baniſhed for his inflexible integrity and zeal in reproving the manners of the age. At his death he was recalled, but was again baniſhed for the boldneſs of his language. A high teſtimony to the character of Demetrius is given by Seneca, who ſays, "leaving the nobles clad in purple, I converſe with, and admire the half-naked Demetrius; and why do I admire him, but becauſe I perceive, that in the midſt of his poverty he wants nothing! When I hear this excellent man diſcourſing from his couch of ſtraw, I perceive in him, not a preceptor only, but a witneſs of the truth, and I cannot doubt, that Providence has endowed him with ſuch virtues and talents, that he might be an example, and a monitor of the preſent age." Moreri. Brucker's Hiſt. of Phil. by Enfield.

DEMEU, in *Geography*, a ſmall town of France, in the department of the Gers; ſix miles W. of Vic ſur Loſſe.

DEMI, in *French Muſic*, is equal to ſemi in the Engliſh, and in compoſition of the ſame import as ſemi, Lat. implying half any quantity or ſubſtance. Demi-god, half-mortal, half-divine.

Semi-quaver, half a quaver, in muſic. Demi-ſemi-quaver, half a ſemi quaver, a note in muſic with a black head, and three hooks, or three ties to the tails. Demi or ſemi is half the ſubſequent word.

Demi, or Demy, in *Heraldry*, ſignifies the half of a thing; as, a demy lion, &c.

Colombiere has what he calls croix & demy, a croſs and a half; being a ſhaft croſſed in the upper part like the Calvary croſs, and having but one arm at the lower part.

Demi-Air, or Demi-Volt, in *Horſemanſhip*, is one of the ſeven artificial motions of a horſe; being an air, in which his fore-parts are more raiſed than in terra à terra: but the motion of the horſe's legs is more quick in the latter than in the demi-volt.

DEMIANKA, in *Geography*, a river of Ruſſia, which runs into the Irtiſch, near Demianſkoi.

DEMIANSKOI, a town of Ruſſia, in the government of Tobolſk, ſituated at the conflux of the Demianka and Irtiſch, 100 miles N.N.E. of Tobolſk. N. lat. 59° 35′. E. long. 69° 22′.

Demi-Bastion, ſhould literally imply "half a baſtion," but ſuch would be a very weak defence, on account of the extreme acuteneſs of the angle preſented exteriorly at the point of diviſion; which would, if mathematically done, be effected by a line drawn from the centre of the polygon to the flanked angle, along the capital of the baſtion. To remedy this, the gorge is extended ſo as rather to exceed, than to be under, the meaſurement of the greateſt diameter; ſome make the gorge equal to the length of the face, by which means the new face, or capital, becomes an *acute*, inſtead of an *obtuſe* angle therewith.

Demi-baſtions are chiefly found in *horn-works*, and *crown-works*, and in the various junctions of faces, appertaining to regular fronts, with redans, and other irregular portions; eſpecially where they break off from the defence of land ſides, to the defence of rivers, &c. By this means the inland defences are preſerved in ſyſtematic order; while due advantage is taken of the form or height of a bank, &c. See Fortification.

Demi Cannon, a piece of ordnance, uſually about ſix inches bore, 5400 pounds weight, ten or eleven feet long, and carrying a ſhot of 30 or 32 pound weight.

It carries point-blank 150 paces; its charge of powder is 14 pound weight.

There are alſo two ſizes of demi-cannon above this, which are ſomething larger; as, the ordinary demi-cannon, which is ſix inches $\frac{1}{6}$ bore, twelve feet long, weighing 5600 pounds; its charge of powder 17 pounds 8 ounces; it carries a ſhot ſix inches and a half diameter, whoſe weight is 32 pounds: this piece ſhoots point-blank 162 paces.

Demi-cannon of the largeſt ſize, is 6 inches $\frac{6}{8}$ bore, twelve feet long, 6000 pounds weight; its charge is 18 pounds of powder, and it carries 180 paces. See Cannon, and Ordnance.

Demi-Cross, an inſtrument uſed by the Dutch to take the ſun's altitude, or that of a ſtar, at ſea; but inſtead of which we uſe the croſs-ſtaff or fore-ſtaff. See *Plate* V. *Aſtronomy, fig.* 46.

The ſtaff, A G, is graduated eaſily, being only a line of whole tangents, whoſe radius is E B, the length of the croſs-piece, or tranſom. It hath three vanes; a horizontal vane, as A; a ſight vane, as H; and the ſhade vane, as E.

When the vanes are on the ſtaff and croſs-piece, to take the ſun's altitude, hold the inſtrument with the tranſom as upright as you can, and looking through the ſight vane, as H, look for the horizon through the ſlit in the horizon vane, and then ſlide the croſs-piece or tranſom to and fro, till you make the ſhade of the vane at E to fall at the ſame time upon the ſlit of the horizon vane, and alſo at A; then are the degrees cut on the ſtaff, by the edge of the croſs-piece, the ſun's altitude required. But to take the height of a ſtar, you muſt remove the horizon vane, A, and put it on the end G, and transfer the ſight vane H to A; then holding up the inſtrument as before, looking through the ſight vane, ſee for the horizon through the horizon vane, and for the ſtar by the ſhade vane, ſliding the tranſom to and fro, till the horizon and ſtar are both ſeen by their reſpective vanes, and then the tranſom will cut the degrees of the ſtar's altitude on the ſtaff, allowing about eight or ten minutes for your height above the level of the water, as muſt be done in all ſuch caſes.

Demi-Culverin, is a piece of ordnance commonly $4\frac{1}{2}$ inches bore, ten feet long, 2700 pounds weight; its charge is 7 pounds 4 ounces of powder; and it carries a ſhot of 10 pounds 11 ounces, and ſhoots point-blank 175 paces.

Demi-culverin of the leaſt ſize, is $4\frac{1}{4}$ inches bore, ten feet long, 2000 pounds weight; it carries a ball of 4 inches diameter, its charge is 6 pounds 4 ounces of powder, and its level range is 174 paces.

Demi-culverin of the largeſt ſort, is 4 inches $\frac{6}{8}$ bore, ten ſeet long; its charge of powder is 8 pounds and 8 ounces; the ball is $4\frac{1}{2}$ inches diameter, weighs 12 pounds 11 ounces; and the point-blank ſhoots 178 paces. See Cannon and Ordnance.

Demi-Ditone, in *Muſic*, is uſed by ſome for a third minor.

Demi Gods, in *Mythology*, thoſe fabulous beings that were ſuppoſed to be produced by the connexion of gods with women, or of goddeſſes with men; of theſe there was a prodigious number, whoſe temples were diffuſed over the whole earth, and whoſe worſhip, though leſs ſolemn than that of the gods, formed a conſiderable part of the Pagan religion. See Genii, God, Heroes, Idolatry, and Theogony.

Demi-Gorge of a baſtion, is the half of the *gorge*, or neck of the baſtion, meaſured in a right line from the ends of the two curtains, or faces, between which the baſtion is ſituated. Where the mean and great ſyſtems of fortification are blended, the baſtions connecting the faces, which appertain to thoſe ſyſtems reſpectively, will be unequal in regard to the general proportions of their two ſides, and the gorge will be divided into two unequal parts by its capital; which paſſes in a right line from the flanked angle to the centre of the polygon; and where the polygon is drawn upon an ellipſis, or oval, and the defences are derived from two or more centres, the capital of each demi-baſtion will lead to a diſtinct point, *i. e.* the centre of its own derivation, and there will be found a ſpace between the two capitals, excluſive of two unequal demi-gorges. This, however, rarely occurs, and, when it does, is more a nominal than an eſſential difference; it being uſual to conſider a mean difference between the two, as the centre of the gorge, and to ſuppoſe the demi-gorges to meet at that point. See Fortification.

Demi-Haque. See Harquebuss.

Demi-Lune, is a defence uſually attached exteriorly to the poſterns of a raveline: they were formerly made of a creſcent form, whence their name; but the modern ſyſtem explodes all circular defences, except in the more petty claſs, ſuch as redoubts, block-houſes, cavaliers, &c. The demi-lune is now generally called the *lunette*; it is in general uſe, but is always made with a flanked angle, and not circular. See Fortification.

Demi-Quian, in *Geography*, a river, ſwamp, and lake, on the

the weſtern ſide of Illinois river in the N. W. territory. The river runs a S.S.E. courſe, is navigable 120 miles, and has the ſwamp of the ſame name on the northern bank near its mouth; which laſt is 50 yards wide, 32 miles above Sagamond, and 165 miles above the Miſſiſippi. The lake is of a circular form, 200 yards W. of the river, is 6 miles acroſs, and diſcharges itſelf into the Illinois by a ſmall paſſage four feet deep, 175 miles from the Miſſiſippi.

DEMIR-Capi, a town of Aſiatic Turkey, in the province of Natolia; 20 miles S.E. of Balikeſri.

DEMISE, in *Law*, is applied to an eſtate either in fee-ſimple, fee-tail, or for term of life, or years; and ſo it is commonly taken in many writs. It is alſo uſed for any eſtate. (2 Inſt. 483.)

The king's death is, in law, termed the demiſe of the king, to his royal ſucceſſor, of his crown and dignity.

Demise *of the king*, or *of the crown*, *demiſſio regis vel coronæ*, an expreſſion uſed for the natural diſſolution of the king, becauſe the law is tender of ſuppoſing even the poſſibility of his death, and which ſignifies merely a transfer of property, for the king never dies. (See King.) Plowden obſerves, (177, 234.) that when we ſay the demiſe of the crown, we mean only that in conſequence of the diſunion of the king's natural body from his body politic, the kingdom is transferred or demiſed to his ſucceſſor; and ſo the royal dignity remains perpetual. The demiſe of the king does not diſcontinue any writ or proceſs. Vide ſtat. 1 Ed. VI. cap. 7. ſect. 1, 2, 3.

Nor does it determine any commiſſion civil or military, or great office of ſtate, but they ſhall continue in force for ſix months after the ſovereign's demiſe, unleſs made void by the next ſucceſſor. Stat. 7 and 8 Will. III. cap. 27. ſect. 21. 1 Ann. ſtat. 1. cap. 8. 6 Ann. cap. 7. ſect. 8.

Neither is a parliament thereby determined till after ſix months. 7 & 8 Will. III. cap. 15.

Nor is a defendant, who hath pleaded to an information, obliged to plead to it again. But he may plead again upon requeſt made to the court, within five months after the demiſe. 4 & 5 Will. & Mar. cap. 18. ſect. 7.

Demise, and *Redemiſe*, denote a conveyance where there are mutual leaſes made from one to another of the ſame land, or ſomething out of it.

Demi-*Vills*. See Vill.

DEMIURGE, Δημιεργος, from δημιος, which denotes a *public ſervant*, and εργον, *work*, in the *Mythology of the Eaſtern Philoſophers*, was one of the Æons, employed by the ſupreme Deity in the creation of the world. The character they give him is a compound of ſhining qualities, and inſupportable arrogance; and his exceſſive luſt of empire effaces his talents and virtues. He is repreſented as claiming dominion over the new world he has formed, as his ſovereign right; and, excluding totally the ſupreme Deity from all concernment in it, he demands from mankind, for himſelf and his aſſociates, divine honours.

DEMM, in *Geography*, a town of Arabia, in the country of Yemen; 20 miles S.S.W. of Chamir.

DEMMIN, anciently called *Timin*, *Dymin*, *Demyn*, or *Dimmin*, a ſmall town of Pruſſia, in Pomerania, on the river Peene at the confluence of two lakes, the Trebel and the Tollen, with a good corn trade. It is one of the oldeſt towns in Pomerania, and greatly decayed. Several ſkirmiſhes took place in its neighbourhood between the Swedes and French in the autumn of the year 1807. It is only 36 miles S. of Stralſund.

DEMOCEDES, in *Biography*, the ſon of Calliphon of Croton, a city in Italy, acquired great fame for his ſkill in medicine and ſurgery, and ſettling at Ægina, whither he went to eſcape the tyranny of his father, he received from the city a ſalary of a talent annually. At Athens, to which place he was invited, he was engaged on a ſtipend of 100 minæ, and from Polycrates, the tyrant of Samos, to whom he was afterwards attached, he received annually two talents. From this ſtate of affluence and conſideration, he fell into the deepeſt diſtreſs. Polycrates being treacherouſly murdered by Orætes, and Orætes in his turn, killed by order of Darius Hyſtaſpis the king of Perſia, Democedes, with the reſt of the houſehold of the tyrant, were conveyed to Suſa, loaded with chains, and thrown into a dungeon. But Darius having diſlocated his ankle, and obtaining no relief from his ſurgeon, commanded Democedes to be releaſed, and to be brought before him. Under his care, the king was ſoon relieved from his pain, and the other conſequences of the accident. This brought him into great favour, which was further increaſed by his curing an ulcer in the breaſt, with which Atoſſa, the daughter of Cyrus, was afflicted. He was now lodged in a magnificent houſe, admitted to the table, and to the moſt intimate familiarity with the king, and loaded with preſents. In this ſtate he is ſaid to have employed his intereſt in procuring the pardon of his brethren, who had failed in relieving the king, who were to have been impaled. That he ſhould wiſh to eſcape from a country where favour was accorded, rather to his ſucceſs than to his ſkill, where he had ſuffered ſo much, and where he was ſtill a priſoner, will excite no ſurpriſe; accordingly his thoughts were turned in deviſing means by which he might get to his own country, which at length he effected. For pretending to enter into the views and intereſts of the Perſians, he procured himſelf to be ſent with ſome of the nobles, to explore the coaſt of Greece, and diſcover in what parts it might be attacked with the greateſt probability of ſucceſs. Stopping at Tarentum, the Perſians were ſeized as ſpies, but Democedes eſcaped to Croton, whither the Perſians, on being liberated, followed him, and demanded that he ſhould be given up to them, and on the Crotonians refuſing, they threatened them with the vengeance of the king. Democedes is ſaid to have married a daughter of the famed Milo, who was alſo a native of Croton, and to have continued there the remainder of his days. General Biography.

DEMOCRACY, formed of the Greek δημος, *people*, and κρατειν, *to command, govern*, a form of government, or conſtitution of a ſtate, by virtue of which the ſovereignty, or ſupreme authority, is lodged in the people, who exerciſe the ſame by perſons of their own order, deputed for that purpoſe. In a democracy, therefore, the people are in ſome reſpects the ſovereign, and in others the ſubject. In this kind of government, the people in whom the ſupreme power reſides, ought to do of themſelves whatever they conveniently can; and what they cannot well do, they muſt commit to the management of miniſters; but it is a fundamental maxim in a democracy, that the people ſhould chuſe their miniſters, that is, their magiſtrates, whether the election be made by themſelves, as at Athens, or by ſome magiſtrate deputed for that purpoſe, as was cuſtomary at Rome upon certain occaſions. The people, ſays Monteſquieu (Sp. of Laws, vol. i. p. 13.) are extremely well qualified for chuſing thoſe, whom they are to intruſt with part of their authority. They can tell when a perſon has been often in battle, and has had particular ſucceſs; they are therefore very capable of electing a general. They can tell when a judge is aſſiduous in his office, when he gives general ſatisfaction, and has never been charged with bribery; this is ſufficient for chuſing a prætor. They are ſtruck with the magnificence or riches of a fellow-citizen: this is as much as is requiſite for electing an ædile. But are

the

the people able to manage an affair, to find out and to make a proper uſe of places, occaſions, moments? No; this is beyond their capacity. Should we doubt of the people's natural ability in reſpect to the diſcernment of merit, we need only caſt our eyes on the continual ſeries of ſurpriſing elections made by the Athenians and Romans; which no one will ſurely attribute to hazard. As moſt citizens, though they have a capacity of chuſing, are not, however, ſufficiently qualified to be choſen; ſo the common people, though capable of calling others to an account for their adminiſtration, are incapable of the adminiſtration themſelves. The public buſineſs muſt, however, be carried on, with a certain motion neither too quick nor too ſlow. But the action of the common people is always either too remiſs or too violent. In a popular ſtate the inhabitants are divided into certain claſſes. In the manner of making this diviſion great legiſlators have ſignalized themſelves; and on this the duration and proſperity of democracy have always depended. As the diviſion of thoſe who have a right of ſuffrage is a fundamental law in a republic; ſo the manner of giving this ſuffrage is another fundamental law. The ſuffrage by lot is natural to democracy; as that by choice is to ariſtocracy. The former is a method of electing that offends no one; it allows each citizen to entertain reaſonable hopes of ſerving his country; but as this method is naturally defective, it has been the glorious endeavour of the moſt eminent legiſlators to regulate and amend it. The law which determines the manner of giving the ſuffrages is likewiſe fundamental in a democracy. The people's ſuffrages ought, without doubt, ſays Monteſquieu, to be public; and this ſhould be conſidered as a fundamental law of democracy. The lower ſort of people ought to be directed by thoſe of higher rank, and reſtrained within bounds by the gravity of certain perſonages. Hence by rendering the ſuffrages ſecret in the Roman republic all was loſt: it was no longer poſſible to direct a populace that ſought its own deſtruction. It is likewiſe a fundamental law in democracies, that the people ſhould have the ſole power to enact laws; and yet there are a thouſand occaſions in which it is neceſſary the ſenate ſhould have a power of decreeing; and it is often proper to make ſome trial of a law before it is eſtabliſhed. In this reſpect the conſtitutions of Rome and Athens were extremely wiſe. The decrees of the ſenate had the force of laws for the ſpace of a year, and did not become perpetual till they were ratified by the conſent of the people.

The principle of democracy is virtue. When Sylla wanted to reſtore Rome to its liberty, this unhappy city was incapable of receiving it. She had only ſome feeble remains of virtue, and as this was every day diminiſhing, inſtead of being rouſed out of her lethargy, by Cæſar, Tiberius, Caius, Claudius, Nero, Domitian, ſhe every day rivetted her chains; the blows ſhe ſtruck were levelled againſt the tyrants, but not at the tyranny. The politic Greeks, who lived under a popular government, knew no other ſupport but virtue. The modern inhabitants of that country are entirely taken up with manufactures, commerce, finances, riches, and luxury. The principle of democracy is corrupted, not only when the ſpirit of equality is extinct, but likewiſe when they indulge a ſpirit of extreme equality, and when every citizen wants to be upon a level with thoſe he has choſen to command him. Thus the people, incapable of bearing the very power they have intruſted, want to do every thing of themſelves, to debate for the ſenate, to execute for the magiſtrate, and to ſtrip the judges. When this is the caſe, virtue can no longer ſubſiſt in the republic. Democracy has, therefore, two exceſſes to avoid; the ſpirit of inequality, which leads to ariſtocracy or monarchy; and the ſpirit of extreme equality, which leads to deſpotic power, as the latter is compleated by conqueſt. As diſtant as heaven is from earth, ſo is the true ſpirit of equality from that of extreme equality. The former does not conſiſt in managing; ſo that every body ſhould command, or that no one ſhould be commanded; but in obeying and commanding our equals. It endeavours not to be without a maſter, but that its maſters ſhould be none but its equals. In the ſtate of nature, indeed, all men are born equal; but they cannot continue in this equality. Society makes them loſe it, and they recover it only by means of the laws. Such is the difference between a well and an ill policed democracy, that in the former men are equal only as citizens, but in the latter they are equal alſo as magiſtrates, ſenators, judges, fathers, huſbands, maſters. The natural place of virtue is near to liberty; but it is not nearer to extreme liberty than to ſervitude.

The moſt flouriſhing democracies in eminent times were thoſe of Rome and Athens, and in latter days, the republic of Geneva in Switzerland: the modern republics, as Venice, and the United Provinces, were rather ariſtocracies than democracies.

In a democracy, where the right of making laws reſides in the people at large, public virtue, or goodneſs of intention, is more likely to be found than either of the other qualities of government; and therefore it uſually poſſeſſes a conſiderable degree of patriotiſm and public ſpirit. Democracies are uſually the beſt calculated to direct the end of a law; ariſtocracies to invent the means by which that end ſhall be obtained; and monarchies to carry thoſe means into execution. See REPUBLIC.

DEMOCRAT, in *Geography*, a town of Egypt; 20 miles N. of Aſna.

DEMOCRITUS, in *Biography*, a celebrated philoſopher of the Eleatic ſect, was born at Abdera, a town of Thrace, in the firſt year of the 80th Olympiad, B. C. 460, and was contemporary with Socrates, Anaxagoras, Archelaus, Parmenides, Zeno, and Protagoras. His father was a perſon of rank and opulence, and is ſaid to have contributed liberally towards the entertainment of the army of Xerxes, on his return to Aſia, in recompence of which ſervice the Perſian king made the Abderites rich preſents, and left among them ſeveral Chaldæan magi. By theſe magi Democritus was inſtructed in aſtronomy and theology. Upon his father's death, he received the portion of 100 talents bequeathed him, and thus amply provided with money, he travelled into diſtant countries in purſuit of knowledge; firſt viſiting Egypt for the purpoſe of learning geometry of the Egyptian prieſts; then directing his courſe to Ethiopia, in order to converſe with the gymnoſophiſts of that country; and from thence he paſſed over into Aſia, where he reſided for ſome time among the Perſian magi, and, as ſome have ſaid, his curioſity led him into India. He was alſo inſtructed in the doctrines of the Pythagorean ſchool, and became a diſciple of Leucippus. His reſources were completely exhauſted in his travels, and returning deſtitute to his native place, he was amply ſupplied by his brother Damaſis. As it was a law at Abdera, that any perſon, who waſted his patrimony, ſhould be deprived of the rites of ſepulture, Democritus, dreading this diſgrace, enriched himſelf by delivering lectures to the people, out of one of the moſt valuable of his writings, entitled "Deacoſmus," ſo that he had no apprehenſion of ſuffering cenſure as a ſpendthrift. Beſides money, he acquired great fame, and excited much admiration among the ignorant Abderites. Of his knowledge of natural philoſophy, he artfully availed himſelf for predicting unexpected changes in the weather, ſo that his fellow-citizens conceived that he

poſſeſſed the faculty of predicting future events; and thus deluded they diſtinguiſhed him by the appellation of "Wiſdom," regarded him as a being more than mortal, and entruſted him with the direction of their public affairs. Preferring, however, a contemplative and ſtudious to a political and active life, he declined the public honours aſſigned him, and ſpent the reſidue of his days in ſolitude. Many marvellous tales are related concerning him during his retreat from the world; but as they are fabulous, it is needleſs to recite them. We may, nevertheleſs, deduce this inference from them, that Democritus was a man of ſublime genius and penetrating judgment; who, by much obſervation and ſtudy, and long experience, became an eminent maſter of ſpeculative and phyſical ſcience; and, like Roger Bacon at a later period, he aſtoniſhed and impoſed upon his ignorant and credulous countrymen.

Democritus has been commonly known under the appellation of the "Laughing Philoſopher;" and Seneca relates, that whenever he appeared in public, he expreſſed his contempt of the follies of mankind by laughter. But this is one of thoſe numerous tales, the truth of which is contradicted by his love of ſolitude and contemplation, and by his known character for that ſtrength and elevation of mind, which his philoſophical reſearches required. It is not improbable, however, that a man, ſo ſuperior to his ſtupid countrymen, might frequently treat their follies with ridicule and contempt. Hence, among his fellow-citizens, he obtained the appellation of γελασινος, or the "Derider." In his manners Democritus was chaſte and temperate, and his ſobriety was recompenſed by continued health and vigour in very advanced age. He is ſaid to have lived to the year B. C. 361, and to have died in his 99th year by mere decay. His death was much lamented by his countrymen, and the charge of his funeral was defrayed out of the public treaſury. He wrote much, but none of his works are extant. Diogenes Laertius has given a long catalogue of his works on natural and moral philoſophy, criticiſm, and polite literature.

Concerning truth, Democritus taught, that there are two kinds of knowledge, one obſcure, derived from the ſenſes, and another genuine, obtained by the exerciſe of thought upon the nature of things. This latter mode of acquiring certain knowledge he confeſſed to be very difficult; and, therefore, he uſed to ſay, that truth lay in a deep well, from which it is the office of reaſon to draw it up. Concerning phyſics, it was the doctrine of this philoſopher, that nothing can ever be produced from that which has no exiſtence, and that any thing which exiſts can never be annihilated. Whatever exiſts muſt conſequently owe its being to neceſſary and ſelf-exiſtent principles, of which he conceived there were two; *viz.* atoms, and a vacuum, both infinite, the former in number, the latter in magnitude. Atoms are ſolid, and the only beings; vacuum, or entire ſpace, can neither be ſaid to be exiſtent nor non-exiſtent, being neither corporeal nor incorporeal. Atoms have the property of figure, magnitude, motion, and weight, being heavy in proportion to their bulk. They are various in figure and in magnitude; and are perfectly ſolid, indiviſible, and unalterable. Theſe atoms have been eternally moving in infinite vacuum or ſpace, in a direction perpetually deviating from a right line; and thus colliſions are produced, which occaſion innumerable combinations of particles, from which ariſes the various form of things that exiſt. Theſe primary corpuſcles are moved and united by that natural neceſſity, which is the only fate that creates and governs the world. The ſyſtem of nature is one, conſiſting of parts, differing in their figure, order, and ſituation. The production of an organized body is occaſioned by the ſuitable arrangement of atoms, adapted in their nature to form that body; if it be diverſified, alteration takes place; if it be entirely deſtroyed, diſſolution. The qualities of bodies are not eſſential to their nature, but the caſual effect of arrangement; and this occaſions the different impreſſions which they make upon the ſenſes. In infinite ſpace there are innumerable worlds, ſome ſimilar, others diſſimilar; but all ſubject to growth, decay, and deſtruction. The world has no animating principle, but all things are moved by the rapid agitation of atoms. The ſun and moon are compoſed of light particles, revolving about a common centre. The heavenly bodies are arranged in the following order; firſt, the fixed ſtars, then the planets, then the ſun, then the moon: all move from eaſt to weſt, and thoſe which are neareſt revolve with the leaſt velocity; ſo that the ſun, the inferior planets, and the moon, move more ſlowly than the reſt.

A comet is a combination of planets, which approaching near each other, appear as one body. The earth at firſt was ſo ſmall and light, as to wander about in the regions of ſpace; but at length increaſing in denſity, it became immoveable. The ſea is continually decreaſing, and will at length be dried up. Man was at firſt produced from water and earth. Our knowledge of his exiſtence ariſes from conſciouſneſs. The ſoul, or principle of animal life and motion, is the reſult of a combination of round or fiery particles, conſiſting of two parts, one ſeated in the breaſt, which is the rational, the other diffuſed through the whole body, which is the irrational. The ſoul periſhes with the body; but human bodies, though they periſh, will revive. Different animal beings poſſeſs different ſenſes. Perception is produced by εἴδωλα, images, which flow from bodies according to their reſpective figures, and ſtrike upon the organ of ſenſe.

The fundamental difference between the doctrine of Democritus, and that of former philoſophers, concerning atoms, is, that the latter conceived ſmall particles endued with various qualities; whereas this philoſopher conceived the qualities of bodies to be, as we have already ſaid, the mere effect of arrangement. Democritus, in his whole ſyſtem, pays no regard to an external efficient cauſe, but abſurdly ſuppoſes, that the intrinſic neceſſity, which gives motion to atoms, is *alone* ſufficient to account for the phenomena of nature. Whatever he is ſaid to have taught concerning nature, fate, or providence, he merely aſſerted, that the fire, which reſulted from the combination of certain ſubtle atoms, and which has been called the ſoul of the world, is a mechanical agent in nature, cauſing by its rapid motion the changes which take place in the univerſe. Plutarch ſays, that Democritus conſidered the ſun and moon as ignited plates of ſtone; but this is not conſiſtent with his general ſyſtem, and with his knowledge of nature. The belief of the materiality of the ſoul was the natural reſult of the atomic ſyſtem; for if the ſoul be a mere compoſition of atoms, when theſe are diſperſed, it muſt periſh. As to the reviviſcence of human bodies, he can only be ſuppoſed to mean, that the atoms compoſing any human ſoul, would, after their diſperſion, coaleſce again, in ſome diſtant period, and recover their former life. The term εἴδωλον, or image, ſeems to have had, in his uſe of it, two different ſignifications: it denoted thoſe images which he ſuppoſed to flow from external objects, and ſtriking upon the ſenſes, excite ideas in the mind, and alſo, thoſe divine beings that exiſted in the air, and which he called gods. Although Democritus rejected the notion of Deity, and allowed him no ſhare in the creation or government of the world, he endeavoured to conceal his impiety, by admitting the popular belief of divinities inhabiting the aerial

nerial regions, and teaching that they make themſelves viſible to ſome favoured mortals, and enable them to predict future events.

The moral doctrine of Democritus, like that of Epicurus, makes the enjoyment of a tranquil ſtate of mind, εὐθυμία, the great end of life, and conſequently teaches moderation as the firſt law of wiſdom. Moreover, he maintained that there is nothing naturally becoming or baſe in human actions, but that every diſtinction of this nature ariſes from cuſtom or civil inſtitutions, and that laws are framed to reſtrain the natural propenſity of mankind to injure one another; in this latter reſpect his opinion ſeems to have coincided with the more modern doctrine of Hobbes.

We cannot forbear, before cloſing this article, to ſubjoin ſome valuable maxims of practical judgment and conduct, aſcribed to Democritus.

"He who ſubdues his paſſions is more heroic than he who vanquiſhes an enemy; yet there are men who, whilſt they command nations, are ſlaves to pleaſure. It is criminal, not only to do miſchief, but to wiſh it. He who enjoys what he has, without regretting the want of what he has not, is a happy man. The ſweeteſt things become the moſt bitter by exceſs. Do nothing ſhameful though you are alone; revere yourſelf more than all other men. A man muſt either be good or ſeem to be ſo. Every country is open to a wiſe man, for he is a citizen of the world. It is better for fools to be governed than to govern. Rulers are choſen, not to do ill, but good. By deſiring little, a poor man makes himſelf rich. A cheerful man is happy, though he poſſeſſes little; a fretful man is unhappy in the midſt of affluence. One great difference between a wiſe man and a fool is, that the former only wiſhes for what he may poſſibly obtain, the latter deſires impoſſibilities. It is the office of prudence, where it is poſſible, to prevent injuries; but where this cannot be done, a wiſe regard to our own tranquillity will preſerve us from revenging them." Diog. Laert. l. i. ix. Stob. Serm. Suidas. Sext. Emp. Plutarch. Bayle. Moreri. Brucker's Hiſt. Phil. by Enfield, vol. i. See Atomical *Philoſophy*.

Democritus, a Greek writer on muſic, of which nothing remains but the name.

DEMODOCUS, an ancient Greek bard; whoſe character Homer, as a poet, in the 7th book of the Odyſſey, exalts to the ſummit of human excellence.

DEMOGORGON, in *Mythology*, the chief of the terreſtrial divinities, as its name, derived from Δαίμων and γοργων, imports. Boccace, in his genealogy of the gods (l. 1.) repreſents him as a ſlovenly old man, overſpread with filth, pale, and diſfigured, who had his dwelling in the heart of the earth. His companions were Eternity and Chaos: growing weary, it is ſaid, of this diſmal ſolitude, he made a little bowl to ſit upon, and having raiſed himſelf into the air, encompaſſed the earth, and ſo formed the heavens. Having accidentally paſſed over the Acroceraunian mountains, he fetched from thence the burning matter, which he ſent to heaven to enlighten the world, and thus formed the ſun, which he gave in marriage to the earth; from which marriage proceeded Tartarus, the Night, &c. Demogorgon is reported to have ſeveral children, of whom the firſt was "jarring Diſcord," ſevered from the bowels of Chaos, and raiſed from the bottom of the earth to dwell upon the ſurface; Pan, his ſecond ſon, and the three Parcæ, *viz.* Clotho, Lacheſis, and Atropos, Heaven, Pitho, and the Earth, who was his eighth child. The Earth had afterwards ſeveral children, whoſe father was not known, ſuch as Night, Tartarus, Pharca, Tages, and Antæus. The ninth of Demogorgon's children was Erebus, who had a numerous offſpring. Theſe fables are ſuppoſed to allude in a myſterious manner to the creation of the world, the knowledge of which had been acquired from ſome imperfect tradition. The Arcadians, as Bauier ſuggeſts, (Mythology, &c. vol. ii. p. 550.), ſeeing that the earth of itſelf produced flowers and fruits, fountains, ſtreams, and rivers, that it frequently emitted fire and flames, and that it was liable to convulſions, imagined that ſhe was animated, and gave the name of Demogorgon to the divinity that preſided over her. The philoſophers, it is probable, meant no more by this divinity than that vegetative principle which gives life to the plants, deſcribed by Virgil, (Georg. l. ii.)

> "Spiritus intus alit, totamque infuſa per artus
> Mens agitat molem."

The vulgar fancied there was a real god, who reſided in the bowels of the earth, to whom they offered ſacrifices, eſpecially in Arcadia. Some authors, however, have imagined, that Demogorgon had been a magician, ſo ſkilful in his art, that he had ghoſts and aerial ſpirits under his command, whom he abſolutely ſubjected to his will, ſeverely puniſhing ſuch as did not execute his orders.

DEMOISELLE, the *dancing-bird*, in *Ornithology*, a long-legged and long-necked bird of the *Ardea* kind, a native of Numidia. It is remarkable for its jumping or dancing in its walk. It has the ſame kind of plication in the windpipe with the common crane. It is the Ardea *Virgo* of Gmelin, the Numidian crane of Albinus, the demoiſelle of Numidia of Edwards, and the demoiſelle of Latham. It inhabits the eaſtern and weſtern ſhores of Africa, Egypt, Numidia, Tripoli, about the Caſpian and Black ſeas, and the lake Baikal.

Its bill is yellowiſh, greeniſh at the baſe, and red at the vertex; the irides are red, the crown cinereous, the reſt black, as are alſo the neck, throat, breaſt, legs, and wings; the long feathers of the breaſt are pendulous, the creſt white and hanging backwards; the back, vent, tail, abdomen, blueiſh-cinereous.

DEMON. See Dæmon.

DEMONA, *Valley of*, in *Geography*, a diſtrict of the iſland of Sicily, lying to the north-eaſt part of the iſland, neareſt to Italy, about 100 miles long, and 20 broad.

DEMONAX, in *Biography*, a Cynic philoſopher, who flouriſhed during the reign of Adrian. He was a native of Cyprus, and deſcended from a family of wealth and high rank; but preferring a life of philoſophic ſtudy to the employments which his birth and fortune might have commanded, he removed to Athens while he was young, and there ſpent the remainder of his days. In his manners and habits he was, in ſome reſpects, the imitator of Diogenes, and hence he obtained a rank among the Cynics, though he never profeſſed himſelf to be of any ſect. From them all he ſelected what was excellent, and moſt favourable to moral wiſdom; and like Socrates he endeavoured to make philoſophy not a ſpeculative ſcience, but the rule of life and manners. He was virtuous without oſtentation, and was able to reprove vice without acrimony, and with the happieſt effect. So high was his reputation, that the greateſt deference was paid to his opinion in the aſſemblies of the Athenian people. After his death, which was not till he had attained the age of 100, he was honoured with a public funeral, attended with a numerous train of philoſophers, and others who lamented the loſs of ſo eſtimable a character. Moreri. Brucker's Hiſt. Phil. by Enfield.

DEMONIAC. See Dæmoniac.

DEMONIACAL Possession. See Dæmoniacal *Poſſeſſion*.

DEMOIVRE, Abraham, in *Biography*, a celebrated

mathematician, born at Vitri, in France, in the year 1667. At the revocation of the edict of Nantz, in 1685, he determined, with many others, to take ſhelter in England, where he purſued the mathematics with great eagerneſs, having laid the foundation of this knowledge in his own country. His very limited income induced him to give leſſons to private pupils, and alſo to read public lectures on the branches of ſcience in which he was moſt converſant. Sir Iſaac Newton's "Principia" falling in his way, led him to pay particular attention to geometrical inveſtigations, and he ſhortly after became a firſt rate mathematician. He was ſoon aſſociated with the principal philoſophers of his own times, and was elected member of the Royal Society of London, and alſo of the academies of Berlin and Paris. By the former he was fixed on as a fit perſon to decide the famous conteſt between Newton and Leibnitz concerning the invention of fluxions. Towards the cloſe of his life he was conſulted on all queſtions relating to chances, gaming, and annuities, and by his anſwers he chiefly ſubſiſted. He died at London November 1754, at the great age of 87 years. Beſides many important and intereſting papers in ten or twelve volumes of the Philoſophical Tranſactions of London, he publiſhed, 1. "Miſcellanea Analytica de Seriebus et Quadraturis," &c. 2. A 4to volume on the "Doctrine of Chances;" and another volume in 8vo. "On Annuities." This was firſt printed in the year 1724. A few years afterwards, Mr. Thomas Simpſon publiſhed a work on the ſame ſubject, in which he paid ſome handſome compliments to Demoivre, who ſo far from feeling the obligation, paſſed ſeveral ſevere and unmerited cenſures on Mr. Simpſon in a ſecond edition of his own work. Mr. Simpſon replied, and here the controverſy terminated, but by no means to the credit of M. Demoivre, who was conſidered by the philoſophers of that day as having acted in an uncandid and ungracious manner towards a young man of high merit and extraordinary talents.

DEMONIUS LAPIS, in *Natural Hiſtory*, a name given to a ſtone famous among the writers of the middle ages for a number of imaginary virtues, ſuch as rendering people victorious over their enemies, and the like. All the deſcription they have left us of it is, that it was variegated with two colours laid in lines ſo as to repreſent a rainbow. It was probably an agate.

DEMONSTRABLE, a term uſed in the ſchools, to ſignify ſomewhat that may be clearly and evidently proved: thus, it is demonſtrable that the ſide of a ſquare is incommenſurable with the diagonal.

DEMONSTRATION, in *Logic*, a ſyllogiſm in form, containing a clear and irrefragable proof of the truth of a propoſition.

A demonſtration is a convincing argument, the two firſt propoſitions whereof are certain, clear, and evident; whence of neceſſity ariſes an infallible concluſion.

A demonſtration uſually conſiſts of three parts; explication, preparation, and concluſion.

The explication is the laying down of the things ſuppoſed to be given or granted; from which the demonſtration is to be made. The preparation is ſomething to be previouſly done, according to the nature of the demonſtration intended. The concluſion is a propoſition that concludes the thing to be demonſtrated, fully perſuading, and convincing the mind.

The method of demonſtrating things in mathematics is the ſame with that of drawing concluſions from principles in logic. In effect, the demonſtrations of mathematicians are no other than ſeries of enthymemes: every thing is concluded by force of ſyllogiſm, only omitting the premiſes, which either occur of their own accord, or are recollected by means of quotations. To have the demonſtration perfect, the premiſes of the ſyllogiſms ſhould be proved by new ſyllogiſms, till at length you arrive at a ſyllogiſm, wherein the premiſes are either definitions, or identic propoſitions.

Indeed it might be demonſtrated, that there cannot be a genuine demonſtration, *i. e.* ſuch a one as ſhall give full conviction, unleſs the thoughts be directed therein according to the rules of ſyllogiſm. Clavius, it is well known, reſolved the demonſtration of the firſt propoſition of Euclid into ſyllogiſm: Herlinus, and Daſipodius, demonſtrated the whole ſix firſt books of Euclid, and Heniſchus, all arithmetic, in the ſyllogiſtic form.

Yet people, and even mathematicians, uſually imagine, that mathematical demonſtrations are conducted in a manner far remote from the laws of ſyllogiſm; ſo far are they from allowing that thoſe derive all their force and conviction from theſe. But we have men of the firſt rank on our ſide the queſtion. M. Leibnitz, for inſtance, declares that demonſtration to be firm and valid, which is in the form preſcribed by logic; and Dr. Wallis confeſſes, that what is propoſed to be proved in mathematics, is deduced by means of one, or more ſyllogiſms: the great Huygens, too, obobſerves, that paralogiſms frequently happen in mathematics, through want of obſerving the ſyllogiſtic form. See SYLLOGISM.

Problems conſiſt of three parts: a propoſition, reſolution, and demonſtration.

In the propoſition is indicated the thing to be done.

In the reſolution, the ſeveral ſteps are orderly rehearſed, whereby the thing propoſed is performed.

Laſtly, in the demonſtration it is ſhewn, that the things enjoined by the reſolution being done, that which was required in the propoſition is effected. As often, therefore, as a problem is to be demonſtrated, it is converted into a theorem; the reſolution being the hypotheſis, and the propoſition the theſis: for the general tenor of all problems to be demonſtrated is this; that the thing preſcribed in the reſolution being performed, the thing required is done.

The ſchoolmen make two kinds of demonſtration; the one τὸ διοτι, or *propter quod*; wherein an effect is proved by the next cauſe. As when it is proved, that the moon is eclipſed, becauſe the earth is then between the ſun and moon. The ſecond τὸ ὅτι, or *quia*; wherein the cauſe is proved from a remote effect: as when it is proved, that fire is hot, becauſe it burns; or that plants do not breathe, becauſe they are not animals; or that there is a God, from the works of creation. The former is called demonſtration à priori, and the latter demonſtration à poſteriori.

DEMONSTRATION, *Affirmative*, is that which, proceeding by affirmative and evident propoſitions, dependent on each other, ends in the thing to be demonſtrated.

DEMONSTRATION, *Apagogical*. See APAGOGICAL.

DEMONSTRATION, *Geometrical*, is that framed of reaſonings drawn from the elements of geometry.

DEMONSTRATION, *Mechanical*, is that, the reaſonings whereof are drawn from the rules of mechanics.

DEMONSTRATION *à priori*, is that whereby an effect is proved from a cauſe, either a next, or remote one; or a concluſion proved by ſomething previous, whether it be a cauſe, or only an antecedent.

DEMONSTRATION *à poſteriori*, is that whereby either a cauſe is proved from an effect, or a concluſion is proved by ſomething poſterior; whether it be an effect, or only a conſequent.

DEMONSTRATIVE, in *Rhetoric*, one of the genera, or

or kinds, of eloquence; being that which obtains in the compoſing of panegyrics, invectives, gratulatory and funeral orations.

Rhetoric is divided into three kinds; deliberative, demonſtrative, and judiciary. See RHETORIC.

Demonſtrative diſcourſes, conſiſt either in praiſe or diſpraiſe; and theſe reſpect either perſons or things. In praiſing or diſpraiſing perſons, rhetoricians preſcribe two methods. One is, to follow the order, in which every thing happened, that is mentioned in the diſcourſe; and the other is, to reduce what is ſaid under certain general heads, without a ſtrict regard to the order of time. In the proſecution of the firſt method, the diſcourſe may be conveniently divided into three periods; the firſt containing occurrences that preceded the perſon's birth; the ſecond the whole courſe of his life; and the third events ſubſequent to his death. Under the firſt of theſe may be comprehended what is proper to be ſaid concerning his country or family; under the ſecond the qualities of his mind and body, together with his circumſtances in the world; and under the third, the public loſs, and public honours conferred upon the deceaſed. This order of time has been followed by Iſocrates, in his funeral oration upon Evagoras, king of Salamis, and by Pliny, in his panegyric upon the emperor Trajan. This kind of diſcourſe, in which the method is plain and obvious, will require the more agreeable arts to render it intereſting and delightful; but otherwiſe it ſeems rather like an hiſtory than an oration. The other method above ſuggeſted was to reduce the diſcourſe to certain general heads, without regarding the order of time. As if any one in praiſing the elder Cato, ſhould propoſe to do it by ſhewing, that he was a moſt prudent ſenator, an excellent orator, and moſt valiant general; all which commendations are given him by Pliny. (Hiſt. Nat. l. vii. c. 27.) In like manner the character of a good general may be compriſed under four heads; ſkill in military affairs, courage, authority, and ſucceſs; from all which Cicero recommends Pompey; (Pro Leg. Manil. c. 24.) and agreeably to this method Suetonius has written the lives of the firſt twelve Cæſars.

Things, as diſtinguiſhed from *perſons*, comprehend all beings inferior to man; and likewiſe the habits and diſpoſitions of men, either good or bad, when conſidered ſeparately and apart from their ſubjects, as arts and ſciences, virtues and vices; with whatever elſe may be a proper ſubject for praiſe or diſpraiſe. In diſcourſes of this kind, whether of praiſe or diſpraiſe, the orator ſhould well conſider where, and to whom he ſpeaks, and adapt his diſcourſe to his audience. Ward's Oratory, vol. i. lect. 7.

DEMONSTRATIVE, in *Grammar*, is applied to pronouns which ſerve to ſhew, point out, or indicate a thing: as, *this*, *that*, *thoſe*, &c.

They are alſo called definitive, becauſe they define and limit the extent of the common name, or general term, to which they either refer, or are joined.

DEMONSTRATIVE *Evidence*. See DEDUCTIVE, and EVIDENCE.

DEMONT, or DEMONTE, in *Geography*, a town of France, in the department of the Sture, which formerly was a part of Piedmont in Italy, with a caſtle on the river Sture, and a population of 6000 individuals; 12 miles S.W. of Coni. N. lat. 44° 19′. It is the chief place of a canton in the diſtrict of Coni. The canton has 5 communes, and 9249 inhabitants.

DEMOSTHENES, in *Biography*, the moſt celebrated orator of ancient Greece, was the ſon of a reſpectable citizen of Athens, who was the proprietor of large iron-forges, and kept a number of ſlaves manufacturing ſword-blades, and furniture of different kinds, by which he acquired conſiderable wealth; though Juvenal (l iv. ſat. 10.) has unjuſtly degraded his origin. He was born in the fourth year of the 99th olympiad, B.C. 381; and at the age of ſeven years he loſt his father, who left him a patrimony of 14 talents, (about 3150*l.* ſterling.) Being of a feeble conſtitution and delicate health, his fond mother would not allow him to be enured to any laborious exerciſe, and by the unfaithfulneſs of his guardians, he was deprived of the means of procuring thoſe advantages in literary tuition to which his fortune entitled him. In his 17th year he determined to devote himſelf to the bar, his ambition being excited, as ſome ſay, by hearing the public pleadings in an important cauſe; others ſay, that at this age he pleaded his own cauſe, againſt his fraudulent guardians with ſucceſs. However this be, he aſſiduouſly applied to ſtudy the art of declamation; and with this view he frequented the ſchool of Iſæus, either becauſe the terms of Iſocrates were too high for his finances, or perhaps, becauſe he preferred the energy and vehemence of the former to the more mild and gentle eloquence of the latter, whoſe ſchool was at this time the moſt famous at Athens. At the ſame time he was an auditor of Plato, and diligently ſtudied his works; to which circumſtance he was indebted in a great degree for the magnificence of his diction. He laboured, however, under ſeveral natural infirmities and defects, which were likely to impede his progreſs in his profeſſion, and which he was therefore determined to overcome. His voice was weak and ſtammering, his pronunciation indiſtinct, and his geſture ungraceful. In order to ſurmount theſe diſadvantages, he ſhut himſelf up in a cave, that he might ſtudy with leſs diſtraction, and there declaimed, ſo that he could not be heard or diſturbed, and he remained in this ſubterraneous apartment for two or three months at a time. He likewiſe exerciſed his voice on the ſea-ſhore, that he might accuſtom himſelf to a tumultuous aſſembly, and in walking up hill, with pebbles in his mouth, that he might correct a defect in his utterance; he practiſed at home before a mirror, and with a naked ſword over his ſhoulders, and alſo took leſſons of an eminent actor, that he might check and reform an ungraceful motion, to which he was ſubject; and by theſe various means, ſteadily purſued, he not only overcame his defects, but acquired diſtinguiſhed excellence both in elocution and action. He alſo ſuperadded the ſtudy of language and the art of compoſition, without which no outward gracefulneſs of utterance and geſture could have enſured to him that fame, which has been tranſmitted, with his admirable orations, to after-ages. He does not appear to have excelled in extemporaneous ſpeaking, and therefore his orations were ſaid to ſmell of the lamp; nevertheleſs on ſome important occaſions he diſtinguiſhed himſelf without premeditation, or at leaſt previous compoſition. Deſpiſing the affected and florid manner of the rhetoricians of his age, he made Pericles his model, and imitated his manly and forcible eloquence, ſo that ſtrength and vehemence are the principal characteriſtics of his ſtyle. In his addreſſes to the people he aſſumes the tone of a man of virtue and patriotiſm, and whilſt he cenſures them for their follies and vices, he inculcates independence in principle, and vigour in action. In his Olynthiacs and Philippics, which are his capital orations, he had a fine field for the diſplay of his talents; the object he had in view was to rouſe the indignation of his countrymen againſt Philip of Macedon, the avowed enemy of the liberties of Greece; and to guard them againſt the inſidious meaſures by which that crafty prince endeavoured to lull them into ſecurity. In the proſecution of this, he adopts every proper method for animating a people renowned for juſtice, humanity, and valour; but in many inſtances become corrupt

rupt and degenerate. He boldly taxes them with their venality, indolence, and indifference to the public cauſe; whilſt with conſummate art, he calls to their remembrance the glory of their anceſtors, and leads them to conſider that they were ſtill a flouriſhing and powerful people, the natural protectors of the liberty of Greece, and that they only wanted the inclination to exert themſelves, in order to make Philip tremble. With his contemporary orators, who were in the intereſt of Philip, or who perſuaded the people to peace, he keeps no meaſures, but reproaches them as the betrayers of their country. Phocion was of this number; he on all occaſions oppoſed the violence of the people; and when Demoſthenes once told him that the Athenians would ſome day murder him in a mad fit, he anſwered, "And you too, perhaps, in a ſober fit." Such is the ſtrain of the orations abovementioned, which are ſtrongly animated, and abounding with the impetuoſity and fire of public ſpirit. The figures which he uſes are never ſought after, but riſe from the ſubject, and are employed ſparingly, for ſplendour and ornament do not diſtinguiſh the compoſitions of Demoſthenes. His character, as an orator, is formed by energy of thought, which is peculiar to himſelf, and elevates him above all others. Things, and not words, appear to be the objects of his attention. He has no parade and oſtentation; no methods of inſinuation; no laboured introductions; but like a man, fully poſſeſſed by his ſubject, after preparing his audience by a ſentence or two for hearing plain truths, he enters directly on buſineſs; warming the mind, and impelling to action.

When Philip had aſſembled an army for the invaſion of Attica, Demoſthenes was deputed to perſuade the Bœotians to take part againſt him; and ſuch was the force of his eloquence that he prevailed, though Python, an orator of great fame, and the advocate of Philip, exerted his efforts againſt him. At Cheronæa, however, Philip obtained a victory over the combined forces, and our orator incurred indelible reproach on the occaſion, as he deſerted his poſt, threw down his arms, and fled with ſuch precipitation, that his robe got entangled on a ſtake, and terror ſuggeſting to him that an enemy had ſeized him, he exclaimed "Spare my life!" In conſequence of this defeat, Demoſthenes was accuſed by the party that oppoſed him at Athens; but he was acquitted by the people. After the death of Philip, young Alexander was deſpiſed; and Demoſthenes thought this a favourable opportunity for cruſhing the Macedonians, and ſucceeded in obtaining a new league among the Grecian ſtates. But the vigorous proceedings of the young king diſſolved the confederacy; and Demoſthenes was one of a deputation appointed to wait upon him and divert his anger; but the courage of the orator failed him, and he turned back upon the road. Alexander required him to be delivered up among other orators; but Demades pacified the king without this ſacrifice. Demoſthenes, having diſplayed his patriotiſm by rebuilding the walls of Athens at his own expence, was recompenſed by a crown of gold, which was decreed to him. Æſchines, the orator, accuſed him on this account; and the accuſation occaſioned a ſolemn trial, and produced Demoſthenes's famous oration, "Pro Corona." He was acquitted by a great majority, and his adverſary was under a neceſſity of quitting Athens for ever. On this occaſion the two orators were competitors; but on a compariſon Æſchines is feeble and unimpreſſive, Demoſthenes is like a torrent which nothing can reſiſt. He draws the character of his antagoniſt in the ſtrongeſt colours, and all the deſcriptions in this oration are highly picturesque. There runs through it a ſtrain of magnanimity and high honour. The orator ſpeaks with that ſtrength and conſcious dignity which great actions and public ſpirit alone inſpire.

Soon after this conteſt a circumſtance occurred, which entailed diſgrace on the character of Demoſthenes. Harpalus, one of Alexander's officers, had been guilty of peculation, and made his eſcape to Athens, as a place of ſafety. Demoſthenes at firſt diſſuaded the Athenians from giving him protection; but on a ſurvey of the treaſures of Harpalus, the ſight of one of the king's golden cups corrupted his integrity. He poiſed it in his hand, and aſked its weight. Harpalus replied, "To you it ſhall weigh 20 talents;" and at night he ſent the orator the cup with that ſum. On the next day, when the caſe of Harpalus was to be conſidered, Demoſthenes appeared in the aſſembly with his throat muffled, and being called upon to ſpeak, he made ſigns that he had loſt his voice. Afterwards provoking an enquiry, as if he had been able to vindicate his innocence, he was tried, found guilty, and was ſentenced to pay a fine of 50 talents, or to be impriſoned till the money was paid; but in order to avoid diſgrace and confinement, he fled to Ægina. Some of his former adverſaries preſſed him to accept money on his departure: and when they exhorted him to bear his fate with courage and reſignation, he replied, "How can I forbear ſorrow on leaving a place where my enemies are more generous than any friends I can meet with elſewhere?" On the death of Alexander, when a new confederacy was planned by the Greek ſtates, Demoſthenes aſſiſted the Athenian deputies in their efforts for the common cauſe, and made himſelf ſo popular, that a decree paſſed for his recall: and upon his return, the whole body of citizens conducted him home in triumph. Although the fine could not be remitted, an equal ſum was granted him under the pretext of paying his charges as conductor of the ſacrifices to Jupiter the preſerver. But the victory of Antipater changed the fortune of Greece, and Athens, as the price of its pardon, was obliged to ſacrifice Demoſthenes and the orators of the ſame party. On the motion of Demades, a decree was paſſed condemning them to death. Demoſthenes took ſanctuary in the temple of Neptune at Calauria. But apprehending that attempts would be made to draw him from his place of refuge, he provided himſelf with poiſon; and when his expectations were realiſed, by an emiſſary of Antipater, he retired to the interior part of the temple, and ſwallowed the doſe. Then turning to Archias, the meſſenger of Antipater, who had been a player, he ſaid, "Now you may perform the part of Creon as ſoon as you pleaſe, and caſt out this carcaſe unburied." Then turning to the altar, he exclaimed, "O Gracious Neptune! I depart alive from thy temple without profaning it, which the Macedonians would have done by my murder." Staggering as he attempted to retire, he fell by the altar, and with a groan expired. He died at the age of 59, in the year B.C. 322. The Athenians not long after erected his ſtatue in braſs, and decreed that the eldeſt of his family ſhould be maintained at the public expence.

In his private character Demoſthenes was vindictive, auſtere, and implacable. For his vanity, his celebrity may be pleaded as an apology; but his love of money diſgraced him both in his political and profeſſional capacity. Patriotiſm was undoubtedly a diſtinguiſhing trait of his character; and it has been alleged to his honour, that Philip regarded him as the chief obſtacle to his ambitious deſigns. "In that great conteſt," ſays one of his biographers, "he ſeems to have been uniformly conſiſtent; and though his conduct on ſome occaſions wanted dignity, and on others reſolution, it was governed by ſteady principle." As an orator he is univerſally allowed to ſtand at the head of his profeſſion. Ci-

cero

cero calls him "a perfect orator," and prefers him to all other ſpeakers, Greek or Roman. Yet Cicero could only judge of him from his writings; whilſt he was a ſtranger to that *action*, which Demoſthenes reckons the firſt, the ſecond, and the third part of oratory. Quinctilian ſpeaks of him as excelling all others in what the Greeks called δεινωσις, or that kind of diction which aggravates every circumſtance proper to excite the ſtronger emotions. "Such," ſays he, "is the force, the conciſeneſs, the tone, and vigour of his language, that you can find nothing either deficient or redundant."

"The ſtyle of Demoſthenes" ſays Dr. Blair, (Lectures, vol. ii.) "is ſtrong and conciſe, though ſometimes, it muſt not be diſſembled, harſh and abrupt. His words are very expreſſive; his arrangement is firm and manly; and though far from being unmuſical, yet it ſeems difficult to find in him that ſtudied but concealed number and rhythmus, which ſome of the ancient critics are fond of attributing to him. Negligent of theſe leſſer graces, one would rather conceive him to have aimed at that ſublime which lies in ſentiment. His action and pronunciation are recorded to have been uncommonly vehement and ardent: which, from the manner of his compoſition, we are led to believe. The character which one forms of him, from reading his works, is of the auſtere, rather than the gentle kind. He is, on every occaſion, grave, ſerious, paſſionate, taking every thing in a high tone: never lets himſelf down, nor attempts any thing like pleaſantry. If any fault can be found with his admirable eloquence, it is that he ſometimes borders on the hard and dry. He may be thought to want ſmoothneſs and grace; which Dionyſius of Halicarnaſſus attributes to his imitating too cloſely the manner of Thucydides, who was his great model for ſtyle, and whoſe hiſtory he is ſaid to have written eight times over with his own hand. But theſe defects are far more than compenſated, by that admirable and maſterly force of maſculine eloquence, which, as it overpowered all who heard it, cannot, at this day, be read without emotion." However, to a modern many of the beauties of diction are loſt; but we have ſuch hiſtorical proof of the efficacy of his oratory, that it is impoſſible to doubt of its real excellence. It was Demoſthenes,

> "—— quem mirabantur Athenæ
> Torrentem, et pleni moderantem frænа theatri:
> Juvenal. Sat. x.

He was the chief of thoſe who, in Milton's words,

> "Wielded at will that fierce democrate,
> Shook th' arſenal, and fulmin'd over Greece,
> To Macedon, and Artaxerxes' throne. Parad. Reg.

On the ſubject of comparing Cicero and Demoſthenes, much has been ſaid by critical writers. The different manners of theſe two princes of eloquence, and the diſtinguiſhing characters of each, are ſo ſtrongly marked in their writings, that the compariſon is, in many reſpects, obvious and eaſy. The character of Demoſthenes is vigour and auſterity; that of Cicero is gentleneſs and inſinuation. In the one, you find more manlineſs, in the other, more ornament. The one is more harſh, but more ſpirited and cogent; the other more agreeable, but withal, looſer and weaker. To Demoſthenes it is a diſadvantage, that, beſides his conciſeneſs, which ſometimes produces obſcurity, the language in which he writes is leſs familiar to moſt of us, than the Latin, and we are leſs acquainted with the Greek antiquities than we are with the Roman. We read Cicero with more eaſe, and of courſe with greater pleaſure: and it muſt be allowed, that Cicero is in himſelf a more agreeable writer than the other. "But," ſays Dr. Blair, "I am of opinion, that were the ſtate in danger, or ſome great national intereſt at ſtake, which drew the ſerious attention of the public, an oration in the ſpirit and ſtrain of Demoſthenes, would have more weight, and produce greater effect, than one in the Ciceronian manner. Were Demoſthenes's Philippics ſpoken in a Britiſh aſſembly, in a ſimilar conjuncture of affairs, they would convince and perſuade at this day. The rapid ſtyle, the vehement reaſoning, the diſdain, anger, boldneſs, freedom, which perpetually animate them, would render their ſucceſs infallible over any modern aſſembly. I queſtion whether the ſame can be ſaid of Cicero's orations; whoſe eloquence, however beautiful, and however well ſuited to the Roman taſte, yet borders oftener on declamation, and is more remote from the manner in which we now expect to hear real buſineſs and cauſes of importance treated." In this judgment Mr. Hume concurs, in his "Eſſay upon Elocution." He gives it as his opinion, that of all human productions, the orations of Demoſthenes preſent to us the models which approach the neareſt to perfection. In comparing Demoſthenes and Cicero, the French critics, however, are diſpoſed to give the preference to the latter. One exception, however, occurs. Fenelon, the famous archbiſhop of Cambray, gives the palm to Demoſthenes.

Demoſthenes is ſaid to have compoſed 65 orations, of which a ſmall proportion only is come down to our times. Among the beſt editions of theſe are that of Frankfort, 1604, folio, with Wolfius's Latin verſion: of Taylor, unfiniſhed, 3 vols. 4to. Cantab.; and of Reiſke, 10 vols. 8vo. Leipſ. 1770. Plut. Vit. Demoſth. Cicero de Oratore et Brutus. Quinctilian Inſt. Univ. Hiſt. Gen. Biog. Rollin's Anc. Hiſt.

DEMOTICA, or Dimotuc, in *Geography*, a town of European Turkey, in the province of Romania, ſituated near the Maritſch, where a Greek archbiſhop reſides, and where the Chriſtians have two churches; 12 miles S. of Adrianople.

DEMOURS, Peter, in *Biography*, doctor in medicine, but more known as an oculiſt, was the ſon of Anthony Demours, an apothecary at Marſeilles, under whom he received the early part of his education, which was continued at Avignon, where he reſided, until he had taken the degree of doctor: this was in the year 1728. He then removed to Paris, and was placed for two years under M. Du Verney, to improve himſelf in anatomy. On the death of Du Verney, he was aſſociated with M. Chirac in the care of the cabinet of natural hiſtory, in the royal garden at Paris. Having made the ſtructure of the eye in a particular manner his ſtudy, in 1741 he ſent to the royal academy of ſciences a memoir on the ſubject, in which he ſhews that the vitreous humour is of a cellular texture, and that the cells communicate with each other, which had not been before obſerved. He now employed himſelf, almoſt excluſively, in attending to the diſeaſes of the eye, and ſoon attracted ſo much notice as to be appointed oculiſt to the king. In 1767, he publiſhed "Lettre a M. Petit," on the ſubject of a diſeaſe in the eyes, occurring in a patient who had been inoculated with the ſmall-pox. As he had acquired a competent knowledge of the Engliſh language, he tranſlated into French the Edinburgh medical eſſays, which he publiſhed at Paris, in eleven volumes, 12mo. Baker's Natural Hiſtory of the Polypus. Hales's account of a Ventilator. Ranby's treatiſe of Gunſhot Wounds, and ſeveral volumes of eſſays on medicine, and on natural hiſtory, taken from the Philoſophical Tranſactions, which procured him to be elected one of the foreign members of the royal ſociety. He had been before aſſociated with the royal academy of ſciences at Paris. De-

mours died in 1770, at an advaneed age. Eloy. Dict. Hiſt.

DEMPSTER, Thomas, in *Biography*, a Scots writer, born about the year 1579. He was educated in the Roman catholic religion, but left his native country, and ſtudied for ſome time at Pembroke hall, Cambridge. From thence he went to Paris, where he pretended that he had left a great property in his own country, through attachment to his religion. It does not appear that he obtained much credit on account of theſe aſſertions, but was obliged to keep a ſchool for his maintenance. The violence of his temper, and the muſcular powers of his body, on which he ſeemed to depend, led him into many diſputes, the event of which obliged him to take refuge in England. He brought with him a very beautiful wife, whoſe exquiſite features and form attracted uncommon notice in the ſtreets as ſhe paſſed, ſo that, we are told by Bayle, it was with difficulty ſhe could proceed. Dempſter next went to Piſa where he became a profeſſor in the univerſity; here his wife eloped with one of his ſcholars. He then removed to Bologna, where he taught with great reputation, and was admitted as member of the academy. He died in 1625. He was author of many works in law, antiquities, philology, and the ſeveral branches of the belles lettres. He wrote alſo "A Martyrology of Scotland." But his hiſtorical facts have ever been regarded with ſuſpicion. In his liſt of Scottiſh writers he has put a number of celebrated authors, who are known not to have been born there. He has been thus characterized by M. Baillet, a prieſt of his own profeſſion. He forged titles of books which were never publiſhed, to raiſe the glory of his native country, and has been guilty of ſeveral cheating tricks, by which he has loſt his credit among men of learning. "He was," ſays the learned Bayle, "a man of a prodigious memory, indefatigable, a zealous friend, and a violent enemy; he had no great judgment, nor much honeſty; for he publiſhed I know not how many fables without ſhame. Some of his books were condemned by the Inquiſition." Moreri. Bayle.

DEMULCENT Medicines, are thoſe ſubſtances which tend to obviate the irritation of acrid and ſtimulant matters in the body, not by correcting or changing their acrimony, but merely by involving it in a mild and viſcid matter, which prevents it from acting upon the ſenſible parts. This claſs of medicines compriſes the vegetable mucilages or gums, and the fixed animal and vegetable oils. The latter may be uſed for the purpoſe of covering the acrimonious qualities both of acids and alkalies; and even vitriolic acid may be in a great meaſure covered by being mixed with the mucilage of gum arabic.

Theſe effects of demulcent medicines are ſufficiently evident with reſpect to the external parts; and it may be preſumed that the ſame may happen with reſpect to the internal, ſo long as the acrid continues mixed with the demulcent. It has generally, however, been conſidered by phyſicians, till the time of Dr. Cullen, and even now the doctrine is followed in practice to a great extent, that demulcents act upon diſtant organs of the body through the medium of the circulation. Thus the gum arabic, which is the mucilage moſt univerſally employed, becauſe it can be introduced in the moſt concentrated ſtate, and therefore in the largeſt quantity, is ſuppoſed to extend its demulcent qualities to the bronchiæ, and there to correct the acrimony that occaſions coughing; and it is eſpecially ſuppoſed to reach the urinary organs, and there to cover any acrimony prevailing in the urine, and thus to relieve ſtrangury, ardor urinæ, &c.

But it is difficult to ſuppoſe that the demulcent matter retains its mild and inviſcating quality, after it has been taken into the body. For, in the firſt place, its viſcidity muſt be greatly diminiſhed in its paſſage through the ſtomach and inteſtines to the blood-veſſels, ſuppoſing that no other change took place, by mere dilution with the ſerous fluids. But, ſecondly, it is not to be queſtioned that demulcents, which are commonly of a very nutritious nature, ſhould paſs through the ſtomach, without undergoing that digeſtive proceſs, by the power of the gaſtric liquor, which all ſuch matter undergoes; *i. e.* that it ſhould, in common with other ſubſtances taken in, be altogether changed in its qualities, and rendered of the ſame fluidity with the other matters that paſs into the lacteals; in a word, that theſe demulcents can have no effect as ſuch, in the maſs of the blood, or in paſſing by the various excretions.

Beſides this general reaſoning with reſpect to mucilages, the conſideration of the quantity thrown in is of no ſmall weight. In common practice, hardly more than a few ounces are given in one day; and it is obvious that this can communicate a very ſlight mucilaginous quality to many pounds of ſeroſity. But not only reaſoning *à priori*, experience alſo coincides in proving the correctneſs of this opinion. "What others may have obſerved," ſays Dr. Cullen, "I cannot determine; but, for myſelf, I can aſſert that, in innumerable trials, I have never obſerved the effects of gum arabic in the maſs of the blood, or in the excretions derived from it. The moſt frequent occaſion for its uſe is in the ardor urinæ; and in that I have been often diſappointed, and have often found, that two pounds of water, or watery liquors, added to the drink, would be of more ſervice than four ounces of gum arabic, taken in without ſuch addition." Materia Medica, vol. ii.

In ſhort, there has been a deception, not uncommon in the practice of medicine, upon this ſubject. When the urine is much diluted, its acrid ſalts are diffuſed through a large medium, and irritate the paſſages but little. Hence the effects of the quantity of liquid containing mucilage in ſolution, have been miſtaken for the effects of the mucilage, which it contained.

In the caſe of coughing, mucilages, which often decidedly allay it, and ſuſpend the repetition of it, produce their beneficial effects not by covering the acrimony of the circulating fluids, but, by beſmearing the throat and preſerving thoſe parts from the irritation of their own ſecretions, and of the matter raiſed from the lungs.

DEMURRAGE, in *Traffic*, an allowance made to the maſter of a ſhip, by the merchants for ſtaying in a port longer than the time firſt appointed for his departure.

DEMURRER, in *Law*, a kind of pauſe, or ſtop, put to the proceeding of any action, upon ſome difficult point, which muſt be determined by the court, before any further progreſs can be had in it.

In every action, the controverſy is either as to fact, or as to law; the firſt, decided by the jury, the ſecond, by the court.

A demurrer is, therefore, an iſſue upon matter of law; and it confeſſes the facts to be true, as ſtated by the oppoſite party, but denies, that by the law ariſing upon theſe facts, any injury is done to the plaintiff, or that the defendant has made out a legitimate excuſe; accordingly the party, which firſt demurs, (*demuratur*, *moratur in lege*), reſts or abides upon the point in queſtion. As, if the matter of the plaintiff's complaint or declaration be inſufficient in law, as by not aſſigning any ſufficient treſpaſs, then the defendant demurs to the declaration; if, on the other hand, the defendant's excuſe or plea be invalid, as if he pleads that he committed the treſpaſs by authority from a ſtranger, without making out

out the ſtranger's right; here the plaintiff may demur in law to the plea:—and ſo on in every other part of the proceedings, where either ſide perceives any material objection in point of law, upon which he may reſt his caſe.

The form of ſuch demurrer is by averring the declaration or plea, the replication or rejoinder, to be inſufficient in law to maintain the action or the defence; and therefore praying judgment for want of ſufficient matter alleged. Sometimes demurrers are merely for want of ſufficient *form* in the writ or declaration. But in caſe of exceptions to the form, or manner of pleading, the party demurring muſt, by ſtatute 27 Eliz. c. 5. and 4 & 5 Ann. c. 16. ſet forth the cauſes of his demurrer, or wherein he apprehends the deficiency to conſiſt. And upon either a *general*, or ſuch a *ſpecial* demurrer, the oppoſite party muſt aver it to be ſufficient, which is called "a joinder in demurrer;" and then the parties are at iſſue in point of law; which iſſue in law, or demurrer, the judges of the court before which the action is brought muſt determine. (Finch. L. lib. iv. c. 40. 1 Inſt. 71. Blackſt. Comm. vol. iii. p. 314.)

Accordingly, demurrers, or queſtions concerning the *ſufficiency* of the matters alleged in the pleadings, are to be determined by the judges of the court, upon ſolemn argument by counſel on both ſides; and to that end a demurrer book is made up, containing all the proceedings at length, which are afterwards entered on *record*; and copies thereof, called *paper-books*, are delivered to the judges to peruſe. When the ſubſtance of the record is completed, and copies are delivered to the judges, the matter of law upon which the demurrer is grounded, is upon ſolemn argument determined by the court, and not by any trial by jury: and judgment is thereupon accordingly given.

A *demurrer in equity* is nearly of the ſame nature as a demurrer in law; being an appeal to the judgment of the court, whether the defendant ſhall be found to anſwer the plaintiff's bill; as for want of ſufficient matter of equity therein contained; or, when the plaintiff, upon his own ſhewing, appears to have no right; or where the bill ſeeks a diſcovery of a thing which may cauſe a forfeiture of any kind, or may convict a man of any criminal miſbehaviour. For any of theſe cauſes a defendant may demur to the bill. And if, on demurrer, the defendant prevails, the plaintiff's bill ſhall be diſmiſſed: if the demurrer be over-ruled, the defendant is ordered to anſwer. Bl. Comm. v. iii. p. 466.

DEMURRER *to evidence* takes place when a record, or other matter, is produced in evidence, concerning the legal conſequences of which there ariſes a doubt or queſtion in law; in which caſe the adverſe party may, if he pleaſes, demur to the whole evidence, which admits the truth of every fact that has been alleged, but denies the ſufficiency of them all in point of law to maintain or overthrow the iſſue. (Co. Litt. 72. 5 Rep. 104.) This draws the queſtion of law from the cognizance of the jury, to be decided by the court. But this kind of demurrer is now ſeldom uſed.

DEMURRER *to indictments* is incident to criminal caſes, as well as civil, when the fact, as alleged, is allowed to be true, but the priſoner joins iſſue upon ſome point of law in the indictment; by which he inſiſts that the fact, as ſtated, does not amount to the crime charged.

Some have held (2 Hal. P. C. 257.) that if, on demurrer, the point of law be adjudged againſt the priſoner, he ſhall have judgment and execution, as if convicted by verdict: but this is denied by others, (2 Hawk. P. C. c. 32. § 56.) who maintain, that in ſuch caſe he ſhall be directed and received to plead the general iſſue, not guilty, after a demurrer determined againſt him. However, upon this doubt, demurrers to indictments are ſeldom uſed; ſince the ſame advantages may be taken upon a plea of not guilty; or, afterwards, in arreſt of judgment, when the verdict has eſtabliſhed the fact. Blackſt. Comm. vol. iv. p. 334.

MURIS, JOHN DE, in *Biography*, the celebrated writer on muſic, to whom the invention of muſical characters is generally given. Fabricius, biſhop Tanner, and others, allow him to have flouriſhed about the year 1330. He is ſtyled by ſome a doctor and canon of the Sorbonne, by ſome a mathematician and philoſopher, and by others a chanter of the church of Nôtre-Dame at Paris. His country is likewiſe diſputed: for though the general opinion be that he was born at Meurs in Normandy, whence he had his name, yet, by a typographical error, he is called Parmigiano in Bontempi, inſtead of Parigino, which makes him a native of Parma, inſtead of Paris. We call it a typographical error, in order to acquit Bontempi of making J. de Muris an Italian, either from ignorance or want of integrity; as we are in poſſeſſion of a proof copy of his Storia della Muſica, in which, among other corrections made in his own hand, the word Parmigiano is changed to Parigino. But though he has no title to the invention of the time-table, as we ſhall ſoon demonſtrate, he muſt certainly have been a great benefactor to practical muſic by his numerous writings on the ſubject, which, doubtleſs, threw new lights upon the art, as may be better imagined now from the gratitude of his ſucceſſors, by whom he is ſo frequently quoted and commended, than from the writings themſelves, which Time, to whom he was ſuppoſed to have been ſo great a friend, has rendered totally uſeleſs, and almoſt unintelligible.

But though he is entitled to an honourable place among muſical worthies; yet, as both his country and profeſſion have been diſputed, all that can be done to gratify the reader's curioſity concerning him, is to give a complete liſt of his works that are ſtill preſerved in the ſeveral libraries of Europe; and, from their titles and contents, to deduce at leaſt a probable opinion of other circumſtances concerning him.

Beſides a MS. by the ſame author, in the Vatican, on the ſubject of counterpoint, we found there three others by De Muris, on the ſubject of muſic. Of the two firſt, which are in the ſame volume, No. 5221, one of which is a treatiſe on "Time, or Meaſured Muſic:" Joannis de Muris Practica Cantus Menſurabilis, pr. quilibet in Arte: This tract is likewiſe in Be'net college Camb. No. 410, in the ſame vol. as Walter Odington's treatiſe, though the author has been hitherto unknown: the other is "A Compendium of Counterpoint:" Joannes de Muris Ars Summaria Contrapuncti, pr. volentibus introduci. The third, which is among the queen of Sweden's MSS. No. 1718, conſiſts of "Muſical Theorems explained in Verſe:" Joan. de Muris Theoremata Muſica Verſibus explicata.

In the king of France's library at Paris, there are two copies of his "Speculum Muſicæ," or Mirror of Muſic, in ſeven books, which is the principal and moſt ample of all his muſical writings. This is the work mentioned by Merſennus, Du-Cange, and Rouſſeau, and in which they all tried in vain, as well as myſelf, (ſays Dr. Burney) to find proofs of his having been the inventor of the time-table.

Rouſſeau has given two conſiderable quotations from this work in his Muſical Dictionary, article DISCANT, which de Muris defines "The ſinging extempore with one or more perſons in different concords, in ſuch a manner as to produce one harmony." Diſcantat qui ſimul cum uno vel pluribus dulciter cantat, ut ex diſtinctis ſonis ſonus unus fiat, non unitate ſimplicitatis, ſed dulcis concordiſque mixtionis unione. After which he explains what he means by con-

cords, and the choice that ſhould be made of them upon theſe occaſions. He then ſeverely cenſures the fingers of his time for their ignorance and indiſcriminate uſe of them. "If our rules are good, with what front," ſays he, "do thoſe dare to *diſcant* or *compoſe*, who are ſo ignorant of concords as not to know which are more or leſs pleaſing, which ought to be avoided, or moſt frequently uſed; where to introduce them, or any thing that concerns the true practice of the art? If they accord, it is by mere chance; their voices wander about the tenor or plain-ſong without rule, truſting wholly to Providence for their coincidence. They throw ſounds about at random, as awkward people throw ſtones at a mark, without hitting it once in a hundred times."

The good maſter Muris then proceeds to flagellate with great fury theſe corruptors of the pure and ſimple harmony of his time: "Heu! proh dolor! His temporibus aliqui ſuum defectum inepto proverbio colorare moliuntur. Iſte eſt, inquiunt, novus diſcantandi modus, novis ſcilicet uti conſonantiis; offendunt ii intellectum eorum, qui tales defectus agnoſcunt, offendunt ſenſum: nam inducere cùm deberent delectationem, adducunt triſtitiam. O incongruum proverbium! O mala coloratio, irrationabilis excuſatio! O magnus abuſus, magna ruditas, magna beſtialitas, ut aſinus ſumatur pro homine, capra pro leone, ovis pro piſce, ſerpens pro ſalmone! Sic enim concordiæ confunduntur cum diſcordiis, ut nullatenùs una diſtinguatur ab aliâ. O! ſi antiqui periti Muſicæ Doctores tales audiſſent diſcantatores, quid dixiſſent? Quid feciſſent? Sic diſcantantem increparent, et dicerent: non hunc diſcantum, quo uteris, de me ſumis. Non tuum cantum unum et concordantem cum me facis. D quo te intromittis? Mihi non congruis, mihi adverſarius ſcandalum tu mihi es; O utinam taceres! non concordas, ſed deliras et diſcordas." The Latin of this paſſage is ſo obſolete and monkiſh, that it ſeems as if it would fall more naturally into Engliſh of the 16th century, than into that of the preſent times. "But, alas! in theſe our dayes, ſome do ſtryve to gloſſe over theyr lacke of ſkyll with ſilly ſayenges. This, cry they, is the *newe* method of diſcantynge, theſe be the newe concordes.—Howbeit they grievouſly offend thereby both the hearing, and the underſtanding of ſuche as be ſkylled to judge of theyr defects; for where we look for delight, they do induce ſadneſſe. O incongruous ſayenge! O wretched gloſſe! irrational excuſe! O monſtrous abuſe! moſt rude and beſtial ignorannce! to take an aſſe for a man, a goat for a lyon, a ſheepe for a fiſhe, a ſnake for a ſalmone! For in ſuche ſorte do they confound concordes with diſcordes, as ye ſhall in no wiſe diſcerne the one from the other. O! if the good old mayſters of former time did hear ſuche *diſcanters*, what would they ſay or do? Out of doubte they wolde thus chyde them and ſay, This diſcant, whereof ye now make uſe, ye do not take it from *me*; ye do in no wyſe frame your ſonge to be concordaunt with *me*; wherefore do ye thruſt yourſelves in? ye do not agree with me; ye are an adverſary, and a ſcandal unto me. O that ye wolde be dumb! This is not *concordynge*, but moſt doatynge and delyrious *diſcordynge*."

Concerning the writings upon various ſubjects by John de Muris that are ſtill preſerved among the manuſcripts of the Bodleian and Muſeum libraries, we ſhall tranſcribe the account given in Tanner's Bibliotheca Britannica, p. 537, which is ſo ample as to need little addition.

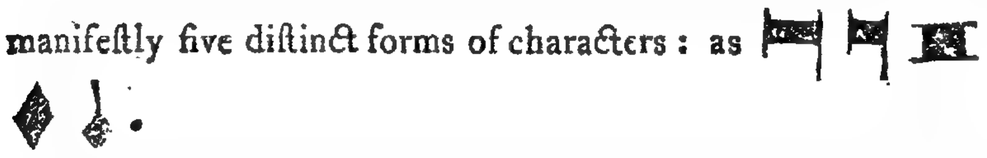
"John de Muris, or Murus, an Engliſhman, and an eminent philoſopher, mathematician, and muſician, wrote "Ex Stellarum Poſitionibus Prophetiam." Lib. i. Infra Annum certe Mundi. "Arithmeticam Speculativam." Lib. i. MS. Oxon. in Bibl. Publ. Impreſſ. Mogunt. "Tractatum Muſicum." Lib. i. Quoniam Muſica eſt de Sono relato ad Numeros. MS. Bodl. N. E. F. 10, 11. "Artem componendi (metiendi) fiſtulas Organorum ſecundum Guidonem." Lib. i. "Cognita conſonantia in Chordis. Ibid." "Sufficientiam Muſicæ Organicæ editam (ita habet MS.) a Mag. Joanne de Muris, Muſico Sapientiſſimo, et totius orbis Subtiliſſimo experto." Pr. Princeps Philoſophorum Ariſtoteles. Ib. "Compoſitionem Conſonantiarum in Symbolis ſecundum Boëtium." Pr. Omne Inſtrumentum Muſicæ. Ib. "Canones ſuper Tabulas Alphonſinas." Pr. Quia ſecundum Philoſophum, 4to. Phyſicorum. MS. Bodl. Digby 168. f. 132. "Collectionem Prophetiarum de Rebus Anglicis, per Joh. de Muris." MS. Cotton. Veſpaſ. E. VII. 8. In MS. Bodl. Digby 190. fol. 72. extat "Prologus in Opus, cui Titulus; Tractatus Canonum minutiarum Philoſophicarum et Vulgarium, quem compoſuit Mag. Johannes de Muris, Normannus A. MCCCXXI. a quo eodem anno (verba ſunt autoris) Notitia Artis Muſicæ proferendæ et figurandæ tam menſurabilis quam planæ, quantum ad omnem modum poſſibilem diſcantandi, non ſolum per integra, ſed uſque ad minutiſſimas fractiones:" "Cognitioque circuli quadraturæ" perfectiſſime demonſtratæ: "Expoſitioque tabularum Alphonſi" regis Caſtelliæ: et "Genealogiæ Aſtronomiæ" nobis claruit, &c. "Canones de Eclipſibus." Pr. In oppoſitione habenda aliud. MS. Bodl. Digby 97. ubi habetur hæc nota: Hos Canones diſpoſuit Joannes de Muris Pariſiis in A. MCCCXXXIX. in Domo Scolarium de Sorbona. "De Conjunctione Saturni et Jovis," A. MCCCXLV. Pr. Tres Principes ex Militia. MS. Bodl. Digby 176. Bal. XI. 74. Pits. App. p. 872. ſeq."

As all the tracts in the liſt of his writings which concern muſic have been carefully examined, we will endeavour to convey to the reader an idea of their contents.

The tract which begins "Quoniam Muſica eſt de Sono relato ad Numeros," is now marked Bodl. 300. It is a treatiſe of Harmonics, in which the circular and conical diagrams and diviſions of the ſcale are innumerable. The author is as fond of the circle in this work, as Tartini was four hundred years after. The tranſcriber has, however, omitted many of theſe illuſtrations of his doctrines, by which, perhaps, the injury to muſical ſtudents of the preſent age is not very conſiderable. "Explicit Muſica Magiſtri Joannes de Muris."

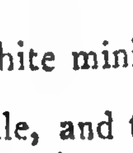
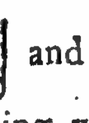
What follows in the manuſcript is manifeſtly a continuation of the ſubject, and a ſecond part of the preceding tract. It begins thus: "Princeps Philoſophorum Ariſtoteles ait in Principio Mathematicæ ſuæ omnino Scientis Signum eſt poſſe docere." We find after the introduction a repetition of the initial ſentence of the firſt part: "Quoniam Muſica eſt de Sono relato ad Numeros." This part, however, relates more to the practice of muſic than the other.

In his chapter "De Tempore perfecto et imperfecto," he ſeems to call common time perfect, and triple time imperfect: for, he ſays, "quod longa poſſit imperfici per brevem. Brevis per ſemibrevem. Semibrevis per minimam. Quod minima non poſſit imperfici." However, by theſe words, he, perhaps, only means to ſay that a long, which by itſelf is perfect, or equal to three breves, by poſition may be rendered imperfect, that is, equal to two breves only, by a breve, the next ſhorteſt note being placed after it; and ſo a breve, which alone, or with other breves, is triple, becomes double by a ſemibreve following it. What he means by ſaying that a minim cannot be imperfected in the ſame manner, is, that there was no ſhorter note, the crotchet not being then invented, to perform the operation. In his Diagrams of Muſical Proportions, or Time Tables, he gives but four

kinds of notes; that is, in four columns; for in theſe are manifeſtly five diſtinct forms of characters: as  .

The ſcale of Guido, in a perpendicular diagram; and the hexachords, which are well arranged under their ſeveral denominations of durum, naturale, and molle, are exhibited in this tract.

In the tract by John de Muris, beginning "Quilibet in arte," which we unexpectedly found in Be'net college, Cambridge, in the ſame volume as Odington's treatiſe, the notes are divided into five claſſes: "Quinque ſunt partes prolationis, videlicet, maxima, longa, brevis, ſembrevis et minima," ut hic —giving the ſame characters as in the tract juſt mentioned: and here, likewiſe, his doctrine agrees with that in his other treatiſe, where he ſeems to call the triple proportions imperfect, and the dual perfect.

This is the moſt ancient manuſcript in which we have found the ſigns of the modes, C ☉ ○ ⊙, and the "punctum perfectionis." Here it plainly appears that the punctum, or point, in John de Muris, operates in the ſame manner as that already deſcribed in Franco, p. 187, where it makes the note to which it is prefixed *perfect*, that is, of three times; and the calling it "punctum perfectionis," or point of perfection, prove its power of making a double quantity triple, as at preſent. At the bottom of fol. 6. is written, "Explicit tractatus Joannis de Muris:" however, it goes on for fifteen pages more. Here, too, we firſt ſaw an open, or white minim,  and a half lozenge note  . The ink is pale, and the writing very bad, and difficult to decipher; but the manuſcript, which is written on paper of a coarſe texture, ſeems entire, and correſponds in every particular with that in the Vatican library, No. 5321. It was this treatiſe which Proſdocimo de Beldemandis of Padua, a voluminous writer on muſic in the beginning of the fifteenth century, thought of ſufficient importance to merit a commentary, which is now in the poſſeſſion of Padre Martini of Bologna. "Practica Menſurabilis Cantus," Mag. Joan. de Muris, de Normandia, alias Pariſienſis, cum expoſit. Proſdocimo de Beldemandis Patav. MS. an. 1404.

The tract by J. de Muris, in the Bodleian library, upon the meaſures, and proportions of organ-pipes, according to Guido, beginning "Omne inſtrumentum muſice," is very ſhort, and contains nothing very important to muſic at preſent. It is not known that Guido ever wrote on the ſame ſubject, and de Muris only means by "ſecundum Guidonem," to ſay that he has followed the ſame proportions which Guido eſtabliſhed in his diviſion of the monochord.

In another ſhort tract of the ſame volume he follows Boëthius. And in his "Tractatus Canonum minutiarum Philoſophicarum et vulgarium," where he tells us that he had compoſed at the ſame time "a Treatiſe on the Art of Muſic," teaching and deſcribing in figures or notes both meaſured and plain-ſong, with every poſſible kind of diſcant, not only by integers or long-notes, but by the ſhorteſt and moſt minute fractions, he probably alludes to his "Speculum Muſicæ," in ſeven books, which ſeems the moſt voluminous of all his writings, but the invention of the Characters for Time, which has been given to de Muris, by almoſt all the writers on muſic of the two laſt centuries, and whom many Engliſh authors ſeem ambitious of claiming as their countryman, probably with the hopes of honouring this kingdom with his invention of the time-table. But however patriotic may be their deſign, we are in poſſeſſion of ſuch a ſtubborn proof, from his own acknowledgment, of that diſcovery not being his property, as he would be unable to refute, if he could riſe from the tomb and claim it.

Among the MSS. which were bequeathed to the Vatican library by the queen of Sweden, there is a "Compendium of Practical Muſic," by John de Muris, in which he treats of muſical characters for time; but introduces the ſubject with a ſhort chronological liſt of anterior muſicians who had merited the title of *Inventors:* beginning, as uſual, with Tubal; and, after naming Pythagoras and Boethius, he proceeds to Guido, the monk, "who conſtructed the gammut, or ſcale for the monochord, and placed notes upon lines and ſpaces; after whom came Magiſter Franco, who invented the figures, or notes, of the Cantus Menſurabilis."—Deinde Guido monachus qui compoſitor erat gammatis qui monochordum dicitur, voces lineis, et ſpaciis dividebat. Poſt hunc Magiſter Franco, qui invenit in cantu menſuram figurarum. MS. Reginæ Sueciæ in Vatic. No. 1146. "Compendium Joannes de Muribus."

With reſpect to the diſpute concerning the place of his nativity, though Tanner, copying Pits and Bale, calls him an Engliſhman, yet we find that in the title of one of the manuſcripts of the Bodleian library, in Tanner's liſt, he is called a Norman, and in another a Pariſian. Padre Martini likewiſe quotes a manuſcript of the year 1404, in which he is called the Great John de Muris, de Normandia, alias Pariſienſis.

Having taken ſome pains to trace the opinion of his being an Engliſhman to its ſource, we have been able to find no ſuch title given to him in any of his numerous writings that have been preſerved in manuſcript throughout Europe. The aſſertion reſts entirely on Robert Record, a phyſician at Cambridge, and one of the firſt writers upon ſcience in the Engliſh language. His works were very voluminous, of which, however, little more remain than the titles preſerved in Pits' account of him, which ſays, that he was living in 1552. (Append. Illuſt. Ang. Script. tom. i. p. 872.); at leaſt, we have never been able to procure any of his writings, except his Arithmetic, printed in black letter 1543. And as John de Muris had written on the ſame ſubject (Arithmeticam Speculativam, l.b. duos,) we had hopes of meeting in this tract the place where Record calls him an Engliſhman; but no ſuch could be found.

Pits, (loc. cit.) calls him an Engliſh mathematician, and ſays, "he was a man of ſome genius, but poſſeſſed of too daring a curioſity; for, while he was ſtudying philoſophy, he addicted himſelf to mathematics, and to that more ſublime part of aſtronomy which contemplates the heavens: and in the exerciſe of his genius for calculation, he had the inſolence to predict future events; thus perſuading the ignorant and vulgar, that by the aſpect of the ſtars he could penetrate the decrees of Providence. He dared to publiſh celeſtial ſecrets under the title of Prophetiarum, prophecies."

Theſe particulars, and many more, he ſays, were collected from Robert Record. But neither from him nor any one elſe was he able to diſcover at what time he lived. Bale, who calls him a mathematician and a conjurer (*Mathematicus et Vates*) gives the ſame authority for his being an Engliſhman.

This bare aſſertion, made at a time when it was not ſo cuſtomary to give or expect proofs and critical exactneſs in ſupport of facts as at preſent, has not only been copied, without farther enquiry by Pits, Bale, and Tanner, at home, but by Fabricius and other reſpectable writers on the continent. A Latin diſtich, by an anonymous writer, which has been quoted in favour of this opinion, can add but little to its weight, when it is known to come from the moſt ignorant

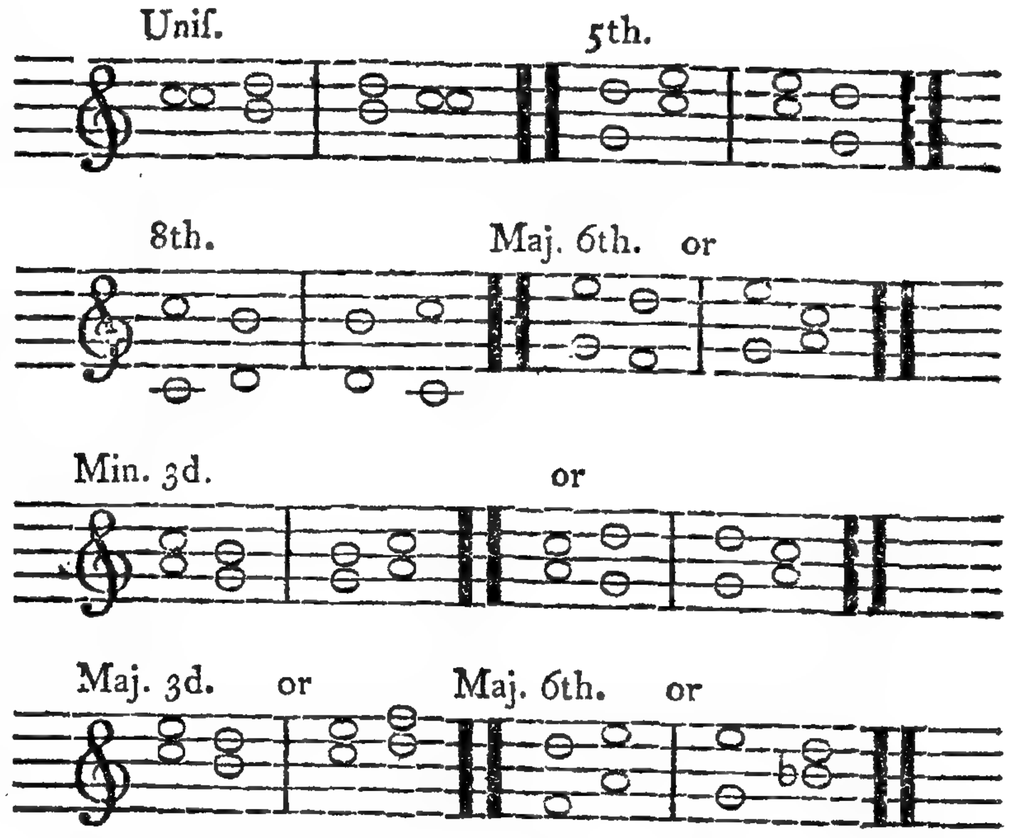
and monk'ſh of writers, the author of a treatiſe "De Origine et Effectu Muſice," written 1451; who tells us that "Cyrus lived ſoon after the deluge; that one king Enchiridias was a writer on muſic," miſtaking, I ſuppoſe, ſome Enchiridion which he had ſeen, for the name of a royal author: And that "Thubal kept a blackſmith's ſhop, at which Pythagoras adjuſted the conſonances by the ſound of his hammers." But ſuch authority will be found no more to prove J. de Muris an Engliſhman, than Guido or Franco, as both thoſe writers equally contributed to the progreſs of muſic in this kingdom; and it may as well be inſiſted upon, that, becauſe Metaſtaſio has enriched this country with many beautiful ſongs, he muſt conſequently be a native of England.

That monks and perſons of learning, for many centuries before the Reformation, were more frequently diſtinguiſhed by the name of the place which gave them birth joined to their baptiſmal appellation, than by their family name, is moſt certain: as Guido Aretinus, Geoffry of Monmouth, Henry of Huntingdon, William of Malmſbury, John of Saliſbury, Mathew of Weſtminſter, &c. who have been always ſuppoſed natives, or, at leaſt, inhabitants, of the ſeveral places by which they were called. Now, though no town in Normandy of the name of Meurs can be found, either in maps or geographical books, yet, as there are ſeveral places ſo called in France, particularly one in Touraine, and another in Anjou, near Angers, which by giving birth to our John, ſerved to diſtinguiſh him from his innumerable nameſakes of other kingdoms, cities, and profeſſions; and as no ſatisfactory or probable reaſon has been aſſigned for ſuppoſing him an Engliſhman, nor can any one be now ſuggeſted, except a patriotic deſire of appropriating to our own country a man whoſe learning and talents have been long celebrated, it is but juſt to reſtore him to that country which ſeems to have the faireſt claim to him.

John de Muris, though not the inventor of the "Cantus Menſurabilis," ſeems, by his numerous writings, greatly to have improved it. Indeed, every ſpecies of note to be found in his tracts, except the minim, is deſcribed in Franco, as well as uſed in compoſitions anterior to his time, and mentioned by authors who wrote upon muſic before him. Nor is it poſſible to imagine that this art was invented and received by all Europe at once: like others, it had its beginning, improvements, and perfection, in different periods of time. His "Art of Counterpoint," of which we procured a copy at Rome, though compriſed in a few pages, is, however, the moſt clear and uſeful tract on the ſubject, which thoſe times could boaſt.

He begins, by informing his reader, that, beyond the octave, all is repetition. That, "within the octave there are ſix ſpecies of concord, three perfect, and three imperfect: of the firſt kind are the uniſon, 8th and 5th: and of the ſecond, the two 3ds, and major 6th. The firſt of the perfect kind, he ſays, is the uniſon, which, though by ſome not allowed to be a concord, yet, according to Boethius, it is the ſame, and the origin of all conſonance. The uniſon naturally requires after it a minor 3d; which, on the contrary, for variety, is beſt ſucceeded by a perfect concord. The 5th being of the perfect kind, is well followed by a major 3d, and *è contra*. The octave, another perfect concord, may be ſucceeded by the major 6th; after which, either a perfect or imperfect concord may be taken. It is the ſame with the minor 3d, which, being of the imperfect kind, may be ſucceeded either by a perfect or imperfect concord. The major 3d, though beſt followed by a 5th, yet may be ſucceeded by another 3d, but then it muſt be minor. The major 6th, too, though beſt followed by an 8th, may yet be ſucceeded either by a perfect or imperfect concord of another ſpecies, for the ſake of variety; it can be followed by a fifth only when the under part riſes a major or minor 3d; but by 3ds and 6ths at pleaſure. Every compoſition ſhould begin and end in a perfect concord; and it muſt be remembered that no two parts ſhould aſcend or deſcend in perfect concords, though imperfect may be uſed without limitation: and, laſtly, care muſt be taken, that when the under part aſcends, the upper ſhould deſcend, and the contrary."

Moſt of theſe rules were given by Franco, but with leſs clearneſs and preciſion; and as they will not only ſhew that harmony had made ſome progreſs in the fourteenth century, but are ſuch as would not ſhock modern ears, we ſhall preſent them to the muſical reader in notes.



The minor 6th, we know not why, is called a *diſcord* by Franco, and has no admiſſion among concords, by John de Muris; though it is only an inverſion of the major 3d, which both allow to be a concord.

John de Muris makes no mention of the 4th in this tract, though, in his "Speculum Muſicæ," he gives rules for diſcanting in a ſucceſſion of fourths, under the barbarous term *diateſſaronare*.

DEMY SANGUE. See HALF-BLOOD.

DEN, a ſyllable added to the names of places, and ſhews their ſituation to be in a valley, or near woods, as Tenterden, Biddenden, &c.

The word is Saxon *den, i. e. vallis*, or *locus ſylveſtris*.

DEN *and ſtrond*, &c. in *Law*, was a liberty for ſhips or veſſels to run or come a-ſhore. King Edward I. by charter, granted this privilege to the barons of the cinque ports.

DENA, in *Geography*, a river of Hindooſtan, S.E. of Adjodin, being one of the four branches of the Setlege (probably the Dond), and, perhaps, ſays Mr. Rennell, the only principal one among them, exeept the Beyah.

DENAIN, a ſmall town of France, in the department of the North, near the river Scheldt, between Valenciennes and Bouchain, remarkable for its abbey, founded by a daughter of king Pepin, and for a victory gained in its neighbourhood by the French, under the duke of Villars in the year 1712, over the allies, after the departure of the Engliſh.

DENARIATUS TERRÆ, in *Ancient Law-Books*, as much land as is worth a penny by the year. See FARDING-*deal*.

"Sibylla Barthelot tenet unam acram, & 5 *denariatos* terræ in eodem tenemento." Du-Cange.

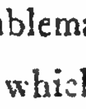
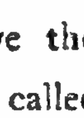
DENARII, in *Antiquity*, a general term for any ſort of *pecunia numerata*, or ready money. Paroch. Antiq. 320.

DENARII *de Caritate*, cuſtomary oblations made to cathedral churches about the time of Pentecoſt, when the pariſh prieſts, and many of their people, went in proceſſion to viſit their mother church. This cuſtom was afterwards changed into a ſettled due, and uſually charged upon the pariſh prieſt; though at firſt it was but a gift of charity, or preſent, for helping to maintain and adorn the biſhop's ſee. Cartular. Abb. Glaſton.

DENARIUS, the Roman penny; a ſilver coin, equivalent to, from ſix to eight-pence half-penny ſterling. See COIN.

The Romans having, for a long time, uſed braſs money, which they call *as*, quaſi *æs*; or *libra* and *pondo*, becauſe it was a pound weight; began in the year of Rome 485, or 269 years B.C. to coin ſilver; and coined firſt the denarius, which was marked with the letter X, becauſe it is worth ten aſſes, whence its name, and divided into two quinarii, marked with V, which were ſubdivided into two ſeſtertia, marked with theſe three letters IIS. The as was then of 3 ounces, and allowing, which was probably the caſe, that theſe large denarii of 90 grains at a medium, are of the firſt coinage, the proportion of copper to ſilver was as 1 to 160. Afterwards, when the denarius was of 60 grains at a medium, and the as of 2 ounces, copper was ſtill to ſilver as 1 to 160; but when the as fell to only an ounce, copper was to ſilver as 1 to 80; and when it fell to half an ounce, and 16 went to the denarius, it was as 1 to 64, at which rate it remained. With us copper to ſilver is in coinage 1 to 40; but in actual value 1 to 72. The denarius was worth eight-pence of our money, the quinarius four pence, and the ſeſtertius, whether ſilver or braſs, two-pence. Afterwards, about the year 579, or 175 years B.C., when the as fell to half an ounce, the ſilver denarius was made to paſs for ſixteen aſſes, the quinarius for eight, and the ſeſterce for four; but in the pay of the army, the ſoldier generally received a ſilver denarius for ten aſſes, (Pliny, Nat. Hiſt. lib. xxxiii. cap. 3. Livy, lib. xv) though not without ſome variations and deductions. The denarius continued at this value till the time of Gallienus. Under Caracalla, or probably under his predeceſſor, Severus, who firſt debaſed the ſilver coinage, there were denarii ſtruck of two ſizes. The large denarius of Caracalla, and his ſucceſſors, is one-third heavier than the uſual one, and it may be reaſonably concluded that it bore one-third more value; and was worth 6 braſs ſeſtertii, while the other retained its firſt value of 4. This large denarius of courſe had 24 aſſaria; and it is called by the writers of the Auguſtan hiſtory, and in reſcripts of the period, *Argenteus*, or the ſilver piece, and *Argenteus Philippus*, or the ſilver Philip, the word *Philip* having become a familiar appellation for any coin. The common denarii now firſt began to be termed *minuti*, and *argentei Philippi minutuli*, and the like, to expreſs their being ſmaller than the others. The firſt *argenteus* is worth nearly one ſhilling ſterling.

From the time that Caracalla ſtruck the large denarius, both it and the ſmall had been leſſening by degrees; till after Gordian III. the latter totally vaniſhed, and the large alone remained. This, in the time of Gallienus, was the ſole denarius of ſilver, and ſo much diminiſhed, as only to equal the *minutus*, or ſmall one, of Caracalla. But Gallienus introducing the *denarii ærei*, which was copper waſhed with ſilver, and of the ſize of the denarius, inſtead of the ſeſtertii, the *argenteus*, though reduced more than a third in ſize, bore 6 *denarii ærei*, its old ſtandard of *ſeſtertii*. Writers of the period, and after, ſay, that the *denarius*, or *argenteus*, was of 60 aſſaria; hence it follows that each *denarius æreus* had 10; and received its name from that circumſtance, as well as its being of the ſize of the ſilver denarius. Theſe aſſaria are of the ſize of the argentei; and ſhew that copper retained its old proportion to ſilver of about 1 to 60. The denarii or argentei continued to be coined in the time of Conſtantine I., and were the money moſt common in currency. As they had been rated at 100 to the pound of ſilver in tale, they began to be called *centenionales*, or *hundreders*. They then diminiſhed very faſt in ſize; thoſe of Conſtantine I. and II., Conſtans, and Conſtantius weigh 50 grains down to 40; thoſe of Julian II., Jovian, 40 down to 30; thoſe of later princes, till Juſtinian, 30 to 20. Under Heraclius, when they ceaſed, the denarii were from 15 grains down to 10. The miliarenſis, which was ſubſtituted by Conſtantine in the room of the denarius, attends the denarius in proportional decline of ſize. See MILIARENSIS and POUND.

The moſt ancient denarii have on one ſide the head of a woman in a helmet, with the inſcription ROMA, and the mark of the denarius X or , and ſome few XVI, and a biga or quadriga on the other; whence they are denominated bigati and quadrigati. The next to theſe in antiquity, have the head of Roma, or ſome other deity, on one ſide, and on the reverſe the name of the mint-maſter, with hiſtorical or emblematical figures. Many of theſe have the mark X or  , which remained long after the denarius paſſed for 16 aſſes. A third ſort have the head of a conſul or general on one ſide, with an hiſtorical or emblematical reverſe: few of theſe have the mark X or  , upon them. Theſe three ſorts are called conſular denarii, becauſe they were ſtruck during the republican government by conſuls. The imperial denarii have commonly the head of the reigning emperor, with his names and titles on one ſide, and ſome emblematical figures on the reverſe, with ſuitable inſcription. The Romans did not uſe the denarius for a weight, as the Greeks did their drachm, till the Greek phyſicians coming to Rome, and finding the two coins nearly equal, preſcribed by it, as they had been uſed to do by the drachm in their own country.

We are informed both by Celſus and Pliny, that eighty-four denarii were coined out of the pound of ſilver; and therefore by determining the true weight of the Roman pound, we ſhall obtain that of the denarius, which depended upon it. But the Roman pound in tale exceeded it, in like manner as our pound in tale falls ſhort of our pound in weight; the Roman pound in tale conſiſted of 100 denarii. Celſus de Medicina, lib. v. cap. 17. Pliny, Nat. Hiſt. lib. xxxiii. cap. 9.

If we take 5040 troy grains for the weight of the Roman pound, as determined from the gold coins, the conſular denarius of 84 in the pound will weigh juſt 60 troy grains. Mr. Raper took the mean weight of forty-ſix of the faireſt denarii in the Britiſh Muſeum, and found it to be 60.95 troy grains; but as ſome of theſe were imperfect, he found the mean of twenty perfect denarii to amount to 60.92: and he queſtions whether the denarii of above ſixty-three grains ever paſſed as current coin. The weight of the denarius was diminiſhed under the emperors; and Greaves found, by examining many imperial denarii, that from Auguſtus's time to Veſpaſian they continually almoſt decreaſed, till, from being the ſeventh part of the Roman ounce, they came now to be the eighth part; and ninety-ſix were coined out of the Roman libra, whereas under the conſuls they coined only

eighty-four. Under Severus and Gordianus they recovered their weight, but with a conſiderable mixture of allay. J. Caſpar Eiſenſchmid of Straſburg, in a book "De Ponderibus et Menſuris Veterum." &c. publiſhed in 1708, informs us, that he found the weight of the imperial denarius from Nero to Sept. Severus, to be to the conſular denarius in the proportion of 7 to 8.

In order to determine the value of the conſular denarius of 60 troy grains of fine ſilver, we are to conſider, that ſixty-two Engliſh ſhillings are coined out of eleven ounces two penny weight, troy, of fine ſilver, and eighteen penny weight allay; and therefore the troy grain of fine ſilver is worth $\frac{62}{1111}$ths of a farthing; and ſixty grains, or the denarius, worth ſomewhat more than eight-pence farthing and a half ſterling; and the as, or ſixteenth part of the denarius, a little more than a half-penny. Phil. Tranſ. vol. lxi. part. ii. art. 48.

Others, as Greaves, and after him Arbuthnot, have made the conſular denarius the ſeventh part of an ounce in weight, a little more than ſixty-two grains, allowing 5256 troy grains to the Roman pound, and its value, allowing eight Engliſh grains to the ſilver penny, $7\frac{3}{4}d.$ of our money; and the imperial denarius the eighth part of an ounce, and worth about $6\frac{1}{2}d.$ ſterling.

M. Tillemont obſerves, that the denarius was held ſufficient to keep a perſon handſomely for a day; and, upon the whole, ſeems to intimate, that it was equal to twelve French ſous, or eleven Engliſh pence; but this eſtimate errs in exceſs more than the preceding does in defect. See Greaves's Diſcourſe of the Denarius, in his works, by Dr. Birch, vol. i. p. 235, and Arbuthnot on Coins, p. 15.

Denarius is alſo uſed, in our *Law books*, for an Engliſh penny.

"Denarius Angliæ, qui nominatur ſterlingus, rotundus ſine tonſura, ponderabit 32 grana frumenti in medio ſpicæ; & 20 denarii facient unciam; & 12 unciæ facient libram." Stat. Ed. I. De menſuris.

Denarius *Dei* denotes earneſt-money; called alſo argentum Dei, by the French deniers de Dieu, and in ſome parts of our country arles.

"Ita quod neuter mercatorum ab illo contractu poſſit diſcedere, vel reſilire poſtquam denarius Dei inter perſonas contrahentes datus fuerit & receptus." Charti Eduardi I.

Denarius *tertius comitatus*, denoted a third part of the profits of county courts. When thoſe courts had ſuperior juriſdiction, before other courts were erected, two parts of the fines, and other profits belonging to them, were reſerved to the king, and a third part to the earl of the county. Paroch. Ant. 418.

Denarius *Sti. Petri*. See Peter-pence.

DENAROS, in *Ancient Geography*, an iſland ſituated at the eaſtern extremity of the iſle of Cyprus, near the promontory Dineratum.

DENAT, in *Geography*, a ſmall town of France, in the deparment of the Tarn, on the river Agout; 9 miles S. of Alby.

DENATES, in *Antiquity*, domeſtic gods, more frequently called *Penates*, which ſee.

DENAVACA, in *Geography*, a town of the iſland of Ceylon; 50 miles S. of Candy.

DENBERA, in *Antiquity*, from the Saxon *Den*, a vale, and *berg*, a hog, denoted a place for the rearing and feeding of hogs, in which they are penned; called by ſome a *ſwine-comb*.

DENBIGH, in *Geography*, the county town of Denbighſhire, North Wales, is ſituated on the ſide and at the top of a craggy and lofty hill, which riſes out of the beautiful and fertile vale of Clwyd. This place was called by the Britons *Cledfryn yn Rhos*, or the craggy hill in Rhos. This part of the county was given by Edward I. to David ap Gruffydd, brother to Llewelyn the laſt prince of North Wales, who being afterwards beheaded for high treaſon, it was given to Lacy, earl of Lincoln, who fortified the town with a ſtrong wall, and either built, or enlarged the caſtle; but his only ſon being unfortunately drowned in the well of this caſtle, his grief was ſo great that he was induced to leave it unfiniſhed. After the earl's death, it went by the marriage of his daughter Alice, into the poſſeſſion of the family of the houſe of Lancaſter. Edward II. gave it to Hugh Spencer; after which, in the reign of Edward III., Roger Mortimer became the poſſeſſor, and fixed his arms on the chief gate; but he being executed for high treaſon, it went to Montague, earl of Saliſbury, and was ſoon afterwards reſtored to the Mortimers. After many changes it came to the houſe of York, and now belongs to the crown. Charles I. reſided in it ſome time. It was delivered up to the parliamentary army in 1646, and appears to have been a place of ſuch ſtrength, that after the reſtoration it was thought adviſable to blow it up. The ruins of the caſtle are ſtill to be ſeen on the ſummit of a rock, which ſlopes on all ſides but one, which is a precipice. The principal part of the caſtle was built anno 1280, temp. Edward I. The grand entrance was through a large gate, with a pointed arch, flanked by two octagonal towers. The caſtle ſeems to have been of a ſingular conſtruction: two walls being built ſeveral feet aſunder, the intervening ſpace was filled up by pouring in a mixture of mortar and rough ſtones, which formed, in drying, a maſs as ſolid as the rock itſelf. The proſpect from the caſtle is particularly grand and delightful, commanding an extenſive reach of the banks of the Clwyd, interſperſed with gentlemen's ſeats. Denbigh is a borough town, governed by two aldermen, a recorder, two bailiffs acting as ſheriffs, and twenty-five capital burgeſſes, who form a common council. The aldermen are juſtices, and hold quarter-ſeſſions in the ſame manner as the county ſeſſions are held, by ſtatute. The borough returns one member to parliament: the election is veſted in the reſident burgeſſes, in number about five hundred; the bailiffs are the returning officers. The political influence is entirely in the Middleton family, of Chirk-caſtle, whoſe anceſtors have repreſented the borough in various parliaments from 33 Henry VIII. to the preſent time. The town is not large, but generally well built, and contains 534 houſes and 2391 inhabitants, of whom 794 were returned as being employed in trade and manufacture, particularly of ſhoes, gloves, and other articles of leather, in which commodities the town carries on a conſiderable traffic. Denbigh gives the title of earl to the noble family of Fielding. Near the caſtle ſtands the chapel of St. Hilary, which is the common place of worſhip for the inhabitants of the town; as the pariſh church and burial ground are about a mile diſtant in the bottom of the vale. Near the lower end of the town, in the pariſh of Henllan, ſtood a priory of White Friars; but little of it remains except a part of the church, now converted into a barn. Here are alſo the ruins of an abbey of Black Monks of the Benedictine order, founded and endowed by Adam Saluſbury, in the reign of Henry III. Denbigh is diſtant from London 218 miles N. W. Evans' Cambrian Itinerary.

Denbigh, *Cape*, a point of a peninſula, on the American coaſt, ſouth of Norton Sound, obſerved in captain Cook's third voyage in 1778, firſt ſuppoſed to be an iſland, but afterwards found to be united to the continent by a low neck of land, on each ſide of which the coaſt forms a bay. N. lat. 64° 30′. E. long. 198° 30′. The captain had ſome intercourſe

intercourſe with the natives, who exchanged a few dry fiſh for ſuch trifles as they could procure; but they were moſt deſirous of knives, and had no diſlike of tobacco. Lieutenant Gore, who was ſent to examine the peninſula, found there was little freſh water, and that the wood was difficult to be obtained, as the boats grounded at ſome diſtance from the coaſt. To the ſouthward of cape Denbigh, was an iſland named "Beſborough iſland," S. 52° E., 15 leagues diſtant. The adjacent country, where there was no wood, was covered with heath and other plants, ſome of which produced abundance of berries. The underwood, ſuch as birch, willows, and alders, rendered it troubleſome walking amongſt the trees, which were all ſpruce, and none of them above 6 or 8 inches in diameter. All the drift-wood in theſe northern parts was fir. The natives in their ſize and features reſembled thoſe whom the voyagers had met with on every other part of the coaſt, King George's Sound excepted. As they approached the ſhip, they ſang, while one of their number beat upon a kind of drum, and another made a thouſand antic motions with his hands and body; but there was nothing ſavage either in the ſong, or in the geſtures that accompanied it. Their clothing conſiſted principally of deer-ſkins; and they obſerved the cuſtom of boring their under lips, and fixing ornaments to them. Their habitations, ſeated cloſe to the beach, conſiſted ſimply of a ſloping roof, without any ſide walls, compoſed of logs, and covered with graſs and earth. The entrance was at one end; the fire-place juſt within it; and a ſmall hole near the door let out the ſmoke. Although they had ſome beads, the article which they ſeemed chiefly to value was iron; and for four knives made out of an old iron hoop, they gave 400 pounds weight of fiſh, ſome being trout, and the reſt in ſize and taſte between a mullet and herring. The berries procured here were wild currant-berries, hurtle-berries, partridge-berries, and heath-berries. The low land connecting this peninſula with the continent was full of creeks, and abounded with ponds of water, ſome of which in the month of September were frozen over. Here were a great many geeſe and buſtards, ſome ſnipes, and on the high ground partridges of two ſorts. In the wood, muſquitoes were in great plenty. This peninſula ſeemed to have been in remote times an iſland; for there were marks of the ſea having flowed over the iſthmus, and it appeared to be kept out by a bank of ſand, ſtones, and wood, thrown up by the waves. Cook's Third Voyage, vol. ii. p. 485. See Norton's *Sound*.

DENBIGHSHIRE, a county of North Wales, is bounded on the weſt by Caernarvonſhire; on the north by the Iriſh ſea; on the eaſt by Flintſhire, Cheſhire, and Shropſhire; and on the ſouth by Merionethſhire and Montgomeryſhire. This diſtrict is divided into ſix hundreds; and extends from north-north-weſt to ſouth-eaſt about thirty-nine miles; while its greateſt breadth from eaſt to weſt does not exceed twenty-three miles. This extent is not accurately aſcertained, as there has never been a correct ſurvey of the county. Mr. Kay, who drew up a conciſe agricultural report reſpecting Denbighſhire, ſtates, that it contains about 410,000 acres of land, the greater part of which is rugged and mountainous, but the lower grounds being incloſed, and in general well wooded, with a great variety of very rich valleys interſperſed, conſiderably ſoften its appearance. The ſoil is various, conſiſting of gravel, clay, and loam; chiefly loamy gravel and ebb ſhale. The air is ſalubrious; and the inhabitants in general long-lived. The principal rivers are the Clwyd and the Conway; the former paſſes through the vale of the ſame name; whilſt the latter is the boundary between this county and Caernarvonſhire. All the country about Wrexham (the moſt populous, and largeſt town in North Wales, lying on the eaſtern parts of this county,) is beautifully variegated. Chirk caſtle, the ſeat of Mr. Middleton, within twelve miles from Wrexham, is pleaſantly ſituated on a riſing ground, commanding a moſt extenſive view, although ſurrounded with large and very valuable plantations. Wynſtay, the ſeat of ſir Watkin Williams Wynne, which lies half-way between Chirk and Wrexham, is alſo a moſt delightful ſituation, with extenſive old plantations; beſides a great number of other gentlemen's ſeats, all of which are encompaſſed with fine woods. The banks of the Dee afford excellent paſture and hay. The moſt extenſive valley in this county is the celebrated vale of Clwyd, in which are a number of towns, villages, and gentlemen's ſeats. It is above twenty miles in length, and from three to eight miles in breadth, according to the approach or receſs of the mountains, with which it is guarded on all ſides except on the north. This vale is in general in a high ſtate of cultivation; though the weſtern parts are more barren, except on the ſea coaſt. The crops principally cultivated are wheat, oats, barley, and peas, with red and white clover, and rye-graſs, potatoes, and a few turnips. Denbighſhire contains 57 pariſhes, and 12,621 houſes, inhabited by 60,352 perſons, of whom 6,960 were returned as being employed in trade and manufacture, and 21,104 in agriculture. Wool is the principal object of manufacture of the county, and is wrought into cloths of different qualities, and alſo into ſtockings, particularly thoſe called Angola hoſe. Near the village of Chirk are a foundery for cannon, and alſo ſome iron forges. The borders of the county afford ſome lead mines; and in the ſouth-weſtern parts coal-pits are worked. The chief products of this county are cattle, corn, and cheeſe: the latter in ſome parts, particularly in the fine paſture land on the banks of the Dee, is equal in quality to that made in Cheſhire. Denbighſhire returns two members to parliament; one for the county, and one for the county-town. It lies partly in the dioceſe of St. Aſaph, and partly in that of Bangor. "Kay's General View of the Agriculture of North Wales." "Evans's Cambrian Itenerary."

DENCHE', Denchea, or *Endenché*, in *Heraldry*. See Danche'.

DENDER, in *Geography*, a river of Flanders, which runs into the Scheldt at Dendermond.

DENDERA, the ancient *Tentyris* or *Tentyra*, a town or large village of Egypt, built near the ruins of the ancient city at a ſhort diſtance from the weſt bank of the Nile, at the extremity of a very fertile plain, about 242 miles S. of Cairo, and 48 S.S.E. of Girgé. The ſurrounding orchards, which produce excellent oranges, lemons, pomegranates, grapes, and figs, render it a charming place, and afford a delightful coolneſs in a ſcorching country. A foreſt of palms and fruit-trees, mentioned by the ancients, ſtill exiſts in its environs, and furniſhes the greateſt part of the charcoal that is conſumed in Egypt. An Arabic prince, with the title of emir, has a ſovereign authority over Dendera and the circumjacent country; but he pays a tribute to the beys of Cairo. The ſite of Tentyris, which was formerly a celebrated city of Egypt, and gave its name to the nome Tentyritus, of which it was the capital, is little more than a quarter of a league from the preſent village of Dendera, towards the mountains to the weſtward. This city was of great extent, and, from its ſplendour, was reckoned one of the moſt conſiderable cities. Iſis and Venus were here honoured with public worſhip; and a temple was conſecrated to each of thoſe divinities. But what rendered this place more particularly remarkable was the enmity which the inhabitants had ſworn to crocodiles, and the continual war which they waged againſt thoſe hideous reptiles. The Tentyrite

tyrite purſued the crocodile into the water, overtook him, leaped upon his back, and ran a ſtick into his mouth, with which, as with a bridle, he brought him to the ſhore, where he put him to death. In the midſt of ruins and rubbiſh, occupying a great ſpace of ground, and atteſting the grandeur and magnificence of ancient Tentyris, there is ſtill ſtanding a temple, entire, and in good preſervation. It was dedicated to Iſis; and this tutelary divinity was there worſhipped in the ſhape of a cat. This temple is in the form of an oblong ſquare, and is built of white ſtones, taken from the calcareous rocks of which the neighbouring mountains conſiſt. The façade is 132 feet and ſome inches in length. In the middle of the cornice, below the corona, is a globe reſting upon the tails of two fiſhes. The large veſtibule is ſupported by enormous columns, which are 21 feet in circumference. Their capitals are of a ſingle piece, and repreſent heads or broad faces placed oppoſite to each other, and upon a feſtooned drapery; over them are ſquare blocks, which project beyond the figures, and have ſome reſemblance to pannels. The interior of the building is divided into ſeveral apartments, the walls of which are covered with hieroglyphics and ſymbolical figures. The exterior walls are alſo charged with them. Theſe figures are very remarkable images, and ſuch as are not to be found on any other monuments of ancient Egypt. Three perſons are ſeen, who form part of an Iſiac proceſſion. Behind each of theſe figures is a row of hieroglyphics; which, if they were underſtood, would probably explain the different attributes diſtinguiſhing theſe ſeveral perſonages. The Egyptian figures which have tails are cynocephali (dog-headed) or other monkies; having a human form, with appendages aſſimilating them to animals. The flowers are probably thoſe of the lotus, or water-lily, a plant which was famous in Egypt, as a proof of the neceſſary overflowings of the Nile, and as one of the moſt common articles of ſubſiſtence of the inhabitants. The figure of Oſiris or Iſis has the head of a ſparrow-hawk; but it is impoſſible to determine whether it be a man or a woman. Its head-dreſs is compoſed of the ſun's diſk and the lunar creſcent; it holds in one hand the *thau*, or handled croſs, and in the other, a ſceptre capped with a ſection of the fruit of the Egyptian arum (arum colocaſia) one of the plants moſt in uſe for the ſuſtenance of the inhabitants of Egypt. Here is obſerved a ſceptre ſurmounted by a fleur-de-lis, adopted by the kings of France for their coat of arms. This ſeems to have been the emblem of power among ſeveral ancient nations in the Eaſt. Herodotus and Strabo relate, that the kings of Syria and Babylon formerly bore the fleur-de-lis at the end of their ſceptre. The cieling of part of this temple is painted in freſco, of the brilliant azure blue colour, with which, in fine weather, the canopy of heaven is adorned; the figures in relievo, with which this blue ground is interſperſed, have been painted of a beautiful yellow; and theſe paintings, at the expiration of ſome thouſands of years, ſtill poſſeſs a brilliancy to which our preſent colours cannot be compared, and they are ſtill as bright as if they had been recently laid on.

We have already obſerved, that the façade of this temple is more than 132 feet in length. The depth of the periſtyle is 115 feet 3 inches, and its breadth 60 feet 11 inches. The two ſides of the edifice are 254 feet 9½ inches in length; and the depth is 110 feet 11 inches. The roof of the temple is flat, and formed of very large ſtones, placed from one pillar to another, or from a wall to a pillar, or reſting upon two party-walls. Several of theſe blocks are 18 feet long, and 6 broad. Such is the deplorable change that has taken place in Egypt with regard to the arts, which had their birth here, and which had arrived at a high degree of perfection, that a number of figures have diſappeared in this wonderful monument of ingenuity, under the efforts of that deteſtation which modern barbarians have vowed to the arts, in general; and, in particular, to repreſentations of animated nature. All the figures, within their reach, are in a great meaſure deſtroyed. Several Greek and Roman copper medals and engraved ſtones, as well as other fragments of antiquity, and emeralds, are very commonly found in the ruins of Tentyris. According to the aſtronomical obſervations made by Mr. Bruce, the latitude of Dendera is determined to be 26° 10′. Sonnini's Travels in Upper and Lower Egypt.

DENDERMOND, Dermonde, *Tenermonde*, *Teneræmunda*, but at preſent generally called *Termonde*, is a town of France, in the department of the Scheldt (Eſcaut), at the confluence of the river Scheldt and Dender, which traverſes the town; 18 miles S. of Antwerp, 18 miles W. of Malines, and 18 miles N. W. of Bruſſels. N. lat. 51° 3′. Dendermond is well fortified, its environs can eaſily be laid under water, and ſome works which have lately been added, render it very ſtrong, and particularly important in time of war to facilitate or to impede the communication between Gand and Antwerp. It is the chief place of a diſtrict of the ſame name, and counts 5028 inhabitants. Its canton has an extent of 90 kiliometres, 11 communes, and a population of 18875 individuals. The whole diſtrict contains 11 cantons, 73 communes, 180,516 inhabitants, and a territorial extent of 892 kiliometres and a half. The ſoil is uncommonly fertile, producing all ſorts of corn, beſides hemp and flax. It has excellent paſtures, and is remarkable for good horſes.

DENDRANATOMY, from δενδρον, *tree*, and ανατομη, *anatomy*, a term uſed by Malpighi, and others, to expreſs the diſſection of the ligneous parts of trees and ſhrubs, in order to the examination of their ſtructure and uſes. Galen has uſed the ſame word, and taken ſome pains to diſcover ſome of the ſubjects of theſe reſearches. There is a very remarkable analogy between the parts of ſome trees, and thoſe of peculiar parts of animal bodies; and Malpighi has, with great juſtice, uſed the comparative anatomy of trees, to explain, by the formation of the galls, and other preternatural tumors on them, the puſtules and other unnatural fleſhy excreſcences on animal bodies.

DENDRITES, Dendritical. This term, derived from δενδρον, *a tree*, is applied to thoſe cryſtallizations of ſalts and other bodies that aſſume a ramified appearance. The lateral branches of the dendritically cryſtallized ſalts are generally long and ſlender, and more or leſs curved; hence they often as much reſemble feathers as vegetables, in which caſe they are generally denominated feathery or plumoſe. Some of the moſt beautiful ſpecimens of this kind of cryſtallization are exhibited by the froſt work that forms on the inſide of windows during the winter. Sal ammoniac and nitre may alſo be made to depoſit cryſtals of great beauty by ſpreading a few drops of a watery ſolution of each on the ſurface of a plate of glaſs, and allowing it to dry gradually.

Of the mineral ſubſtances, thoſe the moſt liable to this kind of cryſtallization, are native copper, ſilver, and gold, and the mixed oxyds of iron and manganeſe. The latter forms thoſe extremely delicate blackiſh brown ſprigs reſembling moſs, and the ſmaller kinds of ſea-weed by which the ſurface of many kinds of marble is variegated, and which, when imbedded in agate and chalcedony, form thoſe pretty pebbles called Mochoa ſtones. It may be obſerved by the way that they are thus called not becauſe they come from the town of Mochoa in Arabia, but from a corruption of the German term *mochſtein*, moſs-ſtone.

DENDROBIUM, in *Botany*, (from δενδρον, *a tree*, and βιος, *life*,)

life,) a genus of plants, belonging to the Orchis tribe, growing paraſitically, for the moſt part, on the trunks or branches of old trees, in tropical countries. Willd. Sp. Pl. v. 4. Swartz. Act. Holm. 1800. p. 244. Tracts on Botany, 197. Schrad. Journal, 1799, 234. t. 2. f. 1. Sw. Orchid. in Schrad. Neues Journ. v. 1. 92. Claſs and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*, Linn. Juſſ.

Gen. Ch. reformed. *Cal.* (in ſome ſpecies reverſed,) three-leaved, oblong, ſomewhat ſpreading; the two lowermoſt leaves extended at the baſe, on their under ſide, and cohering ſo as to form a pouch, bearing ſome reſemblance to a ſpur. *Cor.* Petals two, oblong, lateral; nectary a lip, of various ſhapes in different ſpecies; its baſe included in, and often connected with, the pouch of the calyx, deſtitute of a ſpur; its prominent part occaſionally concave or flat, undivided or lobed, generally more coloured than the reſt of the flower. *Stam.* Anther an hemiſpherical terminal deciduous lid, of two or four cells; maſſes of pollen two or more, globular, yellow, glutinous. *Piſt.* Germen inferior, oblong or ovate, erect, furrowed; ſtyle columnar, ſemi-cylindrical, a little incurved, concave in front; ſtigma a moiſt, ſhining, orbicular ſpot, in the fore part of the ſtyle near the top. *Peric.* Capſule oblong or ovate, with three or ſix angles or ribs, one cell and three valves, burſting between the ribs. *Seeds* numerous, minute, each clothed with a chaffy tunic.

Eſſ. Ch. reformed. Calyx-leaves forming a pouch with their baſe. Lip without a ſpur. Anther vertical. Pollen globoſe. Flowers often reverſed.

* *Flowers direct.*

Sp. 1. D. *palmifolium*. Sw. (Epidendrum palmifolium; Sw. Prod. 123.) "Leaves lanceolate, broad, ribbed, each proceeding from a bulb. Flower-ſtalks radical, many-flowered." Sw. Found by Dr. Swartz in Jamaica, and known to us by the above characters only. 2. D. *Barringtoniæ*. Sw. (Epidendrum Barringtoniæ; Sm. Ic. Pict. t. 15.) Leaves elliptic-lanceolate, many-ribbed, ſeveral proceeding from each bulb. Flower-ſtalks radical, moſtly ſingle-flowered. We believe this magnificent ſpecies has never been publiſhed but by the writer of the preſent article, in the work above quoted. Dr. Swartz has taken his characters from thence, he not having met with it in Jamaica, from which iſland its roots were ſent to the late Hon. Mrs. Barrington, in whoſe fine collection at Mongewell they flowered in April, 1791. The next year the ſame ſpecies bloſſomed under Mr. Fairbairn's care at Cheſſea. The *roots* are, as in the whole genus, perennial and paraſitical; conſiſting of long, thick, round, downy branching fibres, which inſinuate themſelves into the cracks and cavities of the old rotten bark of trees. *Bulbs* expoſed, cluſtered, ovate, green, ſmooth, longitudinally furrowed and wrinkled, as large as turkey's eggs. *Leaves* three or four from the top of each bulb, a foot long, ſheathing, ſpreading, of a broad lanceolate, ſomewhat elliptical, ſhape, waved, pointed, ribbed, plaited, entire, ſmooth, of a fine green. *Flower-ſtalks* radical, few, three inches high, ſimple, ſheathed with ſcales, each bearing one, rarely two, large and very ſingular flowers, whoſe *calyx* and *petals*, each much above an inch long, are green, tipped with a tawny hue, and elliptical. *Lip* rather ſhorter than the petals, three-lobed, with a thick yellow palate; the ſide lobes ſmall, thin, acute; the central one large, fringed, orange bordered with yellow. *Style* with its lid white, bent down to the palate. In drying every part turns black. The flowers have no ſmell. 3. D. *præcox*. (Epidendrum præcox; Sm. Exot. Bot. t. 97.) Leaves lanceolate, three-ribbed; two from each bulb. Flower-ſtalks terminal, ſingle-flowered. Lip of the nectary tubular, fringed, marked with five rough lines. Found by Dr. Francis Buchanan in Upper Nepal in the Eaſt Indies, growing among moſſes on the trunks of trees or on rocks. The natives call it *Caybu ſwa*. *Bulbs* at firſt ſmall, awl-ſhaped, inveſted with ſcales; afterwards ovate or heart-ſhaped, and as large as the root of a tulip, green ſpeckled with purple. *Leaves* in pairs from the ſummit of each bulb, lanceolate, three-ribbed, ſomewhat ſtalked, coming after the *flowers*, which grow ſolitary on a little ſtalk from the top of (we believe) a diſtinct, but ſimilar, bulb, and are very large and handſome, purple; their *nectary* rolled up into a tube, its edge fringed and white, its palate marked with five parallel, rough, yellow ribs. 4. D. *humile*. (Epidendrum humile; Sm. Exot. Bot. t. 98.) Leaves ..... Flower-ſtalks radical, ſingle flowered. Lip of the nectary tubular, jagged, hairy, marked with nine elevated lines. Gathered alſo on the moſſy trunks of trees in Upper Nepal, by Dr. Buchanan, who never could find any *leaves*. Its habit is like the laſt, and probably the *bulbs* bear leaves at their ſummits, as in that. The *flower-ſtalks* however ſpring from the root. *Flowers* ſolitary, fleſh-coloured with purple ribs. *Lip* very beautifully coloured internally with yellow and crimſon, fringed alſo and hairy. The two laſt are moſt lovely plants, whoſe bulbs, if they could be procured, would prove a great acquiſition to our gardens. 5. D. *ſanguineum*. Sw. (Satyrium n. 3; Browne's Jamaica, 324. Vilcum radice bulboſâ minus, delphinii flore rubro ſpecioſo; Sloane's Jam. v. 1. 250. t. 121. f. 2.) "Leaves oblong, ſingle-ribbed, two from each bulb. Stalk terminal, with ſeveral flowers. Petals decurrent along the germen." A native of the Weſt Indies. Browne ſays it is one of the moſt beautiful of its tribe, and grows indifferently on all the trees and rocks in the low lands of Jamaica. *Bulbs* about the ſize of nutmegs, each bearing two rigid, elliptic-oblong, blunt *leaves*, with one channelled rib. *Stalks* terminal, ſolitary from between the leaves, a ſpan high, divided into a few branches, every one of which bears a purple flower, above an inch in diameter, whoſe lip is broad and crenate, variegated with yellow and purple. According to Swartz the two *petals* run down the germen, of courſe within the pouch of the *calyx*, in the form of a ſpur. 6. D. *moſchatum*. Sw. Orch. 94. (Epidendrum moſchatum; Buchanan in Symes's Emb. to Ava, t. 26. Thee-kua nee of the Birmans.) Stem creeping, marked with eight furrows. Leaves two-ranked, elliptic. Cluſters many-flowered. Petals twice as broad as the calyx. Lip entire. Grows on trees in the Eaſt Indian kingdom of Ava. The leafy *branches* are a foot long, with eight furrows, like the main ſtem. *Leaves* rigid, ſmooth, elliptic-oblong, obtuſe, ſpreading in two ranks. *Cluſters* ſpreading in an oppoſite direction to the branches; their ſtalks round and even. *Flowers* about ſix in each cluſter, large, very fragrant, yellow with a purple ſpot on each ſide of the nectary. Buchanan. 7. D. *Myoſurus*. Sw. (Epidendrum Myoſurus; Forſt. Prod. 60.) "Leaves linear, ſomewhat lanceolate, channelled, ſlightly emarginate. Flower-ſtalks naked. Spike filiform, drooping." Sw. A native of the Society iſlands in the South ſea. Forſter. 8. D. *utricularioides*. Sw. (Epidendrum utricularioides; Sw. Prod. 122.) "Leaves lanceolate, lineated, flat, ſtalk panicled. Petals united by their baſes into a very ſhort ſpur, beneath the great inverſely heart-ſhaped lip." Sw. Found by Dr. Swartz in Jamaica and Hiſpaniola, and his ſpecific character is all the information we have concerning it. 9. D. *teſticulatum*. Sw. (Epidendrum ſatyrioides; Sw. Prod. 123.) "Leaves cylindrical, ſomewhat tapering. Flower-ſtalk nearly ſimple. Flowers with two globoſe ſwellings at the baſe in front." Sw. A

native of Hiſpaniola. 10. D. *punctatum*. Sm. Exot. Bot. t. 12. Leaves radical, very ſhort, imbricated. Spike many-flowered. Lip three-lobed, acute, downy. Sent by Dr. White from the neighbourhood of Port Jackſon, New South Wales. *Stems* ſeveral, two or three feet high, unbranched, round, purple, clothed with a few ſtraggling ſcales only, and bearing ſix or eight ſhort, imbricated, ovate, fleſhy *leaves* at the baſe. Each ſtem terminates in a long ſimple bracteated *ſpike*, or rather *cluſter*, of very numerous and handſome purple flowers, dotted all over with red ſpecks, and their germens are beſprinkled with purple glands. The *calyx-leaves* and *petals* are lanceolate and acute. *Lip* ſcarcely equal to them in length, deeply three-lobed, yellow and downy above towards the baſe. 11. D. *corniculatum*. Sw. (Epidendrum corniculatum; Sw. Prod. 123.) "Stem very ſhort. Leaf ſolitary, oblong, ſomewhat wedge ſhaped, ſlightly ſtalked. Flower ſolitary, with a curved point." Sw. A native of Jamaica. 12. D *lanceolatum*. Sw. (Epidendrum Lanceola; Sw. Prod. 123.) "Stem very ſhort. Leaf ſolitary, lanceolate, ſtalked. Stalks two-flowered." Sw. This minute ſpecies forms little tufts, each plant conſiſting of a *ſtem* about half an inch high, bearing at its ſummit one narrow, lanceolate, ſtalked, ſmooth, pale-green, ſtraight leaf, ſcarcely two inches long, and by its ſide a ſlender, ſhorter flower-ſtalk, on which ſtand two little pale bracteated *flowers*. It grows in Jamaica, from whence we have received it through Dr. Swartz's hands. 13. D. *ſertularioides*. Sw. (Epidendrum ſertularioides; Sw. Prod. 122) "Stem ſlender, creeping. Branches erect, very ſhort, ſingle-leaved. Leaves lanceolate, ſomewhat ſtalked. Flowers ſolitary." Sw. A native of Jamaica. 14. D. *racemiflorum*. Sw. (Epidendrum. racemiflorum; Sw. Prod. 125.) Stem elongated, erect, ſheathed. Leaf ſolitary, elliptical, ſtalked. Cluſter taller than the leaf. Flowers leaning to one ſide, pointed, quadrangular. A native of Jamaica. Dr. Swartz. It has ſomewhat of the aſpect of the Linnæan *Ophrys monophyllos*, but with fewer flowers in the cluſter, and thoſe flowers are alſo larger. The *leaf* is obtuſe, with one principal rib, and many ſmaller ones. *Stem* inveſted with a few long, tubular, brown, membranous ſcales. 15. D. *alpeſtre*. Sw. (Epidendrum alpeſtre; Sw. Prod. 125.) "Stem elongated. Leaf ſolitary, ovato-lanceolate. Cluſters looſe. Angles of the capſule muricated." Sw. A native of Hiſpaniola. 16. D. *laxum*. Sw. (Epidendrum laxum; Sw. Prod. 125.) "Stem elongated. Leaf ſolitary, oblong, pointed. Cluſters looſe. Capſules naked." Sw. A native of Jamaica. Dr. Swartz ſuſpects Plumier's Helleborine ophiogloſſo ſimilis, Ic. t. 176. f. 3, may be this ſpecies, though quoted by Linnæus for his Epidendrum ophiogloſſoides, which is Stelis ophiogloſſoides of Swartz, a very different plant. 17 D. *ruſcifolium*. Sw. (Epidendrum ruſcifolium; Linn. Sp. Pl. 1353. Jacq. Amer. 226. t. 133. f. 3.) "Stem elongated. Leaf ſolitary, ovato-lanceolate. Flowers cluſtered in the boſom of the leaf." Sw. Found in Martinico. *Root* fibrous. *Stem* ſolitary, ſimple, ſtraight, ſcarcely a ſpan high, bearing one pale terminal *leaf*, of an ovato-lanceolate, pointed form, with many ribs, from the inſertion of whoſe ſtalk ſprings a little tuft of greeniſh white flowers.

* * *Flowers reverſed.*

18. D. *biflorum*. Sw. (Epidendrum biflorum; Forſt. Prod. 60.) "Stem round, ſimple. Leaves in two ranks, linear-lanceolate, flat. Flower-ſtalks very ſhort, in pairs, oppoſite to the leaves, proceeding from the baſe of their ſheaths." Sw. Native of the Society iſlands, in the South ſea. The *ſtem* bears many *leaves*, whoſe ſheaths are perforated by a pair of flower-ſtalks, each bearing a ſingle flower. Sw. 19. D. *anceps*. Sw. "Stem two-edged, ſimple. Leaves in two ranks, lancet-ſhaped, flat. Flower-ſtalks very ſhort, in pairs from the baſe of the ſheaths." Sw. A native of the Eaſt Indies, known to us only by the above characters. 20. D. *moniliforme*. Sw. (Epidendrum moniliforme; Linn. Sp. Pl. 1352. E. monile; Thunb. Jap. 30. Fu Ran; Kæmpf. Exot. 864, cum ic.) Stem round, ſimple, jointed. Leaves linear-lanceolate, acute. Flowers on terminal, elongated, divaricated ſtalks. Spur rounded. Common upon trees, rocks, and walls in Japan, where it is uſual to hang up bunches of this plant in the houſes, in which ſituation it will, according to Kæmpfer, bear flowers and ſeed; and though it bloſſoms no more, it will retain life for ſeveral years. The *roots* creep by means of ſcyons. *Stems* cluſtered, erect, ſimple, of many ſtriated joints. *Leaves* coming after the flowers, linear-lanceolate, acute, chiefly about the tops of ſome of the ſtems. *Flowers* from the ſummits of the leafleſs ſtems, two, three, or more, together, on ſpreading ſtalks about an inch long. They are white or bluſh-coloured, with a thick rounded baſe or ſpur. The lip is ſpotted with purple. Kæmpf. Thunb. 21. D. *crumenatum*. Sw. (Angræcum crumenatum; Rumph. Amb. v. 6. 105. t. 47. f. 2.) "Stem ſomewhat branched, ſlightly compreſſed, tuberous at the baſe. Leaves ovato-lanceolate. Cluſters erect. Flowers in alternate diſtant pairs. Spur acute." Sw. Native of Java; Sw. Amboina; Rumphius. This ſpecies is but imperfectly known to us, though we have ſeveral from Dr. Buchanan, and there are ſome in Rumphius, nearly related to it, the preciſe determination of which muſt be reſerved for ſome future opportunity. Their *flowers* are generally large and handſome, often in pairs, with a conſiderably elongated ſpur-like baſe. *Stems* clothed with alternate *leaves*, of a coriaceous texture whith numerous ribs. 22. D. *polyſtachyon*. Sw. (Epidendrum minutum; Aubl. Guian. v. 2. 824. Heleborine ramoſa, floribus minimis luteis; Plum. Ic. 180. t. 185. f. 1.) "Leaves nearly radical, elliptic-lanceolate. Stem two-edged. Spikes numerous, alternate, all leaning one way." Sw. Native of Guiana, the Weſt Indies, and, according to Swartz, of Africa and the Eaſt Indies. *Root* of many thick, juicy, ſimple fibres. *Stem* ſolitary, clothed, at the very baſe only, with ſeveral broad-lanceolate, ſpreading, rigid, ribbed *leaves*. *Flowers* terminating the ſtem, which is otherwiſe ſimple, in ſeveral alternate, looſe, roughiſh ſpikes. *Bracteas* minute. *Petals* ſmall, yellowiſh. *Germen* long. *Capſules* elliptical. The flowers in Plumier's plate are very incorrect. 23. D. *criſpatum*. Sw. (Epidendrum criſpatum; Forſt. Prod. 60.) "Stem branched, wand-like. Leaves thread-ſhaped, ſomewhat incurved. Cluſters lateral, ſimple." Sw. Found in the Society iſles of the South ſea. The middle ſegment of the lip is revolute, undulated and crenate. Forſter. 24. D. *javanicum*. Sw. "Stem throwing out roots. Leaves ſtalked, erect, broad-lanceolate, obtuſe. Stalks many-flowered, from the baſe of the ſheathing footſtalks." Sw. A native of Java. 25. D. *ſpecioſum*. Sm. Exot. Bot. v. 1. 17. t. 10. Stem ſimple. Leaves nearly radical, elliptic-oblong. Cluſter ſolitary, terminal, many flowered. Lip three-lobed. Grows on rocks and trees about Port Jackſon, New South Wales. *Stem* ſhort and thick. *Leaves* almoſt entirely radical, from ſix to twelve inches long, more or leſs recurved, oblong or ſomewhat elliptical, ribbed, very tough and rigid. *Cluſter* ſolitary, on a terminal, ſcaly ſtalk, ſimple, a foot or more in length, conſiſting of a great number of alternate or ſcattered flowers, which are large and handſome, variegated with white, yellow, and pink, the lip dotted with purple. *Capſule* obovate, large. 26. D. *linguiforme*. Sm. Exot. Bot. v. 1. 19. t. 11. Stem creeping. Leaves ſeſſile, obo-

vate ſmooth, fleſhy. Cluſters from the baſe of the leaves. Lip revolute. Grows on rocks along the ſea-ſhore at Port-Jackſon, New South Wales. *Stems* branched, creeping, with very long, thick, fibrous roots. *Leaves* alternate, ſcarcely an inch long, ſeſſile, obovate or elliptical, ſmooth, extremely thick and juicy, convex beneath, furrowed above. *Stipula* ſolitary, ſheathing, membranous, very large. *Cluſters* ſolitary from each ſtipula at the baſe of the leaf, erect, about a finger's length, inveſted with a double ſheath of their own in the lower part, ſlender above, of ſix or more very elegant flowers. The *petals* and *calyx-leaves* are upright, linear, acute, cream-coloured. *Pouch* yellowiſh, ſhort. *Lip* narrow, acute, revolute, ſlightly three-lobed, blue near the baſe, yellowiſh and furrowed towards the extremity. 27. D. *pygmæum*. Stem creeeping, bulbiferous. Leaves nearly ſeſſile, elliptical, downy, coriaceous, ſolitary from each bulb. Cluſters .... Gathered on moſſy rocks and trees in New Zealand, by Mr. Archibald Menzies, F.L.S. This is but half the ſize of the laſt, with which it agrees ſo nearly in habit, that though its flowers are unknown, we ſcruple not to refer it hither. *Stems* thread-ſhaped, ſlender. *Leaves* alternate, on very ſhort footſtalks, elliptical, obtuſe, revolute, coriaceous rather than fleſhy; ribbed and roughiſh beneath; clothed above with ſhort, prominent, downy hairs. Each footſtalk proceeds from a little round bulb, like a ring, ſmooth and ſhining, yellowiſh, and much wrinkled in a dry ſtate, but apparently very ſucculent when freſh. 28. D. *reptans*. Sw. "Stem creeping, bulbiferous. Leaves ovate, in pairs from each bulb. Flower-ſtalks radical." Sw. Found in the iſland of Mauritius. Of this we know nothing but the above character of Dr. Swartz, who quotes in Schrader's Journal, 215, (where he originally made it a *Cymbidium*,) the Tjſeroutecka-maravara, Rheede Hort. Mal. v. 12. 45. t. 23, but with a mark of doubt. The plant there figured is cloſely allied to our laſt ſpecies, but its leaves are larger, ſmooth, emarginate, and their bulbs rather elliptical than annular. Each bulb bears but one leaf, which circumſtance does not accord with Dr. Swartz's ſpecific character. 29. D. *galeatum*. Sw. "Stem creeping. Branches ſheathed, ſingle-leaved. Leaves broad-lanceolate, obtuſe. Cluſters ſolitary, many-flowered, ſhorter than the leaves. Flowers conical, incurved, helmet-ſhaped." Sw. Gathered at Sierra Leone, Africa, by Dr. Adam Afzelius, as well as the three following, all known to us merely by the characters given in Dr. Swartz's work above quoted. 30. D. *pumilum*. "Stem creeping, thread-ſhaped, bulbiferous. Leaves oblong, ſolitary from each bulb. Flower-ſtalks from the baſe of the bulbs, very ſlender, elongated; zig-zag at their ſummits." Sw. 31. D. *roſeum*. "Stem leafleſs, upright, clothed with ovato-lanceolate membranous ſheaths. Cluſter terminal. Flowers conical, ſomewhat deltoid; lip ſpatulate, minutely crenate." Sw. 32. D. *paniculatum*. "Stem clothed in its lower part with oblong, obtuſe, emarginate leaves; in its upper two-edged and ſheathed. Spikelets thread-ſhaped, panicled, terminal. Flowers crowded, minute." Sw.

Dr. Swartz conjectures the *Epidendrum carinatum*, Linn. (Bontiana luzonica; Petiv. Gazoph. t. 44. f. 10.) may be of this genus, which, as far as can be gueſſed from Petiver's incomplete figure, is probable. Linnæus, who truſted to this figure alone, ſeems to have taken the bulbs for leaves.

Alſo the following:

Epidendrum graminifolium; Linn. known only by Plumier's Ic. t. 176. f. 1.

Epidendrum concretum; Jacq. Amer. 228.

Ceraia ſimpliciſſima; Loureir. Cochinch. 518.

Flos lyncis; Hernand. Mex. 266, a magnificent plant apparently moſt akin to our ſecond ſpecies.

The whole genus *Maxillaria* of the Flora Peruviana. See its Prodromus, t. 25.

With ſeveral ſpecies of *Angræcum* in Rumphius, to which we have already alluded; ſee his v. 6. t. 45—51.

DENDROMETER, (from δενδρον, *a tree*, and μετρεω, *I meaſure*,) an inſtrument for meaſuring trees. The firſt inſtrument for the purpoſe of meaſuring the trunk, the branches, and the height of a tree, without actually touching the tree, was contrived, not many years ago, by Meſſrs. Duncombe and Whittel, who called it the *dendrometer*, and obtained a patent for the excluſive ſale of it. Since this inſtrument ſerves to meaſure trees from a determinate diſtance, other inſtruments, contrived ſubſequent to it, for the purpoſe of meaſuring the ſizes as well as the diſtances of objects in general, though not particularly intended for the menſuration of trees, have likewiſe been called *dendrometers*. The principle of every one of thoſe inſtruments is, that a part of the inſtrument forms a baſe of known dimenſions, and the angle at each extremity of this baſe being meaſured with great accuracy, the diſtance of the object may be obtained by means of an eaſy calculation, or from a table. The diſtance being thus aſcertained, the ſize of the object will afterwards be eaſily determined from the angle which it is found to ſubtend. We ſhall now in the firſt place deſcribe Meſſrs. Duncombe and Whittel's original dendrometer; ſecondly, we ſhall deſcribe another inſtrument lately contrived for the purpoſe of meaſuring trees but by immediate contact; and ſhall, laſtly, give a general idea of the other inſtruments for meaſuring diſtances, &c. which have likewiſe obtained the name of *dendrometers*.

"Meſſrs. Duncombe and Whittel's dendrometer conſiſts of a ſemicircle A, (*Plate* VI. *Surveying*, *fig.* 7.) divided into two quadrants, and graduated from the middle. Upon the diameter B, there hangs a plummet, L, for fixing the inſtrument in a vertical poſition. There is alſo a chord, D, parallel to the diameter, and a radius, E, paſſing at right angles through the diameter and chord. From a point on the radius, hangs an altimeter C, between the chord and diameter, to which is affixed a ſmall ſemicircle G, and a ſcrew to confine it in any poſition. The altimeter, which is contrived to form the ſame angle with the radius of the inſtrument as the tree forms with the horizon, is divided from its centre both ways into 40 equal parts; and theſe parts are again ſubdivided into halves and quarters. Upon the ſmall ſemicircle, G, on which is accounted the quantity of the angle made by the altimeter and radius, are expreſſed degrees from 60 to 120; being 30 on each quadrant. The radius is numbered with the ſame ſcale of diviſions as the altimeter. There is alſo a nonius to the ſmall ſemicircle, which ſhews the quantity of an angle to every five minutes. On the back of this inſtrument the ſtock M, (*fig.* 8.) of the ſliding-piece is confined to the axis N, which moves concentrically paralliel to the elevation index, F, (*fig.* 7.) on the oppoſite ſide, to which it is affixed. This index is numbered by a ſcale of equal diviſions with the altimeter and radius. At the end of the index is a nonius, by which the angles of elevation above or of depreſſion below the horizon, meaſured upon the ſemicircle of the inſtrument, are determined to every five minutes. There is alſo a groove in the radius, that ſlides acroſs the axis by means of a ſcrew, I, working between the chord and ſemicircle of the inſtrument; and this ſcrew is turned by the key O. Upon the ſtock, M, (*fig.* 8.) is a ſliding piece, P, that always acts at right-angles with the altimeter, by means of a groove in the latter. To the ſhank of the ſliding piece is affixed a moveable limb, Q, which

forms the ſame angle with the altimeter as the bough forms with the body, or trunk, of the tree. This limb may be of any convenient length, divided into equal parts of the ſame ſcale with all the foregoing diviſions."

"At the extremity of the fixed axis, on a centre, an index, R, with teleſcopic ſights, works horizontally upon the moveable limb of the ſliding piece. Upon this horizontal index, R, may be fixed a ſmall quadrant, T, deſcribed with any convenient radius from the centre, on which the index moves, and divided into 90°; beginning at a right line drawn from the centre at right angles with the fiducial edge of the ſaid index; and upon the extremity of the axis is a nonius, whereby to determine the quantity of an angle upon the quadrant to every five minutes. There are alſo two ſmall circular arches, S, S, ſerving to keep the ſights in a parallel poſition, each containing an equal number of degrees. Upon theſe arches is meaſured the angle, ſubtending a ſide equal to the difference of the altitudes of the obſerved objects, above the plane of the horizon, and whoſe baſe is the neareſt diſtance between the perpendiculars, in which thoſe objects are ſituated. The *dendrometer* is fitted to a theodolite, and may be uſed either with or without it, as occaſion requires."

"The principal uſe of this inſtrument is for meaſuring the length and diameter of any tree, perpendicular, or oblique, to an horizontal plane, or in any ſituation of the plane on which it reſts, or of any figure, whether regular or irregular, and alſo the length and diameter of the boughs, by mere inſpection; and the inventors of it have calculated tables, annexed to their account of the inſtrument itſelf, by the help of which the quantity of timber in any tree is obtained without calculation, or the uſe of the ſliding rule.

"The inſtrument is rectified by ſetting it in a perpendicular poſition, by means of the plummet, and ſcrewing it to the ſtaff; then the altimeter is placed in the exact poſition of the tree, whether perpendicular, reclining, or inclining, and is ſcrewed faſt. If the tree ſtands on level ground, the horizontal diſtance from the tree to the axis of the inſtrument is meaſured with a tape line, and the radius is moved with the key, till that diſtance be cut upon it by the inſide of the diameter: but if the ground be ſlanting, the diſtance from the tree to the inſtrument is meaſured, and the elevation index is moved, till the point of the tree, from which the diſtance was meaſured, is ſeen through the ſights, and there ſcrewed faſt; and the radius is moved backwards or forwards with the key, till this diſtance is cut upon the elevation index by the perpendicular line of the altimeter; and the horizontal line will be marked upon the radius by the inſide of the diameter. In order to obtain the length of the tree, the elevation index is firſt moved downwards, till the bottom of the tree, cut by the horizontal wires, is obſerved through the ſights, and the feet and inches marked by the index upon the altimeter below the point of ſight, or horizontal line, are noted down: then the index is moved upwards, till the part which you would meaſure, cut by the horizontal wires, is ſeen, and the feet and inches marked on the altimeter, above the point of ſight, are noted: theſe two quantities added together, give the exact length of the tree, which is inſerted in a field-book. For the girth of the tree, the circumference in that part where the horizontal diſtance was taken, is meaſured with the tape line; and a ſixth part of this circumference is added to the diſtance on the radius, which was before cut by the inſide of the diameter, becauſe the tape-line, in taking the diſtance, cannot be applied to the centre of the body of the tree; then the elevation index is lowered to that part of the tree, of which the diameter is to be taken, and is ſcrewed faſt. Set the moveable limb of the ſliding-piece quite ſtraight; and the edge of the horizontal index upon the firſt diviſion of it. Turn the whole inſtrument about to the left hand, till you ſee, through the ſights, the left ſide of the tree cut exactly by the perpendicular wires; then the inſtrument being fixed, move the ſights only upon the ſliding-piece, till you ſee the right ſide of the tree, cut alſo by the perpendicular wires, and you will find the true diameter, marked by the horizontal index upon the ſliding-piece, which is to be entered in a diſtinct column of the field-book.

"For the boughs: let the diſtance on the radius be now reduced to its former quantity, and the elevation index moved upwards, till the bough is ſeen through the ſights, and ſcrewed faſt. Set the moveable part of the ſliding piece in a poſition parallel to the bough, and the edge of the horizontal index on the firſt diviſion of it. Turn the whole inſtrument about, till you ſee, through the ſights, the ſhoot of the bough, cloſe to the trunk cut by the perpendicular wires; then move the ſights, till you ſee the other end of the bough cut by the ſaid wires, and note the feet and inches marked by the horizontal index on the moveable limb of the ſliding piece, which will give the true length of the bough to be inſerted in the field-book. And the girth of the bough may be obtained, by directing the ſights to that part of it, whoſe girth is deſired; then by moving the elevation index downwards, till you ſee the under-ſide of the bough cut by the horizontal wires, and there noting the feet and inches marked by the ſaid index on the altimeter; after which let the elevation index be moved upwards, till the upper ſide of the bough, cut by the horizontal wires, is ſeen; the feet and inches marked upon the altimeter are to be noted as before: the former quantity ſubtracted from the latter, will give the true diameter of the bough, which is entered in the field-book. The true ſolidity, both of the body of the tree, and of the boughs, may be found from the diameter and lengths, in tables calculated for this purpoſe.

"The dendrometer, fitted to a theodolite, may be applied to the meaſuring of heights and diſtances of objects acceſſible or inacceſſible, whether ſituated in planes parallel, or oblique, to the plane in which the inſtrument is placed. It may be alſo uſed for taking all angles, whether vertical, horizontal, or oblique, in any poſition of the planes in which they are formed; and thus for facilitating the practical operations of engineering, land-ſurveying, levelling, mining, &c. and for performing the various caſes of plane trigonometry, without calculation; of which the inventors have ſubjoined a variety of examples to their account of the inſtrument in their treatiſe upon the *Dendrometer*."

Notwithſtanding the oſtenſible extenſive application of this inſtrument, it does not appear that the uſe of it has been generally adopted, which may be principally attributed to its complicated conſtruction.

The 25th volume of the Tranſactions of the Society for the encouragement of Arts, Manufactures, and Commerce, contains a very uſeful and ſimple machine for the meaſurement of the girths of trees, to which the inventor, Mr. James Broad, gives the name of *Gauge*, or *Meaſure for Timber*, but which in fact is a dendrometer in the ſtrict ſenſe of the word, and it therefore deſerves a place in the preſent article. This inſtrument is repreſented in *Plate* III. *Surveying*, *fig.* 9. *a a*, *a a*, Mr. Broad ſays, are two long pieces of well-ſeaſoned wood, joined near the middle by a pin, *b*, going through them, forming an axis on which they move: *c*, *c*, are two pieces of braſs ſcrewed near the upper ends, on the ſides oppoſite to each other, and projecting over to form the meaſuring points: *d*, is the index faſtened to one of the pieces of wood at *e*, and moving freely under a ſmall bar at *f*:

g, *g*,

g, *g*, are ſcrews with nuts, placed in the middle of the long ſlits of the two arms, to wedge them open, whereby the vibration is deſtroyed, and the arms, though light, are rendered ſtiff: *h*, *h*, *h*, *h*, are ſcrews and nuts, to prevent the arms from ſplitting. With reſpect to the general conſtruction, uſe, and improvements that may be made to it, Mr. Broad expreſſes himſelf in the following manner.

"The inſtrument is compoſed of two ſtraight pieces of well-ſeaſoned deal, about 13 feet long, joined together by a pin going through them, on which they are moveable; but neither the length nor thickneſs is of any particular conſequence, as by following the directions hereafter given, they may be made of any ſize. A little way from the large end is a braſs limb, I call the index, on which are engraven figures denoting the quarter-girth in feet and inches. To uſe this inſtrument, it is only neceſſary to take hold of the large end, and apply the other to that part of the tree where you wiſh to know the girth, opening it ſo wide as juſt to touch at the ſame time both ſides of it, without ſtraining it, keeping the graduated ſide of the index uppermoſt, on which the greater girth will be ſhewn, after allowing for the bark, by the inner edge of the braſs on the right-hand leg. An operation ſo eaſy and ſimple, that a perſon of the meaneſt capacity might meaſure a great number of trees in a day.

"For taking the height of a tree, I would recommend deal rods of ſeven feet long, made ſo as to fit into ferrils at the end of each other, tapering all the way in the ſame manner as a fiſhing-rod. A ſet of five of them with feet marked on them, would enable a man quickly to meaſure a tree of more than 40 feet high, as he would be able to reach himſelf about ſeven feet.

"The improvements it is capable of, are, making a joint in the arch or ſcale, to enable it to ſhut up, (when the legs are cloſed) towards the centre, which would make it eaſier to carry. Secondly, as it ſometimes happens that ſtanding timber is ſold without any allowance for bark, and at other times with a leſs allowance than one inch in 13, two other ſcales on the index might be added in ſuch caſes, one without any allowance, and the other to allow as might be agreed on. I would have added theſe, but thought the ſociety would rather ſee it in the ſtate in which it has been tried on a large ſurvey, as any artiſt can with great eaſe add whatever ſcale he pleaſes. The preſent ſcale allows one inch in 13 for bark, and is calculated on the following data. The diameter of a circle, whoſe quarter-circumference is 26 inches, is 33.96 inches. The diameter of a circle, whoſe quarter-girth is $6\frac{1}{2}$ inches, is 8.27 inches. To graduate the ſcale, the inſtrument is opened ſo as to take in at the ſmall end between the touching points 8.27 inches, and a mark is made on the arch to denote 6 inches quarter-girth; it is then opened ſo as to take in 33.96 inches, and another mark is then made on the arch, to denote 2 feet quarter-girth; (theſe marks are made cloſe to the inner edge of the braſs on the right-hand limb:) the ſpace between them is then divided into 18 parts, which repreſent inches, and are again divided into halves, for half-inches; if any notice is to be taken of quarter-inches, the eye will eaſily make a farther deciſion."

The methods of determining the diſtances and ſizes of objects placed at a diſtance from the obſerver, depend entirely upon trigonometrical principles; and thoſe methods for effecting that purpoſe, which ſeem to differ from trigonometrical principles, will upon examination be found to be nothing more than trigonometrical methods abridged or diſguiſed. The general principle upon which all the operations of plane trigonometry depend, is to find out three of the ſix parts of a triangle, when the other three are known; (the ſix parts being the three ſides and the three angles;) excepting, however, when the three angles are given; for in this caſe the proportion only of the three ſides may be found; but not their actual lengths.

When an inacceſſible diſtance is to be determined by trigonometry, the method is to meaſure a line or baſe upon any convenient place, and to obſerve the angles which the imaginary lines, ſuppoſed to be drawn from the extremities of that baſe line to a point or object at the extremity of the diſtance ſought, make with the baſe; for in that caſe we have two angles, and one ſide of a triangle, whence we find by calculation the lengths of the other ſides, one of which is the diſtance ſought. If an object of any known dimenſions be ſituated at the extremity of the diſtance ſought, that diſtance may then be determined without the neceſſity of aſſuming a baſe line upon the place of obſervation; for in that caſe, the object itſelf will be ſuppoſed to form the baſe of an iſoſceles, or of a right-angled triangle; and it will be only neceſſary to meaſure the angle which that object ſubtends at the place of obſervation. The diſtance of an object being known, the ſize of the object may be eaſily determined by only meaſuring the angle which it ſubtends. See TRIGONOMETRY.

Now the dendrometers for meaſuring diſtances from a ſingle ſtation, are ſo conſtructed as to have a line of a determinate length within themſelves, which ſerves as a baſe line, and two divided circular arches, or ſome other contrivance by which the angle which the direction of a diſtant object makes with that baſe line at each extremity of it, may be meaſured. But as ſuch inſtruments cannot be made of an inconvenient large ſize, the baſe line which they contain is but ſhort, and the error of the calculation is greater when the baſe line is ſhorter, and *vice verſâ*; whence ſuch inſtruments ſeldom furniſh a reſult ſufficiently exact, at leaſt for certain purpoſes.

The moſt complete inſtruments of this kind are furniſhed with two or more ſpeculums, (ſomewhat in the manner of Hadley's quadrant,) for meaſuring the difference of the angles at once. Upon this plan ſeveral inſtruments have been contrived and offered to the public by various writers. One of the moſt promiſing, though not the moſt compact, is deſcribed in "Gower's Supplement to the Practical Seamanſhip." But as we are not acquainted with the conſtruction of any inſtrument of this kind, that is quite free from ſtrong objections, we ſhall only ſubjoin a general idea of the principles upon which ſuch an inſtrument may be conſtructed; for the uſe of thoſe perſons who may be deſirous of employing their thoughts upon the poſſible improvements of that conſtruction.

The following plans are ſuggeſted by William Pitt, eſq. in the ſecond volume of the Repertory of Arts; which, he ſays, may perhaps be otherwiſe varied and improved.

"O, (*fig.* 10.) is the object, whoſe diſtance is required. A B C D E is the inſtrument *in plano*; B C a teleſcope placed exactly parallel to the ſide A E. C E an arch of a circle whoſe centre is at A, accurately divided from E, in degrees, &c. A D is an index, moveable on the centre A, with a nonius at the end D, graduated to apply to the diviſions of the arch; alſo with a teleſcope, to enable the obſerver to diſcriminate the object, or any particular part, or ſide, thereof, the more accurately. The whole ſhould be mounted on three legs in the manner of a plane-table or theodolite, and furniſhed with ſpirit levels, to adjuſt it to an horizontal poſition. The inſtrument being placed in ſuch poſition, the teleſcope B C muſt be brought upon the object O, or rather upon ſome particular point or ſide thereof; when,

when, being there faſtened, the index A D muſt be moved, till its teleſcope exactly ſtrikes the ſame point of the object; then the diviſions on the arch E D, mark out the angle D A E, which will be exactly equal to the angle B O A. And the ſide B A being already known, the diſtance B O, or A O, may be eaſily determined two different ways; *viz.* 1ſt, by ſuppoſing the triangle B O A to be an iſoſceles triangle; or, 2dly, by ſuppoſing the triangle A B O right-angled at B. The accuracy of ſuch an inſtrument does, *cæteris paribus*, much depend upon the length of the line A B.

"The conſtruction of a ſimilar inſtrument, on the principles of Hadley's quadrant, for naval obſervations, would alſo doubtleſs be an acceptable object in navigation, by enabling the mariner to aſcertain the diſtances of ſhips, capes, and other objects, at a ſingle obſervation; and that perhaps with greater accuracy than can be done by any method now in uſe.

"For this purpoſe, the following conſtruction is propoſed. A B C D, (*fig.* 11.) repreſents the inſtrument *in plano*. O is the object whoſe diſtance is required. At A, at C, at D, and at 3, are to be fixed ſpeculums, properly framed and fitted; that at 3 having only its lower part quickſilvered, the upper part being left tranſparent, to view the object; the ſpeculum at A being fixed obliquely, ſo that a line A 1, drawn perpendicular to its ſurface, may biſect the angle B A C in equal parts; that at C being perpendicular to the line C 2; thoſe at E, and at 3, being perpendicular to the index E 3; and that at E being furniſhed with a ſight. The arch D C is to be divided from D, and the motion of the index is to be meaſured as before by a nonius. And as the length of the line A E would tend to the perfection of the inſtrument, it may be conſtructed ſo as to fold up in the middle, on the line C 2, into leſs compaſs when not in uſe. The inſtrument may be adjuſted for uſe, by holding up a ſtaff at a diſtance, whoſe length is exactly equal to the line A E.

"To make an obſervation by this inſtrument, it being previouſly properly adjuſted, the eye is to be applied at the ſight in the ſpeculum E, and the face turned towards the object; when the object being received on the ſpeculum A, is reflected into that at C, and again into that at E, and that at 3 on the index; the index being then moved till the reflected object, in the ſpeculum at 3, exactly coincides with the real object in the tranſparent part of the glaſs. Then the diviſions on the arch D 3, ſubdivided by the nonius, will meaſure the angle D E 3 = A O E; from which the diſtance of O may be determined as before."

When a ſtraight line of at leaſt 10 or 20 feet, may be meaſured at the ſtation, where the obſerver is ſituated, and in the direction of a diſtant object; the ſize and diſtance of that object may be determined by the uſe of a moſt ſimple inſtrument; namely, a teleſcope furniſhed with a micrometer, and thus trees and other objects may be meaſured in a manner extremely commodious and ſufficiently accurate. The problems neceſſary for this purpoſe, as given by Mr. Cavallo in the deſcription of his "Teleſcopical Mother-of-Pearl Micrometer," will be found under the article MICROMETER.

DENDROPHORIA, formed of δενδρον, *tree*, and φερω, I *bear*, in *Antiquity*, the carrying of one or more trees, in ceremony, through a city, at certain feaſts, and in honour of certain deities.

The dendrophoria was performed at the ſacrifices of Bacchus, Cybele, and the god Sylvanus. Arnobius, lib. v. makes mention of that performed in the ſacrifices of the mother of the gods. It conſiſted in carrying a pine in proceſſion through the city; which pine was afterwards planted in memory of that under which Atys, the favourite of this goddeſs, mutilated himſelf. The branches of this tree they crowned, in memory of Cybele's doing the ſame; and they covered its trunk with wool, becauſe the goddeſs covered Atys's breaſt with the ſame matter.

The perſons who performed the office of carrying the tree were called dendrophori.

In the Roman hiſtory we find mention made of a company or college of dendrophori, who attended the army; and the critics have laboured much to aſſign their office. Some hold, that they hewed and faſhioned the wood for the tents: others, that they provided the wood neceſſary for the military works, machines of war, &c. Salmaſius, in his notes to the life of Caracalla by Spartian, owns this to be the general opinion of all the learned men of his time; but aſſures us, that they were all miſtaken, and that the dendrophori of the army were the ſame with thoſe of the feaſts and ſacrifices.

DENEB, an Arabic term, ſignifying tail; uſed by aſtronomers as a denomination of ſeveral fixed ſtars.

Thus deneb elecet ſignifies the bright ſtar in the Lion's tail; deneb adigege, that in the Swan's tail, &c.

DENEB, or ALDENEB, *Alcahil*, in the *Writings of the Arabian Phyſicians*, the name of the equiſetum or horſe-tail; there is, however, no great dependence to be had on what authors ſay of this plant.

DENE'E, in *Geography*, a ſmall town of France, in the department of Maine and Loire; 9 miles S. of Angers.

DENEITER, a town of America, in the ſtate of New York, and county of Chenango, containing 310 inhabitants.

DENEUVRE, a ſmall town of France, in the department of the Meurthe; 3 miles S.E. of Baccarat, and 12 miles S.E. of Luneville. It is ſituated on the river Meurthe.

DENEZ'E, a town of France, in the department of the Maine and Loire; 8 miles W. of Saumur.

DENFIELD, a town of America, in New York, and county of Oneida, containing 1039 inhabitants.

DENGLING, a town of Germany, in the circle of Bavaria, and archbiſhopric of Saltzburg; 20 miles N.W. of Saltzburg.

DENGUIN, a ſmall town of France, in the department of the Lower Pyrenées; 3 miles W. of Leſcar.

DENHAM, Sir JOHN, in *Biography*, a poet who has obtained celebrity, chiefly, if not entirely, on account of a few happy couplets that have been quoted a thouſand times as illuſtrative of high poetic excellence. He was born at Dublin in 1615; his father, ſir John, being at the time of the ſon's birth, chief baron of the exchequer in Ireland; an office which he did not long enjoy, as he returned to England in 1617. The young man having laid the foundation of a learned education at a grammar-ſchool, was, at the age of ſixteen, entered a gentleman commoner in Trinity college, Oxford. As a ſtudent he did not by any means diſtinguiſh himſelf, but nevertheleſs obtained his bachelor's degree, and removed to Lincoln's-Inn to ſtudy the law. At college he had acquired an unfortunate propenſity for gaming, which in London rather increaſed than diminiſhed. In theory he felt as much as any man the folly and guilt of the practice, and wrote an eſſay on the ſubject, expoſing its enormity, but he was ſtill a practical gameſter, and, after the death of his father, loſt much of the property that had devolved to him by the ſolemn event. In the year 1641 he commenced his literary career, and brought out a tragedy, entitled "The Sophy," which, though now forgotten, was well received on the ſtage, and admired in the cloſet. As a political

cal character he adhered to the king's party, and was appointed, ſoon after the breaking out of the civil wars, governor of Farnham caſtle; an honour which he ſoon reſigned, his mind being ill-adapted to a military life. He ſtill remained with the court, and performed ſome ſignal ſervices for the king, during his calamities. It does not appear how the poet was employed, or ſupported, during the interval between the execution of Charles I. and the reſtoration of his ſucceſſor. It was, however, very early in the civil broils of the nation, that he publiſhed his poem, entitled "Cooper's Hill," which very ſoon underwent ſeveral conſiderable editions, and which is ſtill read and referred to, on account of ſome excellent and highly expreſſive lines, and alſo becauſe it is one of the earlieſt examples of local deſcription united with hiſtorical and ſentimental matter. The lines which have excited the moſt attention are part of a deſcription of the river Thames:

O could I flow like thee, and make thy ſtream,
My great example—as it is my theme!
Tho' deep, yet clear; tho' gentle, yet not dull;
Strong without rage: without o'erflowing, full.

Of theſe lines Dr. Johnſon ſays: "But ſo much meaning is confined in ſo few words; the particulars of reſemblance are ſo perſpicaciouſly collected, and every mode of excellence ſeparated from its adjacent fault, by ſo nice a line of limitation; the different parts of the ſentence are ſo accurately adjuſted, and the flow of the laſt couplet is ſo ſmooth and ſweet, that the paſſage, however celebrated, has not been praiſed above its merit. It has beauty peculiar to itſelf, and muſt be numbered among thoſe felicities which cannot be produced at will by wit and labour, but muſt riſe unexpectedly in ſome hour propitious to poetry." Much has been written by way of accounting for the beauty of theſe lines: Mr. Maſon, in his Eſſay on the Power of Numbers and Principles of Harmony, after a critique of ſome length, ſays, "the beauty of this diſtich conſiſts in two things, *viz.* the elegance of the ſtyle, and the harmony of the verſe. The elegance of the ſtyle ariſes from the tranſpoſition of the words, the propriety of the pauſes, and the contraſts of the deſcription: and the harmony of the verſe ariſes from the variety and diſpoſition of the numbers happily adapted to the emphaſis of the words, and the nature of the ſubject."

To return however to the author; ſoon after the reſtoration he obtained the office of ſurveyor of the king's buildings, in the room of Inigo Jones, and was created knight of the bath, and a member of the royal ſociety. Amidſt theſe honours, accompanied with ſome emoluments, he was doomed to much diſquietude from a ſecond marriage, which terminated in a temporary inſanity, from which however he recovered, and continued highly eſteemed by the great and the wiſe till his death, which happened in the ſpring of 1668. His remains were depoſited in Weſtminſter Abbey. Biog. Brit. Johnſon's Poets.

DENIA, in Latin *Dianium*, from Diana, in whoſe honour it was built by a colony from Marſeilles ſome centuries before the Chriſtian era, is a town of Spain, in the province of Valencia, on the declivity of a mountain, ſtretching towards the ſea; 63 miles N. by E. of Alicante, 54 miles S.E. of Valencia, oppoſite the iſland of Ivica, containing 1500 inhabitants. N. lat. 38° 56'. It has a ſtrong caſtle, and a convenient harbour, and is remarkable for a tower of great height, from whence veſſels are perceived at a great diſtance at ſea. The Mooriſh kings reſided here from A. D. 1015 to 1244.

DENIER, in *Coinage*, the French penny; a ſmall copper coin, twelve whereof make a ſol, or French ſhilling.

The French denier is now about the twenty-third part of the Engliſh penny. It is ſubdivided into two mailles, and the maille into two oboles. Anciently denier was a general name for all ſorts of monies in France; as nummus for thoſe of Rome. Thus, a piece of gold money was called denier d'or, ſilver money, denier d'argent: after the ſame manner as the Romans ſaid nummus aureus, and nummus argenteus.

There are two kinds of deniers; the one Tournois, the other Pariſis; whereof the latter was worth a fourth part more than the former, and was called monnoy royale, or forte monnoye, and ſometimes denier d'or, and denier à valeur d'or. See MONEY, &c.

There are at preſent in France ſeveral little copper pieces, which, having no proper name, are diſtinguiſhed only by their value in deniers; ſuch are the pieces of 36. 30. 24. 18. 12. 6. 4. and 2 deniers. The pieces of 4 and 2 deniers were coined at Straſburg for currency in their province of Alſace, purſuant to the declaration of Sept. 6, 1695. Thoſe of ſix deniers were coined in the mints of Aix, Montpelier, Rochelle, Bourdeaux, and Nantz, by the edict of 1709, and are little current. Poſt. Dict. Comm.

DENIS, ST., in *Geography*. See ST. DENYS.

DENIS, *St.*, the chief town of the iſle of Reunion, formerly called Bourbon; and the reſidence of the governor of the colony. The abbé de la Caille has, by aſtronomical obſervations, aſcertained the ſituation of the town in 20° 51' S. lat., and 53° 10' E. long. from the meridian of Paris.

DENIZEN, from the Britiſh *dinaſddyn*, man of the city, or *dineſyddl*, free of the city, in *Law*, an alien enfranchiſed in England by the king's letters-patent, and donation; and thereby enabled, in many reſpects, to do as the king's native ſubjects do: namely, to purchaſe, poſſeſs, and deviſe lands, &c.

Denizenſhip is a right inferior to naturalization by parliament: for a ſtranger naturalized may inherit lands by deſcent which a denizen cannot. A denizen is in a kind of middle ſtate between an alien and a natural born ſubject, and partakes of both of them. He may take lands by purchaſe or deviſe, which an alien may not; but cannot take by inheritance; (11 Rep. 67.) for his parent, through whom he muſt claim, being an alien, had no inheritable blood, and therefore, could convey none to the ſon. And, upon a like defect of hereditary blood, the iſſue of a denizen, born *before* denization, cannot inherit to him; but his iſſue born *after*, may. (Co. Litt. c. 8. 8 Vaugh. 285.) A denizen is not excuſed from paying the alien's duty, (ſtat. 22 Hen VIII.) and ſome other mercantile burthens. No denizen can be of the privy council, or either houſe of parliament, or have any office of truſt civil or military, or be capable of any grant of lands, &c. from the crown. (Stat. 12 Will. III. cap. 2.) See ALIEN.

Add, that, in the charter, whereby a perſon is made a denizen, there is uſually ſome clauſe or other, which abridges him of that full benefit which natural ſubjects enjoy.

When a man is thus enfranchiſed, he is ſaid to be *ad fidem regis Angliæ*, or under the king's protection; till ſuch time his goods might be ſeized to the king's uſe.

DENMARK, in *Geography*, in Latin *Dania*, in German *Dänemark*, one of the moſt ancient monarchies of modern Europe; compriſes 1. Denmark Proper, or the peninſula of Jutland, the ſouthern part of which is called the duchy of Sleſwick; with ſeveral iſlands in the Baltic, the principal of which are Zealand, Funen, Laaland, Langeland and Falſter. 2. The duchy of Holſtein in Germany. 3. The kingdom of Norway with Finmark and part of Lapland. 4. Iceland. 5. The Faro or Ferro iſlands. 6. Greenland. 7. The iſlands

iſlands of St. Thomas, St. Croix, and St. John, in the Weſt Indies, which at this time, 1808, however, are in the poſſeſſion of the Engliſh. And, 8. The eſtabliſhment of Tranquebar, on the coaſt of Coromandel, in the Eaſt Indies, which has ſhared the ſame fate.

Denmark Proper is ſituated between 54° 20′, and 58° 40′ north latitude, and 8° 10′, and 12° 40′ eaſt longitude. It is that part of the Scandinavia of the ancients which they called Cherſoneſus Cimbrica. Its name ſeems to be derived from the ancient Teutonic words *dane* or *thane*, a prince or lord, and *mark*, a boundary or frontier country, correſponding in ſome degree with the German *marggrafſchaft*, a frontier country, confided to the protection of an earl. Saxo Grammaticus, however, is of opinion that Denmark ſignifies the country of Dan, who is ſuppoſed to have lived 1038 years before the Chriſtian era, and to have raiſed himſelf to the throne by his courage and ſkill in war. But it is uncertain whether any ſuch king ever exiſted, unleſs it be Dan Mikillati, or the Haughty, mentioned by the hiſtorians of Iceland as having reigned in the year of Chriſt 146. Others pretend that the river Eyder, which ſeparates Denmark from Germany, was anciently called Don, Dana, or Dena, and that all the country now called Jutland was from that river named Dania, or Denmark, which appellation was alſo applied to the conquered iſlands. The name of Denmark may perhaps be traced in the old Britiſh word *Dan*, a ſtrong fortification.

Nearly at the time when Rome paſſed under the authority of emperors, that part of the north of Europe, known to the Romans by the name of Scandinavia, was invaded by a fierce people emigrated from the banks of Boryſthenes and the Tanaïs. The natives adopted the language, religion, and manners of their conquerors. With them they formed a nation that acted a conſpicuous part in the revolution which altered the political exiſtence of Europe after the fall of the Roman empire. Three diſtinct ſtates aroſe by degrees, Denmark, Sweden, and Norway; yet the uncertainty of their limits created frequent and bloody contentions. At the death of Rolf Krake, who is ſuppoſed to have reigned in the ſixth century, ſeveral tributary chiefs ſhared Denmark among themſelves and formed ſmall independent kingdoms; but new diſſenſions aroſe, and at length the three kingdoms of Denmark, Sweden, and Norway united under one chief, formed a powerful monarchy under the deſcendants of the firſt kings of Denmark. The ancient annals of the north extol the exploits of Ragnar Lodbroek, the laſt of thoſe powerful princes. In his attempt to invade England he was made a priſoner and put to death. His ſons divided his extenſive dominions among themſelves. Denmark again acknowledged a ſeparate king.

Powerful rivals, however, ſtarted up in ſome provinces; it was but in the tenth century that they were ſubdued. Schonen, Halland, and Blekingen, three Swediſh provinces ſituated on the other ſide of the Sound, were ceded by Emund, king of Sweden, to Swein. This king conquered all Norway and a conſiderable part of England; the complete conqueſt of which was achieved by his ſon Knut, or Canute the Great. But Magnus, a deſcendant from the kings of Norway, reconquered that kingdom in 1036, and England ſhook off the Daniſh yoke at the death of Hardeknut, or Hardy Canute, one of the ſons of Canute the Great, after whom the Daniſh crown paſſed in 1076 to his ſiſter's ſon, Swein Eſbrithſon. The latter began a dynaſty which held the ſceptre of Denmark for nearly four hundred years.

In the twelfth century Waldemar I. waged war againſt the Vandals who occupied the greateſt part of northern Germany. He took the iſland of Rugen, the town of Stettin, and ſeveral other places in Pomerania. In 1165 he is ſaid to have laid the foundations of Dantzic. In 1169 he ſubdued Courland, and eaſily maintained his authority in his new poſſeſſions, the emperor Frederick Barbaroſſa being favourable to his ſchemes of aggrandizement. He died in 1180. In the year 1195 his ſon Canute cauſed a muſter to be made of all the men fit to bear arms in his dominions, and ordered each province to fit out its proportion of ſhipping, when the whole naval force of Denmark was found to conſiſt of 670 ſhips. Aſſiſted by his brother, and by Abſalom biſhop of Roſchild, he made the conqueſt of part of Holſtein and of the cities of Hamburgh and Lubeck. Both the duke of Pomerania and the prince of Mecklenburg acknowledged themſelves his vaſſals. He died in 1202, and left the throne to his brother Waldemar II., a no leſs ambitious and warlike prince.

After having obtained from the emperor of Germany the ſanction of his claims on the countries conquered from the empire during the two preceding reigns, Waldemar II. ſet ſail for Eſthonia to convert the idolatrous inhabitants of that coaſt of the Baltic to Chriſtianity. But diſmayed at the unuſual ſight of numerous hordes of ſavages, clothed in ſkins, ready to oppoſe them, his troops were going to fly; when, encouraged by the biſhops who attended the king, they ruſhed on the enemy. The report of a banner having been ſent from heaven rallied the fugitives, and led them on to victory. This banner, which was religiouſly kept as a precious relic, under the name of Danebrog, became the oriflame or ſacred ſtandard of Denmark. The vanquiſhed Eſthonians acknowledged the God of the Chriſtians, and ſubmitted to Waldemar, whoſe powerful ſway was extended to both the ſouthern and eaſtern coaſts of the Baltic.

From an account copied by Pontanus from Wilfeld, who aſſerts that he had it from a regiſter kept by Waldemar's ſteward, it appears that the tributary provinces ſent in daily 24 laſts of oats, 24 laſts of rye, half that quantity of wheat, 13 talents of butter and cheeſe, and nine of honey, 24 oxen, 300 ſheep, 200 hogs, and 600 marks of coined money, beſides fines, forfeitures, taxes on law ſuits and pleadings, and other contingencies, amounting in all to upwards of 100,000 marks a-day. With this almoſt incredible revenue, 1400 great and ſmall ſhips of war were kept in conſtant ſervice for the uſe of the crown. Each ſhip carried 121 ſoldiers.

But Waldemar outlived the greatneſs of his power and the ſplendour of his glory. In the year 1223, Henry earl of Schwerin, a prince of Mecklenburg, ſurpriſed and carried him off whilſt he was engaged in a chace. The conquered countries immediately proclaimed their independence. Waldemar was kept a cloſe priſoner for three years, at the end of which he obtained his liberty on the moſt humiliating conditions, to the obſervation of which he bound himſelf by a ſolemn oath. Having however procured a diſpenſation from the pope, he attempted to regain his loſt dominions, and in the year 1227 entered Holſtein with a numerous army. But fortune no longer befriended him. His troops were defeated with great ſlaughter by the Germans at Bornhoevede. At his death, which happened in 1242, Denmark, of all his conqueſts in the Baltic, retained only a ſmall part of Eſthonia and the iſland of Rugen, which a hundred years later paſſed under the dominion of the dukes of Pomerania. Eſthonia was ſold in the year 1346 to the knights of the Teutonic order, who at that time were ſovereigns of Pruſſia.

But before theſe two laſt remnants of the conqueſts of three fortunate princes were loſt, Denmark experienced a long ſeries of misfortunes. Waldemar II. had left the crown to his eldeſt ſon Eric, and the duchy of Sleſwick to his ſecond ſon Abel. In the year 1250, Eric intreated

Abel's

Abel's mediation with the princes of Holſtein, with whom he was at war; but Abel had him treacherouſly murdered at ſea. Abel however did not long enjoy a crown which he had ſo infamouſly acquired. His ſubjects having riſen in arms againſt him in 1252, he was ſlain in a battle which he fought to quell the inſurrection.

Chriſtopher I., who ſucceeded Abel on the throne, had to reſiſt the uſurpations of ſeveral rivals. His more fortunate ſucceſſor, Eric Menved, kept thoſe potent vaſſals in awe. But under Chriſtopher II. the kingdom was torn by the moſt violent factions. The nobles aſſumed arrogant powers; the towns to reſiſt them, ſent deputies to the herredage or diets of the kingdom; and the peaſants or farmers, who as land owners had till then been ranked among thoſe nobles that were not in the king's ſervice, began to form a ſeparate claſs. Theſe encroachments left the king a bare ſhadow of authority, and ſcarcely any revenue. In this diſtreſs he mortgaged ſeveral provinces to the very vaſſals whoſe power he vainly attempted to reduce. The death of Eric, duke of Sleſwick, which happened in 1325, increaſed his difficulties. The duke having left a ſon under age, Chriſtopher claimed the guardianſhip of the young prince; but his claim was reſiſted by Gerhard, earl of Holſtein, as maternal uncle of the minor. Chriſtopher had recourſe to arms; but was defeated near Gottorp. Encouraged in their factious views by this defeat, his rebellious ſubjects proclaimed that Chriſtopher and his eldeſt ſon Eric had forfeited the crown. Eric fell into the hands of the rebels, who kept him cloſely confined in a ſtrong caſtle. The king himſelf fled into Mecklenburg with his two younger ſons Otto and Waldemar. The young duke of Sleſwick, whoſe name was alſo Waldemar, was at firſt proclaimed king, and his duchy given as an hereditary and independent fief to his uncle Gerhard. The factious barons provided for themſelves each at his own convenience. But this arrangement was almoſt as ſoon annulled as formed. Waldemar kept the duchy of Sleſwick; Gerhard took poſſeſſion of Jutland and the iſland of Funen. The diſcontented nobles ſhared the other iſlands. The king of Sweden recovered Schonen, Halland, and Blekingen. The unfortunate Chriſtopher returned to Denmark ſome time after, and died in a corner of the province of Laaland, the only part of his dominions that recognized his authority. Eric his eldeſt ſon had paid the debt of nature before him. Otto the youngeſt was a priſoner of Gerhard, by whom he had been defeated in battle. The fugitive Waldemar had found an aſylum at the court of the emperor of Germany.

Waldemar of Sleſwick now claimed the crown; but Gerhard his uncle enjoyed the regal power, until he was aſſaſſinated near Randers, in the year 1340. Exaſperated at the aſcendency which the houſe of Holſtein had gained, the nation called Waldemar, the youngeſt ſon of Chriſtopher II., to the throne. Supported by the emperor and the margraves of Brandenburg, he eaſily recovered his hereditary dominions, and reigned by the name of Waldemar III. A treaty of peace was concluded between the new king, the duke of Sleſwick, and the earl of Holſtein. The duke renounced the crown, but kept the duchy as an hereditary fief.

Waldemar III. ſoon redeemed the provinces which had been mortgaged. A ſkilful negociation with Magnus Smek, king of Sweden, ended in the recovery of Schonen, Halland, and Blekingen. During his reign the foundation was laid to that political combination which for more than a century ſubjected a large portion of the north of Europe to the Daniſh power, and effected the ſtill laſting union of Norway with Denmark. Waldemar had a daughter named Margaret, who to the graces of her ſex joined talents and qualities which are generally conſidered as the excluſive appanage of men, and which in the ſequel gained her the ſurname of the Semiramis of the North. Her he married to Hakon Hagen or Haquin VII. king of Norway, ſon to the king of Sweden.

Waldemar III. died in the year 1378, and with him ended the dynaſty of the Eſtrithides in the male line. His grandſon Olaf or Olaus ſucceeded him on the throne of Denmark, and after the death of the king of Norway, aſcended likewiſe the throne of that kingdom. But his reign was not long; he died very young, nine years after his grandfather Waldemar. His mother Margaret, being ſtill a widow, inherited the double crown to which there was no male aſpirant left. Her bold genius ſoon inſpired her with a moſt extenſive project.

Sweden was a prey to domeſtic convulſions. Diſcord raged among the nobles, the clergy, and the people. Albert of Mecklenburg had been called to the Swediſh throne. Deſtitute of the qualifications requiſite to ſuppreſs factious tumults, he fell a victim to national broils. Margaret, whoſe power was firmly eſtabliſhed in Denmark and Norway, obſerved the Swedes with a watchful eye. She kept among them emiſſaries who prepared the minds of the people for her vaſt deſigns. A love intrigue with one of the moſt diſtinguiſhed Swediſh noblemen enabled her to gain partizans among the nobility, and an ardent zeal for the intereſts of the church, combined with a rigid obſervance of religious ceremonies, captivated alike the clergy and the people. Albert ſtill fancied himſelf firmly ſeated on the throne of Sweden when the crown was given to Margaret by the moſt powerful party. To recover his power the dethroned monarch took up arms; but the battle of Fahlkœping, which was fought in the year 1389, confirmed his misfortune.

Secure of her triple diadem, Margaret aſſembled the ſtates of the three kingdoms in the town of Calmar, and propoſed a perpetual union of the three crowns, which was decreed. Her adopted ſon, Eric of Pomerania, was proclaimed her ſucceſſor. The memorable treaty by which the union was effected, was concluded on the 13th of July, 1397, and is known by the appellation of the "Union of Calmar."

But neither Margaret's immediate ſucceſſor Eric, nor Chriſtopher of Bavaria, who was choſen to ſucceed the latter, being poſſeſſed of any ſhare of Margaret's abilities, the union of Calmar was not of long duration. Norway alone continued united with Denmark. The kingdom of Sweden ſoon recovered its independency.

Notwithſtanding the ſolemn renewal of the union in the year 1436, the Swedes choſe Charles Knutſon for their king, and had three adminiſtrators, Sten Sture the elder, Swante Sture, and Sten Sture the younger. The union, however, was not yet formally diſſolved; but at length the impolitic conduct of Chriſtian or Chriſtiern II. was the ſignal of an inſurrection, which broke aſunder the political chain that had been forged for Sweden at Calmar. See SWEDEN.

In the year 1448, after Chriſtopher of Bavaria, the Danes choſe Chriſtiern or Chriſtian, earl of Oldenburg, for their king. He reigned by the name of Chriſtian I., and it is from him that the preſent royal family of Denmark is deſcended. His ſon John was choſen his ſucceſſor in 1481, and forced to ſhare Sleſwick and Holſtein with his brother Frederick. Like all the preceding kings who were elected by the ſtates, John, and his ſon Chriſtian II., who ſucceeded him in 1513, were obliged to ſign at their acceſſion to the throne, a capitulation or charter of privileges, by which they

granted conſiderable immunities to the nobility. The Daniſh monarchs were little more than preſidents of a ſenate compoſed of the principal nobles, who continually encroached at once on the rights of the commons, and on the prerogative of the kings. In vain did Chriſtian II. attempt to reſiſt their overbearing influence. His fiery ſpirit prompted him to meaſures of equal ſeverity againſt a violent ariſtocracy, and an inſolent hierarchy, at a time when he was at open war with the Hanſeatic towns. Factious nobles, and arrogant prieſts, miſrepreſented his beſt intentions, and it is difficult to aſcertain whether or to what degree he deſerved the ſtigma of tyranny which has been affixed to his name. The Swedes were the firſt to renounce him. He was obliged to fly from that kingdom. Guſtavus Ericſon Vaſa was proclaimed king of Sweden in 1523, and in the ſame year the Danes rebelled againſt Chriſtian II., and called his uncle Frederick, duke of Holſtein, to the throne. By flying with his wife and children into the Netherlands, Chriſtian in ſome degree ſanctioned the election. Frederick continued in the ſecure poſſeſſion of the crown, and reigned by the name of Frederick I. until the 10th of April 1533, when he died. The opinions of Luther, which he himſelf embraced, made great progreſs in Denmark during his reign; but the Reformation was not formally introduced before the year 1536, under his ſucceſſor Chriſtian III. whoſe ſon Frederick II. aſſiſted by his able miniſter, Peter Oxe, turned the attention of the Danes towards commerce, regulated the Sound dues, and brought under his dominion that portion of the duchy of Holſtein, known by the name of Ditmars or Ditmarſh.

Frederick II. was ſucceeded at his death by his ſon Chriſtian IV. who, in the year 1615, introduced the firſt ſtanding army in Denmark. By the acquiſition of three-fifths of the county of Pinneberg, in Holſtein, he extended the ſouthern part of the Daniſh dominions to the very gates of Hamburgh; but experienced conſiderable loſſes on his eaſtern and northern frontier.

The brilliant ſucceſs of Guſtavus Adolphus of Sweden, the abilities of the generals who had the command of the armies after this great prince, and the diplomatic talents of Oxenſtierna, had given to Sweden a preponderating influence in Germany. During the protracted and intricate negociations which preceded the peace of Weſtphalia, Chriſtian IV. ſhewed that he was not indifferent to the ambitious views of a power which he conſidered as a formidable rival of Denmark; but unfortunately he raiſed the Sound dues. The meaſure irritated the Dutch, who at that time were the principal traders in the Baltic. They agreed with the Swedes to reſiſt the payment of the new duties. Some Swediſh ſhips were treated with uncommon ſeverity. This induced the Swediſh general Torſtenſon to invade Holſtein in 1643. He penetrated as far as Jutland. Chriſtian IV., little accuſtomed to war, oppoſed but a feeble reſiſtance. The Swediſh fleets, reinforced by a Dutch ſquadron, defeated the Daniſh fleet. Negociations were entered into, and in the year 1645, a peace was concluded at Brömſebro under the mediation of France. Sweden obtained the iſlands of Gothland and Oeſel, the provinces of Jemtland and Herjedalen, which had belonged to Norway, and the ceſſion of Halland for 30 years. Chriſtian IV. died in 1648. The eſtabliſhments of the Danes in the Eaſt Indies, as well as the Daniſh joint companies trading to Greenland and Iceland, date from his reign.

His ſon Frederick III. in the capitulation which he, like all the elective kings, was forced to ſign on his acceſſion to the throne, reluctantly granted ſtill farther immunities to the nobles. They ſoon engroſſed the whole adminiſtration of affairs. The clergy and the commons groaned under their oppreſſive meaſures until theſe inteſtine diviſions induced Charles Guſtavus, king of Sweden, to attack Denmark with a powerful army, and to beſiege Copenhagen itſelf. But Frederick III. encouraged by his queen Sophia Amelia, princeſs of Brunſwick Luneburg, and faithfully aſſiſted by the inhabitants of Copenhagen, held out above two years, when preliminaries of peace were ſigned at Roſchild, in 1651, under the mediation of Cromwell, protector of England. Frederick ceded the provinces of Halland, Blekingen, and Schonen, the iſland of Bornholm, and the biſhoprics of Bohus and Drontheim, in Norway, to the Swedes. But the ambition of the Swediſh monarch, which aimed at nothing leſs than the total conqueſt of Denmark, not being yet ſatisfied, he once more beſieged Copenhagen by ſea and land. On the night of the 11th February, 1659, Charles Guſtavus ordered a general aſſault; but his troops were valiantly repulſed on all points, and a Dutch fleet almoſt at the ſame time defeated the Swediſh fleet. The gallant ſpirit of the Swediſh hero could not brook theſe misfortunes. Charles Guſtavus died in the beginning of the year 1660, and Frederick III. kept the Daniſh crown. A new treaty was concluded at Copenhagen, in 1660, under the mediation of France and England. The iſland of Bornholm, and the biſhopric of Drontheim, in Norway, were reſtored to Denmark; but Schonen, Blekingen, and Halland, were left to Sweden.

The active zeal and intrepid conduct of Frederick during the two ſieges of Copenhagen, had endeared him to his ſubjects in general, and more particularly to the inhabitants of his capital. Soon after the concluſion of the treaty with Sweden, a diet was ſummoned at Copenhagen, to take into conſideration the diſtreſſed ſtate of the kingdom. The deputies aſſembled on the 8th of September, 1660.

This Daniſh diet of 1660, affords the unparalleled example of a free people deliberately reſigning their liberty into the hands of a monarch whom they had hitherto controlled, and voluntarily granting him deſpotic ſway. To humble the nobles, the clergy and the commons concurred in rendering the power of the king abſolute. Frederick himſelf appeared to take no ſhare whatever in a project which intereſted him moſt; but the queen was zealouſly active in augmenting the number of the king's friends. She brought over to the court party, the field-marſhal John Schack, and another nobleman of the name of Annibal Sehefted. But the principal actors in this extraordinary political revolution, were Swane, biſhop of Zealand, Nanſen, burgomaſter of Copenhagen, Gabel, a German, ſecretary to the privy council, and king's private ſecretary, and Lenthe, likewiſe a German by birth.

The means of raiſing the ſums neceſſary for the national exigencies, were the firſt object of the deliberations of the diet. The nobles propoſed a tax on all articles of conſumption, and offered to ſubmit to it themſelves, but with ſo many reſtrictions and exceptions, that the principal weight of the new impoſt muſt have fallen on the commoners. This propoſal was held out as a mark of the utmoſt condeſcenſion, and accompanied with ſarcaſtic reflections on the riſing influence of the commons and clergy, both of which would not admit of any tax that was not to be levied equally upon all ranks, without any reſerve. They demanded that the demeſnes of the crown, which had till then been farmed by the nobles excluſively, ſhould be let to the higheſt bidder without diſtinction. This demand the nobles conſidered as an arrogant infringement on their privileges. Reproachful expreſſions were uſed by one of the ſenators. A general ferment enſued. The aſſembly broke up. The friends of the

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court, availing themſelves of this ſtate of irritation, ſuggeſted the extenſion of the prerogative of the crown as moſt conducive to the happineſs of the nation at large. A fortunate incident haſtened the ſucceſs of their ſchemes.

Biſhop Swane, one of his colleagues, the deputies of Copenhagen, and a few of other towns, had been invited to the hall of the nobility to diſcuſs on a point relating to the new taxes. More commoners attending than were expected, the ſenator Otto Kragg, a proud and violent man, diſmiſſed thoſe whom he thought too many. This inſult increaſed the general ferment. The clergy and the commons having new propoſals to offer, it was aſked how they ſhould be communicated to the ſenate. The recent affront they had experienced was yet freſh in their memory. They determined to apply directly to the prince, without any intermediate communication with the ſenators. The deputation was moſt graciouſly received by the king.

On the 8th of October 1660, Nanſen aſſembled the deputies of the commons to examine the clauſes of the projected ſtamp act. They diſcovered that the bill had been materially altered by the ſenate. Loud murmurs were heard. This general diſcontent encouraged Nanſen to move that the crown ſhould be rendered hereditary, in order that the king might be the maſter. The clergy were aſſembled at the ſame time. Swane made the ſame propoſal, and after having conferred with the commons, read the act for rendering the crown hereditary in the perſon of the king and his poſterity, male and female, which was unanimouſly approved. It was then communicated to the ſenate. The nobles met immediately, but having been taken by ſurprize, they ſeparated without coming to a determination on the ſubject.

The next day a deputation of the commons, headed by the burgomaſter of Copenhagen, waited upon the king to remonſtrate againſt the intended ſtamp act. On their return from the palace, they met the ſenator Kragg, who having inquired whence they came, pointed at the Blue Tower, the ſtate priſon of Copenhagen, ſaying, "Do you know that place?" Nanſen immediately replied, "And you, do you know what is ſuſpended yonder?" pointing at the alarm bell in the ſteeple of St. Mary's.

As the nobles had not ſignified their concurrence on the 10th of October, the clergy and the commons repaired in proceſſion to the ſenate, where they found only four ſenators. They returned in the afternoon, but Kragg anſwered, that the ſenate, which beſides was not complete, could not aſſent to the meaſure propoſed by two inferior orders. The deputies then proceeded to the palace, and being admitted into the royal preſence, offered to render the crown hereditary. The king anſwered that he would inform them of his reſolution after he had conferred with the ſenate. Nugatory negociations took place between the prince and the nobles, ſeveral of whom left the city with the intention to paralyſe the proceedings of the diet. To fruſtrate their deſign, the gates were ſhut. Diſpirited at this meaſure, the nobles on the 12th of October ſignified their concurrence ſo far as to render the crown hereditary in the male line of the royal family: but this offer having been rejected, they concurred the following day with the reſolution of the clergy and the commons without any limitation. A committee of the three orders was appointed to ſettle the tranſaction. The choice of the members was left to the king, who appointed four ſenators, four deputies of the nobles who were not ſenators, five of the clergy, ſeven of the commons, and one of the univerſity of Copenhagen. This committee met on Sunday the 14th of October in the forenoon. Swane and Nanſen obſerved a profound ſilence; but Lange, the deputy of the univerſity, ſuggeſted the neceſſity of eſtabliſhing fundamental laws according to the example of other countries where the crown was likewiſe hereditary. Several deputies ſeconded his propoſition. The principles of different conſtitutions were diſcuſſed; but the biſhops interrupted the diſcuſſion by obſerving that it was noon, that the hour for the afternoon's ſervice was approaching, and that it was proper to adjourn the conference for a few hours. The committee ſat again in the evening; but in the mean time it had been intimated to Lange that his preſence was not required. The annulling of the capitulation or charter ſigned by the king at his acceſſion was unanimouſly agreed upon; but to fix on a new tie between the prince and the ſtates was found more difficult. The nobles claimed the continuation of ſome of their ancient privileges, againſt which the clergy and the commons raiſed violent objections. To end their clamorous debates, the biſhop of Zealand propoſed to render the crown hereditary without any ſtipulation, and to leave to the impartiality of the monarch the deciſion of a point on which they, who were moſt concerned in it, could not agree.

On the 16th of October 1660, the three orders framed the decree by which they rendered the government hereditary in the male and female line; ſtipulating only the right of primogeniture, and the indiviſibility of the monarchy. Nothing, however, was mentioned of abſolute ſovereignty. Frederick Gabel, ſon of Chriſtian Gabel, ſecretary to the privy council, who has been named before as one of the principal agents for the court party, ſtates in his memoirs, that his father ſecretly procured the inſertion of *abſolute ſovereignty* in the act by the printer, and thus contributed to render the power of the Daniſh monarchs abſolute: but moſt of the Daniſh writers doubt the truth of his aſſertion. Indeed the term is found in other acts publiſhed before the royal law, which eſtabliſhed the deſpotiſm of the Daniſh kings.

The new oath of allegiance was taken on the 18th of October. The king promiſed to eſtabliſh a form of government by which his ſubjects ſhould be certain of enjoying the advantages of a Chriſtianlike and merciful adminiſtration under his ſucceſſors. The firſt edict which explicitly proclaims the abſolute power of the king was publiſhed in Denmark on the 10th of January 1661, in Norway on the 7th of Auguſt 1661, in Iceland on the 28th of July 1662, and in the Faro Iſlands on the 14th of Auguſt of the ſame year. It was only four years after, that the royal law of Denmark, which is ſtill the baſis of the Daniſh conſtitution, was framed by biſhop Swane and the king's ſecretary Schumacher, afterwards known by the name of count Griffenfeld. This conſtitutional act received the king's ſignature on the 14th of November 1665, but remained in the archives of the crown during the reign of Frederick III., and was only promulgated on the acceſſion of Chriſtian V. to the throne in 1670. Frederick IV. cauſed this law to be engraved in 1709, with an introduction of his own; an abſtract of it will be given under the head of the Daniſh Conſtitution.

From all theſe circumſtances, on which we have purpoſely expatiated with ſome length, it appears evident that the Daniſh people were with much addreſs cajoled into the acceptance of a deſpotic government. The intentions of the commons to diminiſh the power of the nobles by rendering the crown hereditary, did not imply that they meant to renounce their ancient freedom, and to inveſt the monarch with unbounded authority. They were gradually drawn into this conceſſion. When the royal law was promulgated, they could not recal the ſteps they had taken,

and perhaps the joy which they felt at having cruſhed their noble oppreſſors, rendered them inſenſible to the chains which they had eventually forged for themſelves.

Frederick III. was ſucceeded, in 1670, by his ſon Chriſtian V. Not only was the royal law proclaimed at his coronation, but he alſo introduced ſeveral new regulations, which all tended more or leſs to ſtrengthen his abſolute power. He raiſed ſeveral nobles to the dignity of counts and barons, fixed their privileges, and inſtituted the Danebrog order of knighthood. The acquiſition of the counties of Oldenburg and Delmenhorſt, in Weſtphalia, which reverted to Denmark through the death of the earl Anthony Gunther, compenſated in ſome degree for Chriſtian's loſſes in Sweden, with which power he had been forced to ſign a treaty on the terms preſcribed by France, after an obſtinate and unſucceſsful war. He was alſo forced to reſtore the duchy of Holſtein to duke Albert, whom he had treacherouſly detained at Rendſburg, and whoſe poſſeſſions he had invaded. By the treaty concluded at Altona in 1689, under the mediation of the emperor of Germany, the king of Sweden, and the republic of Holland, Albert was alſo confirmed in the poſſeſſion of Sleſwick.

Chriſtian V. died in 1699. His ſucceſſor Frederick IV. jealous of the increaſing rival power of Frederick duke of Holſtein, who had married the ſiſter of Charles XII. of Sweden, laid ſiege to Tonningen, which the duke had fortified with particular care. Charles XII., bent upon avenging his brother-in-law, invaded Denmark, and would have taken Copenhagen, had not the Daniſh king agreed to the peace of Travendahl, which was concluded in 1700, in favour of the duke. But fortune having at length deſerted Charles, after a ſeries of the moſt aſtoniſhing ſucceſſes, his general, Stenbock, was forced to throw himſelf into Tonningen, whilſt Charles was an exile at Bender. This circumſtance occaſioned a new war in Holſtein. Frederick, the brother-in-law to Charles, had been killed at the battle of Cliſſau in 1702. His ſon Charles Frederick, a minor, reigned under the guardianſhip of his uncle Chriſtian Auguſtus, biſhop of Lubeck. When Tonningen opened its gates to Stenbock, the king of Denmark accuſed the houſe of Holſtein Gottorp of being leagued with Sweden, and occupied the duchy with his troops. At the death of Charles XII. the young duke claimed the Swediſh crown, but was forced to yield to Ulrica Eleonora and Frederick of Heſſe Caſſel, her huſband. The king of Denmark concluded a peace with the young duke in 1720, by which he kept poſſeſſion of Sleſwick, and reſtored only part of Holſtein. As Sweden did not oppoſe theſe terms, and as the obſervation of the treaty was guaranteed by England and France, Charles Frederick ſubmitted, but ſolemnly proteſted againſt the injuſtice of the arrangement. He ſoon after married the eldeſt daughter of the czar Peter the Great; and in 1741, their ſon Peter Ulric was nominated by the empreſs Elizabeth, heir to the Ruſſian dominions.

After the death of Frederick IV. his ſon, Chriſtian Frederick, better known by the appellation of Chriſtian VI., mounted the Daniſh throne in the year 1730. To render his ſubjects happy was the firſt wiſh of his heart, and to promote the arts of peace his principal ſtudy. The ruins of the palace of Copenhagen, which was deſtroyed by fire in 1794, evince his taſte in architecture. A diſpute with the king of England, in 1738, about the lordſhip of Steinhorſt, in which ſome blood was ſpilt, terminated in a treaty by which Great Britain paid a ſubſidy of 70,000 *l.* ſterling a-year, on condition that Denmark ſhould keep 7000 troops on foot for the protection of Hanover.

Chriſtian VI. died in 1746, and was ſucceeded by his ſon Frederick V. who, three years before, had married the princeſs Louiſa, daughter to the king of England. Aſſiſted by the elder count Bernſtorf, he improved upon his father's plans for the happineſs of his people: but the new financial and commercial regulations which he introduced were chiefly the work of count Schimmelmann. He took no concern in the ſeven years' war in Germany; yet it was through his mediation that the capitulation of Cloſter Seven was agreed upon between the late duke of Cumberland and the French general Richelieu. Some time after the death of his firſt queen, who was the mother of his ſucceſſor, Chriſtian VII., Frederick V. married a daughter of the duke of Brunſwick Wolfenbuttel. Towards the latter end of his reign, Peter Ulric of Holſtein, who had aſcended the throne of Ruſſia, revived his pretenſions to the whole of Holſtein and the duchy of Sleſwick. His menaces unfortunately induced Frederick to call into his ſervice the count St. Germain, a French officer, whoſe injudicious and haſty reforms in the Daniſh army had almoſt cauſed in Denmark a revolution as fatal as that which his raſhneſs in reforming the French military prepared for France. The Ruſſian general Romanzow was ordered to enter into Holſtein, but he had not yet reached his deſtination when Peter loſt his crown and his life. Catherine recalled the army, and Denmark continued to enjoy the comfort of peace. Another part of Holſtein, that of Ploen, had reverted to Denmark in 1761. As ſoon as the authority of Catherine was firmly eſtabliſhed in Ruſſia, the court of Copenhagen made ſome propoſitions to the court of St. Peterſburg relative to the exchange of the remaining part of Holſtein Gottorp againſt the counties of Oldenburg and Delmenhorſt: but whilſt the count Ernſt Bernſtorff, miniſter of foreign affairs, was zealouſly exerting himſelf in the accompliſhment of this project, Frederick V. died on the 14th of January, 1766.

His ſon Chriſtian VII. ſignalized his acceſſion to the throne by the emancipation of the peaſants on the royal demeſnes, who till then had been held in a ſtate of dependence not far ſhort of ſlavery. A proviſional convention was ſigned with Ruſſia in 1767, reſpecting the exchange of Holſtein; but the tranſaction itſelf was delayed till Paul Petrowitz, as heir of the German poſſeſſions of the unfortunate Peter Ulric, had attained the proper age to ratify the treaty by his ſignature.

Chriſtian VII. married the Engliſh princeſs Caroline Matilda, youngeſt ſiſter to king George III. But his want of firmneſs, and the intrigues of the queen dowager his mother-in-law, involved the young queen in the moſt ſerious misfortune. Ambitious to raiſe her own ſon Frederick to the throne, the queen dowager ſowed the ſeeds of diſſenſion between the king and his conſort. She placed perſons about the monarch to keep him conſtantly engaged in riot and debauchery, and magnified his faults to the unſuſpecting queen, who yet contrived to live on good terms with her royal huſband. All the plans of the old queen failed until the king raiſed his phyſician, Struenſee, a young German doctor, to the dignity of a count, and appointed him his prime miniſter. Inſtigated by an unbounded ambition, this giddy young man, who was not without a ſhare of great political talents, raſhly began to introduce the moſt unexpected reforms, which created him an hoſt of enemies among the old courtiers whom he diſplaced. Deaf to the warning voice of his friend Brandt, who ſhared with him the royal favour, he attempted innovations in ſeveral departments of the ſtate at once. Some of the principal military officers attached to the queen dowager, accuſed him loudly of an intention to overthrow the government by ſuperſeding the king on the ſcore of incapacity, and declaring

claring Carolina Matilda regent of the kingdom during the minority of her ſon.

On the 16th of January 1772, a maſked ball was given at court. The young queen, after having danced the greateſt part of the night with Struenſee, retired about two in the morning. At four, prince Frederick and the queen dowager, accompanied by general Eichſtedt and count Rantzau, went to the king to inform him that the queen, with count Struenſee and Brandt, were at that moment drawing up an act of renunciation to the crown, which they would compel him to ſign, and that he muſt give immediate orders for their being arreſted. The king heſitated, but having been threatened into compliance, count Rantzau proceeded to the apartments of the queen, and conveyed her, together with her infant princeſs, to the caſtle of Cronenburg. Struenſee and Brandt were confined in ſeparate dungeons, ironed, and treated with barbarous ſeverity. They underwent frequent examinations. The fear of the rack extorted from Struenſee the confeſſion of a criminal converſation with the queen. She certainly appears to have taken particular delight in the ſociety of him, who was the favourite of her huſband; yet no intimacy between them was ever proved. Struenſee and Brandt, after having had their right hands cut off, were beheaded on the 28th of April 1772. Their bodies were quartered. A treatment ſo inhuman reflects no ſmall diſgrace on the prince, who had honoured Struenſee in particular with the name of friend. By the interference of the Engliſh miniſter, queen Carolina Matilda was ſuffered to leave Denmark in a Britiſh frigate, which conveyed her to Hanover. She reſided in the palace of Zell, where ſhe died three years afterwards, aged 23 years and 10 months.

After this ſanguinary revolution, count Guldberg was placed at the head of the king's council. He rendered his adminiſtration popular by the promulgation of a law in favour of the natives of Denmark, called the law of "indigenate," and conſidered as one of the fundamental laws of the kingdom. The grand duke Paul Petrowitz having in the mean time attained his majority, the negociations with Ruſſia were reſumed, and a definitive treaty ſigned at Garſkoezelo on the 21ſt of May, and at Fredenſburg on the 1ſt of July 1773. By this treaty the counties of Oldenburg and Delmenhorſt were ceded to the grand duke of Ruſſia, inſtead of which the king of Denmark was put in poſſeſſion of the whole of Holſtein. Paul Petrowitz renounced the two counties in favour of Frederick Auguſtus, biſhop of Lubeck, from whom they devolved to his ſon, Peter Frederick William, who was raiſed to the dignity of a duke of the German empire.

In 1780 Chriſtian VII. acceded to the armed neutrality propoſed by the empreſs of Ruſſia. But the debility of his underſtanding diſqualifying him every day more and more for the management of public affairs, another court revolution took place on the 14th of April, 1784. The queen dowager's friends were removed from the king's councils, and a new council was formed under the auſpices of the crown prince, who had not yet attained his ſeventeenth year. No inſtrument ſigned by the king was declared to be valid, unleſs counterſigned by the crown prince. The commencement of the adminiſtration of this prince was marked by the moſt beneficial meaſures for the proſperity of the country. By the advice of count Bernſtorff, the younger, the Daniſh peaſants were all reſtored to complete freedom, and their emancipation was accompliſhed in a manner ſo gradual and ſo cautious, that it challenges imitation wherever the chains of a long ſlavery are to be broken. The ſlave-trade was alſo gradually aboliſhed by the diſintereſted exertions of count Schimmelmann, who was himſelf poſſeſſed of large eſtates in the Daniſh Weſt-India iſlands. Order was reſtored to the finances of the country, the national debt reduced, uſeful knowledge more generally diffuſed by the moſt liberal patronage beſtowed on ſocieties for the promotion of learning, arts and ſciences, the adminiſtration of juſtice improved, induſtry encouraged, commerce freed of its former ſhackles, and in the midſt of the wars occaſioned by the French revolution the ſtricteſt neutrality was maintained. Every ſolicitation to declare againſt France proved vain, but the menaces of Ruſſia ſucceeded at length in determining Denmark to accede to the confederacy which the northern powers formed againſt Great Britain in 1801. This league however was quickly diſſolved by the appearance of an Engliſh fleet under admirals Parker and Nelſon, in the Baltic, and Nelſon's forcing the line of defence formed by the Daniſh fleet before Copenhagen, on the memorable 2d of April 1801, when the Danes fought with a bravery equal to that of their gallant oppoſers. The diſpute between Great Britain and the northern powers being ſoon after amicably ſettled, Denmark recovered the iſlands in the Weſt Indies, and the ſettlement of Tranquebar, on the coaſt of Coromandel, which had been forced to yield to the Britiſh arms.

The battle of the 2d of April 1801, had interrupted the calm of an eighty years' peace, and appeared to be the commencement of a new era in the naval and military eſtabliſhments of Denmark, which received ſo great an acceſſion of ſtrength, that full confidence was repoſed in the future exertions of either the army or navy on any emergency. Yet the war between England and France having been renewed in 1803, and France having ſucceſſively triumphed over Auſtria and Pruſſia, and formed an intimate connection with Ruſſia, it was ſuppoſed that Denmark would no longer be able to reſiſt the united ſolicitations of Ruſſia and France, and be forced to declare againſt England; particularly as a conſiderable French and Spaniſh force was hovering on its frontier. Under this ſuppoſition, the Engliſh miniſtry propoſed to the crown prince to ſurrender the Daniſh navy into the hands of the king of Great Britain, until the reſtoration of a general peace. This propoſal was indignantly rejected, the prince aſſerted his ability, and proteſted his readineſs to maintain his neutrality, and to defend his country againſt the firſt power that dared to attack it. The peace of Tilſit, which France had juſt concluded with Ruſſia and Pruſſia, left to that ambitious and daring power ſuch irreſiſtible means to compel the feeble kingdom of Denmark to turn its weapons againſt England, that the latter country conſidered herſelf juſtified in reſorting to extraordinary meaſures. In the month of Auguſt, 1807, a ſtrong Engliſh fleet ſurrounded the iſland of Zealand, and landed an army of 20,000 men. Copenhagen was bombarded. (See COPENHAGEN.) On the ſeventh of September the Engliſh took poſſeſſion of the citadel for ſix weeks, and all the Daniſh ſhips then at Copenhagen, being 18 ſail of the line, 15 frigates, ſix ſloops, and 25 gun-boats, together with all the ſtores of the naval arſenal of Chriſtianſholm, were ſurrendered to the diſpoſal of the king of Great Britain. Exaſperated at this treatment, the crown prince declared war againſt England, and ſoon after againſt Sweden, its only ally. He invoked the aid of France. The French marſhal Bernadotte (prince of Ponte Corvo) arrived at Copenhagen on the 16th of March, 1808, at the very moment when intelligence was received in that capital of the death of Chriſtian VII., who died at Rendſburg on the 13th of March, 1808. The crown prince was proclaimed king on the 16th of March by the name of Frederick VI.

On the 22d of March, the prince Chriſtian, Daniſh man of war, ſtruck to the Engliſh, after an obſtinate engagement,

in

in which the Danes had 50 killed and 88 wounded. As the ſhip had been run aſhore, ſhe was ſet on fire and burnt. Thus the Daniſh navy was reduced to one ſingle ſhip of the line.

In the mean time 15000 Spaniſh, 10,000 French, and 5000 Dutch troops, entered the Daniſh continental dominions to aſſiſt the Danes, and 387 veſſels were taken up for the invaſion of Sweden. Several privateers haraſſed the Engliſh traders in the Baltic, and committed ſucceſsful depredations. Frequent engagements took place between Daniſh gun-boats and Engliſh brigs. The Swedes, under baron Armfeldt, entered Norway, and drove the Danes acroſs the Glommen, but could not penetrate to Chriſtiania. A ſtrong Engliſh armament, under the command of ſir James Saumarez, prevented the intended attack upon Sweden. Bernadotte complained in May of the remiſſneſs of the Daniſh government in completing the warlike preparations neceſſary for the execution of the plans with which he was charged. The iſland of Heiligeland, at the mouth of the Elbe, which is conſidered as part of Sleſwick, and the Daniſh poſſeſſions in the Eaſt and Weſt Indies, were occupied by Engliſh troops.

For the remainder of the hiſtory of Denmark, from the month of July 1808, ſee NORWAY.

The boundaries of Denmark Proper are, the river Eyder to the ſouth, which divides it from Holſtein, and conſequently from Germany; to the weſt the North ſea, or German ocean, which the Danes call the Weſtern ocean; to the north that part of the north ſea which is called the Cattegat, and Shaggerack, by which it is divided from Norway; and to the eaſt that inlet into the Baltic ſea, known by the name of the Sound, or Ore-Sound, which divides Denmark from Sweden.

The extent of Denmark Proper is about 4964 Engliſh ſquare miles. It is divided into two parts, the peninſula of Jutland, anciently called Cherſoneſus Cimbrica, and the iſlands at the entrance of the Baltic.

Jutland was anciently divided into North and South Jutland; but the former is now ſimply called Jutland, and the latter Sleſwick, which ſee.

The iſlands at the entrance of the Baltic are two large ones, Zealand and Funen, and five ſmall ones, Laaland, Langeland, Falſter, Moen, Bornholm, which ſee.

Denmark Proper counts 68 towns, 22 market towns, 7000 villages, 948 lordſhips, and 15 earldoms or counties. The principal towns are Copenhagen, Flenſburg, Elſineur, Sleſwick, and Odenſee.

The climate of Denmark Proper is variable and moiſt, but rather temperate on account of the vapours of the ſurrounding ſea. In the northern parts the winter is ſometimes very ſevere; the entrance of the Baltic through the Sound is often obſtructed with ice, and has been at times ſo completely frozen over as to be croſſed by heavy loaden carriages.

The ſoil in general is rather ſandy, but fertile in grain and paſturage. The weſtern coaſt of Sleſwick is expoſed to the inroads of the North ſea, on which account it is kept embanked at a very great expence, and theſe embankments are often extended. The land which the ſea leaves behind is uncommonly fertile, and is called *koog*. The appearance of the country in general is low and flat. There are but a few hills of a bleak and wild aſpect, and ſome high cliffs on the coaſt; yet the country is agreeably variegated with woods and lakes. Denmark has alſo many little ſtreams which interſect the country in various directions. Two of them, the Guden, and the Eyder, deſerve the name of rivers. In the northern part, a large creek of the ſea called the Lymfiord, extends from the Cattegat through more than ſeventy Engliſh miles. It is navigable, and contains numerous ſmall iſlands. The Baltic and the North ſea communicate by three great inlets acroſs Denmark Proper, and on its northern frontier, *viz.* the Sound, the Great Belt, and the Little Belt. The diſtance from Elſineur to Helſinborg in Sweden, acroſs the Sound, is 1331 fathoms, or about 2½ Engliſh miles; between Copenhagen and Malmoë in Sweden, the diſtance is nearly 20 Engliſh miles. The paſſage over the Great Belt from Nyeborg in Funen to Corſoer in Zealand is about 20 Engliſh miles, and from Aſſens to Aaroeſundsfærge over the Little Belt, about 10; but there is another paſſage between Middlefarth and Snoghey, which is not quite two Engliſh miles.

Denmark has an extenſive ſea-coaſt; which, beſides yielding a little amber, abounds in oyſters, muſcles, and herrings, and affords uncommon conveniencies for trade. The roads are not very good; the turnpike roads extend only about 90 miles from Copenhagen.

The population of Denmark, including Norway, Iceland, Greenland, and the Faro iſlands, amounts to two millions and a half, *viz.*

Denmark Proper counts	930,000 inhabitants.
Sleſwick and Holſtein	620,000
Norway, Iceland, &c.	950,000

From 1769 to 1785, the whole population had been increaſed by 200,000 ſouls. The annual average ſurplus of the born over the dead is from 12 to 20,000.

In 1794, the numbers were;

Of the born in Denmark Proper	27,539	Dead	25,956
Sleſwick and Holſtein	17,642		14,306
Norway, Iceland, &c.	28,069		17,344
Born	73,250	Dead	57,606
	57,606		
Surplus	15,644		

In 1806 the numbers were;

Of the born in Denmark Proper	29,949	Dead	22,588
Sleſwick and Holſtein	18,533		14,635
Norway, Iceland, &c.	26,777		18,482
Born	75,259	Dead	55,705
	55,705		
Surplus	19,554		

The language of Denmark is that dialect of the Teutonic, which is called the Scandinavian. It differs very little from the Swediſh language; its chief difference ſeems to ariſe from the drawling tone with which it is pronounced by the Danes. The pronunciation of the Norwegians comes nearer that of the Swedes. There is beſides a greater admixture of German words in the Daniſh language, than in the Swediſh, the German language being univerſally ſpoken beyond Flenſburg, in Sleſwick, till very near the Little Belt, and generally underſtood in the capital. It is but lately that the Danes have taken any pride in their own language. All the laws and public inſcriptions are now in Daniſh.

Some fuller's earth, alum, and vitriol found in Jutland, and ſome porcelain clay obtained in the iſland of Bornholm, ſeem to conſtitute the whole of the mineral productions of Denmark Proper. The fiſheries thrive beſt on the weſtern coaſt of Jutland, and in the creek called Lymfiord. Herrings and flounders are exported on a ſmall ſcale from Aalburg and Skagen. The oyſter banks, which extend from Rypen to Heiligeland, are let to farmers on account of the crown.

With regard to agriculture, Denmark and Holſtein produce rye, barley, oats, and wheat in ſuch abundance, as to ſupply Norway, and frequently to export corn to other countries to the annual amount of 100,000*l.* ſterling. In 1803, an attempt was made in the vicinity of Copenhagen towards cultivating madder. The plant ſucceeded uncommonly well, though it ſtood a ſevere winter. The crop proved of a ſuperior quality. Hops are cultivated chiefly in Funen, tobacco near Fredericia in Jutland, and in Zealand, and Falſter: Rape-ſeed chiefly in Sleſwick and Holſtein. The agriculture of Funen and the ſouth of Jutland is compared by Mr. Marſhal to that of England.

Since the emancipation of the peaſants, agriculture, in all its branches, has been rapidly improving in Denmark. But the Daniſh farmers are chiefly known as excellent graziers. Denmark ſupplies Germany, France, Ruſſia, and Sweden with horſes for both heavy and light cavalry, beſides coach-horſes. Thoſe of Zealand, Funen, Jutland, Sleſwick, and Holſtein are moſt eſteemed. The annual amount of the horſes ſold is reckoned 200,000*l.* ſterling. Black cattle are exported in great numbers to Holland. Many thouſands of oxen, after they have been fattened in the marſh lands, are ſent to the German markets. Salt-beef, butter, and cheeſe, form conſiderable articles of trade. Live hogs and great quantities of bacon are exported to Norway, Holland, and ſeveral ports of the Baltic. In 1780 they counted in Denmark 847,000 ſheep. The beſt wool is that near Eyderſtadt; it is long and fine.

Horticulture is very much encouraged in Denmark. Government furniſhes the farmers gratis with fruit trees from the royal nurſeries.

In the beginning of the eighteenth century, Denmark was almoſt without manufactures. It was only at the end of the northern war that Frederick IV. could ſeriouſly think of encouraging their introduction into his dominions. His ſucceſſor Chriſtian VI. zealouſly exerted himſelf in promoting their ſucceſs. The importation of cloth, ſilks, and other articles, was ſtrictly prohibited. Government has continued ever ſince to ſpur the induſtry of the Danes. From the year 1736 to 1774 not leſs than 800,000 dollars have been ſpent on the encouragement of manufactures. Ancient prohibitory regulations have often been renewed; the queſtion has even been agitated whether the importation of foreign manufactures could be reſtricted by a national coſtume; and ſo late as 1783, an attempt was made to wean the Danes from foreign luxuries by means of ſumptuary laws. But the Daniſh manufactures are not yet ſufficient for the home market.

Linen cloth is wove in ſeveral places, yet Denmark is obliged to purchaſe a third of the coarſe and almoſt all the fine linen it wants from abroad. However ſpinning ſchools, and premiums awarded to the beſt ſpinners and weavers, ſtrengthen the hope of the Daniſh government that the linen manufactures will rapidly improve. Neither is ſail cloth manufactured in ſufficient quantity. Of the woollen manufactures, that of the Goldhouſe at Copenhagen, which is a monopoly of the crown, is the moſt important. With worſted ſtockings Denmark is abundantly provided from Iceland and the Faro iſlands. This manufacture flouriſhes likewiſe in Jutland, where many a ſingle village produces annually from 16 to 20,000 pair. The ſilk manufacturers of Copenhagen and Altona make all ſorts of ſilks, chiefly ribbands and ſtockings. But the calico-printing and cotton manufactures of Copenhagen, Huſum and Wandſbeck, are far more extenſive. Hence the importation of cottons and prints is totally prohibited. The thread lace maufacture of Tondern, which was begun in 1646, and employed moſtly Dutch thread, though not ſo flouriſhing as formerly, gives ſtill employment to 10,000 hands. Paper mills are not yet ſufficient for the home-conſumption. Denmark imports annually 100,000 dollars worth of foreign paper. New mills are however every day eſtabliſhed, and the exportation of rags has been ſtopped.

Denmark is abundantly ſupplied with tanners and leather curriers, chiefly and beſt at Altona. Daniſh leather gloves, which are principally made at Odenſee, are famous all over Europe. The goodneſs of the leather at this place is ſuppoſed to ariſe from a certain property in the river water, in which it is ſoaked, for tanning. The manufactures of earthen ware flouriſh moſt at Aarhuus and Rypen, which ſend their pottery into ſeveral parts of Germany. The royal china manufacture of Copenhagen makes excellent ware, but it ſtill wants the aſſiſtance of government. The amount of the goods manufactured from 1785 till 1792, was 277,349 dollars; but no more than 185,539 dollars could be diſpoſed of. There are ſeveral ſugar refiners, copper, braſs, and iron works, and cannon founderies. The moſt important among the latter is that which was eſtabliſhed in 1756 by general Clauſen, at Frederickſwerk near the Iſefiord, a bay of the ſea on the northern ſhore of Zealand. The works conſiſt of a foundery for cannon and balls, and for making ſaltpetre and gunpowder. Count Schimmelmann's manufactory, near Elſineur, furniſhes the army with muſkets, bayonets, and ſabres. It fabricates annually 3500 muſkets.

Anciently the whole trade of Denmark was carried on excluſively by the Hanſeatic towns. Their firſt competitors were the Dutch, and afterwards in ſome degree the Engliſh. Chriſtian V. encouraged his ſubjects to trade beyond the ſeas, but it was only after peace had been reſtored in the north under Frederick IV. that the Daniſh commerce began to flouriſh. It rapidly extended under Chriſtian VI., and was at its greateſt height in 1792, if an opinion may be formed from the number of merchant veſſels. In 1747 they amounted to 1748, twenty years later to 2053, in 1792 to 3331, and in 1799 only to 2173. But it ought to be remembered that the tonnage of ſhips has been of late years every where increaſed.

The trade of Denmark, with its dependencies and colonies, is conſiderable. That with Iceland, which had long been clogged by reſtrictions, excluſive companies, and monopolies of the crown, has been tripled within the laſt five and twenty years, ſince it has been a free trade. It employs now from 60 to 70 veſſels, and is carried on in Daniſh bottoms only. The trade to the Faro iſlands, which within the laſt fifteen years has been opened to all Daniſh ſubjects, employs but a few veſſels. That to Finmark has alſo been allowed free to all Daniſh ſubjects ſince 1789, and bids fair to become of great importance. The Greenlanders exchange their fiſh, oil, whalebones, and downs with the manufactures of Europe, and ſome colonial produce: but the whale fiſhery conſtitutes the principal part of the Greenland trade. The trade to Norway is moſtly a paſſive one in Daniſh and foreign veſſels. The Daniſh north and Iceland companies are both extinct.

The trade to the Eaſt Indies is in the hands of a privileged company, but not excluſively. Private individuals may fit out veſſels for the Eaſt Indies and China, on their own account on paying to the company five *per cent.* for what they export, and eight *per cent.* on the return cargoes. In 1797, there were 11 return cargoes for private account, three of which came from the Daniſh eſtabliſhments, and eight from other ports in the Eaſt Indies. In 1798 and 1799, the return cargoes for private account were thirteen in

in number, four from Daniſh and nine from other eſtabliſhments in the Eaſt Indies. The increaſed vigilance of the Britiſh government againſt the ſmuggling of tea into England, and the commutation act, have cauſed a remarkable declenſion in the proſperity of the Daniſh Eaſt India company. Only one ſhip has returned annually from Canton ſince 1789, and in 1792 and 1794 there has been no return cargo whatever for the company's account. The dividend in 1797 was 12 *per cent.*

Since the year 1754, the trade to the Weſt Indies is free to all Daniſh ſubjects; yet Copenhagen receives almoſt excluſively the return cargoes from St. Croix, which iſland in 1792 ſent 60,949 cwt. of ſugar, 7000 puncheons of rum, and 1500 cwt. of cotton. The two other Daniſh Weſt India iſlands, St. Thomas and St. John, furniſhed about half as much. They ſend beſides coffee, tobacco, and other colonial productions, which they purchaſe from the neighbouring Antilles. The whole Daniſh Weſt India trade employs in time of peace 30 ſhips and 500 ſailors annually.

The trade to the Mediterranean has been very much improved ſince the year 1755. In 1798, 126 Daniſh veſſels ſailed for Meſſina, Barcelona, Algeſiras, Marſeilles, Toulon, Naples, Leghorn, Genoa, Venice, Ancona, and Trieſte; and Denmark counted 55 return cargoes from the Mediterranean. Moſt of the Daniſh veſſels are employed in the carrying trade, the Daniſh flag being reſpected by the dey of Algiers and the Sublime Porte.

Denmark has alſo a briſk trade with Germany, the countries round the Baltic, Sweden, and Pruſſia. But the balance ſeems to be againſt Denmark, ſince it imports much linen and woollen cloth, wood, brandy, and haberdaſhery from Germany; corn, flax, hemp, wool, and other articles from Pruſſia. This trade employs above 300 veſſels. The whole Daniſh export and import trade is however chiefly carried on in Daniſh bottoms; and its extenſive carrying trade, together with the great balance of production in Norway, leaves no doubt that the balance of trade upon the whole is in favour of the Daniſh dominions. In 1803, there were entered inwards into the ſeveral ports of Great Britain, from the ports of Denmark and Norway, 1536 ſhips, two-fifths of which were Britiſh.

Copenhagen is the emporium of the Daniſh trade, and has increaſed with it in ſize and wealth. In 1798 there were entered inwards at Copenhagen

2066 veſſels from foreign ports,
2490 from Daniſh ports,
414 from Norway,
912 from Sleſwick and Holſtein,
92 from the Eaſt and Weſt Indies.

In all 5974

The other commercial places in Denmark Proper are Elſineur, Aalborg, and Colding; in Norway, Bergen, Drontheim, and Drammen; in Sleſwick, Flenſburg; in Holſtein, Altona and Gluckſtadt.

Accounts in Denmark are kept by rixdollars, marks, and ſhillings, 16 of which make a mark, and ſix marks a dollar. Two mark Daniſh and two ſhilling Daniſh are equal to one mark and one ſhilling Lubiſh. Since 1788, ſpecies has been coined for Sleſwick and Holſtein, which is alſo current in Denmark Proper, and is 25 *per cent.* better than the old currency. Its double value is ſtamped on each piece, as one ſpecies dollar 60 ſhilling currency. This coin comes down to all ſizes, as low as the 24th part of a ſpecies dollar, or 2½ ſhilling currency. The actual coins current are in gold, Chriſtian-d'ors at five dollars, and ducats at 12 marks Daniſh, or ſix marks Lubiſh; in ſilver, crowns at four marks Daniſh. There are alſo 24 ſhilling pieces, four of which make a rix-dollar, 16, 12, 8, 4, 2, and 1 ſhilling pieces; in copper, fyrke or dreilinge, two of which make a ſhilling. Beſides theſe coins, there is an extenſive paper currency, conſiſting of the notes of the Copenhagen and Altona banks.

Sciences and arts flouriſh to a great degree in Denmark, which has to boaſt of the celebrated aſtronomer Tycho Brahe. It has two univerſities, one at Copenhagen, where moſt of the learned ſocieties are eſtabliſhed, (ſee COPENHAGEN,) and the other at Kiel, which ſee. Kongſberg has, ſince 1786, a ſeminary for miners, in which mathematics and mineralogy are publicly taught. There are reading clubs in Zealand and Jutland, where the peaſants read the newſpapers and public journals. The preſs is under no ſtricter regulations than in England: *viz.* that no printer dares print anonymous publications without making himſelf liable to anſwer for their contents, or to give up their author. The Daniſh government has acknowledged the principle, that the more a ſtate is verging towards deſpotiſm, the more it ought to allow the liberty of the preſs. It is by that means only, that the ſubjects of a deſpot are raiſed to the rank of citizens. But the Daniſh government has often abandoned this principle; and where is the ſafety in a deſpotic country, that this will not frequently be the caſe?

The predominant religion of Denmark is the Lutheran, and the religious inſtitutions connected with the ſtate relate excluſively to this church. The hierarchy conſiſts of twelve biſhops or ſuperintendents; ſix in Denmark, *viz.* Zealand, Funen, Ripen, Aarhuus, Wiborg, and Aalborg; four in Norway, *viz.* Chriſtiania, Chriſtianſand, Bergen, and Drontheim; two in Iceland, *viz.* Skaalholt and Hoolum. There is no archbiſhop; but the biſhops of Zealand and Chriſtiania are metropolitans. The inferior clergy are archdeacons or provoſts, pariſh prieſts, and chaplains. Holſtein has no biſhop, but only a general ſuperintendent. The livings ſeldom exceed 400*l.*; but never fall ſhort of 60*l. per annum*, excepting in Iceland, where ſome livings are hardly worth 5*l.*, and the beſt do not exceed 20*l.* a-year. The king, as ſupreme head of the church, nominates the biſhops; but the archdeacons are choſen by the pariſh prieſts, and the latter by the patrons of the livings.

At Copenhagen, Altona, and Frederickſtadt, other creeds are tolerated. The Mennonites, in the juriſdiction of Haderſleben, enjoy great privileges; they are exempted from the military conſcription. The Jews are moſt liberally treated in the Daniſh dominions. They are 1500 in number at Copenhagen, and 2500 at Altona.

The Danes in general are religious without ſuperſtition, and the lower orders, though bigotted, are leſs ſo than the Norwegians. Their morals are upon the whole tolerably pure. The predominant vices of the lower claſſes are lazineſs, gluttony, and an exceſſive fondneſs for ſpirituous liquors; that of the higher orders the love of ſhow and pleaſure. The manners of the nobility and gentry are refined and eaſy, partaking rather of the old French ſchool. All ranks are equally attentive to ſtrangers. Hoſpitality and affability pervade all claſſes. The favourite diverſions of the Danes are the theatre, cards, muſic, dancing, and in winter driving on ſledges over the ſnow. The middle ranks, to enjoy their favourite amuſement of dancing and playing at cards, meet in clubs, the number of which at Copenhagen is greater than in any other town on the continent of equal or ſuperior population. Thither they take the ſtranger to whom they wiſh to ſhew any civility; and thus avoid the expence of an entertainment at their own houſes. There are no baths nor watering places in Denmark.

The

DENMARK.

The conſtitution of Denmark, as eſtabliſhed by the Royal Law, Kong's Low, Lex Regia of the 14th of November 1665, is an abſolute monarchy: the king is bound by no human law; and either in eccleſiaſtical or civil affairs, acknowledges no ſuperior or judge but God. He has the power of making and repealing laws. He is the ſource of all titles, dignities, honours, and offices. He has the power of making war and peace, of forming alliances, and impoſing taxes. He is the ſupreme chief of the church, and alone enjoys every right of ſovereignty by whatever name it may be called.

But the king of Denmark muſt be of the Lutheran church, deſcended from Frederick III. born in wedlock. He is of age at his entering his fourteenth year. At the death of a king the throne devolves inſtantly to the next heir without any other formality; but the new king muſt be ſolemnly anointed and crowned, and this ceremony may take place even during his minority.

The inſignia of the coronation are kept in the royal palace of Roſenburg.

The Daniſh nobility have no ſhare whatever in the government. There are no dukes but of the royal family. Beſides the duke of Holſtein Auguſtenburg, there is no other Daniſh prince on appanage. Neither are there any marquiſſes. The nobles are ſimply counts, barons, and noblemen.

Frederick VI. the preſent king of Denmark, was born on the 28th of January 1768 of Chriſtian VII. king of Denmark, and Carolina Matilda, princeſs of England. He ſucceeded his father on the 13th of March 1808.

The royal title is: Frederick VI. by the grace of God, king of Denmark and Norway, of the Goths and Vandals, duke of Sleſwick, Holſtein, Stormarn, Ditmarſh, &c. The title of the eldeſt ſon is crown prince. The younger ſons are called hereditary princes. The royal arms are parted by the Danebrog croſs into four principal quarters. In the firſt or, three lions paſſant gardant azure, ſurrounded with nine hearts gules for Denmark. In the ſecond gules, a lion rampant crowned or, holding a Daniſh battle-axe argent for Norway. In the third azure three crowns or for Denmark, Norway, and Sweden. In the fourth or a lion leopardiſed azure, with nine hearts gules for ancient Gothland. The inefcutcheon quarterly in the firſt or two lions paſſant azure for Sleſwick. In the ſecond gules three nettle leaves argent, pierced with three nails of the croſs charged with a ſmall eſcutcheon argent for Holſtein: in the third gules a cygnet argent gorged with a crown or for Stormarn: in the fourth gules, a cavalier armed argent, holding a ſword pommelled or for Ditmarſh. Upon all, an inefcutcheon in the centre party per pale, or two bars gules for Delmenhorſt; and azure a croſs party or for Oldenburg. The ſupporters are two ſavages armed with clubs.

There are but two orders of knighthood in Denmark. The firſt is the order of the Elephant, of which Canute VI. is falſely conſidered as the founder. In 1464 Chriſtian I. eſtabliſhed a monaſtic ſociety with the badge of an elephant, which probably ſuggeſted to Frederick II. the idea of founding the order of the Elephant. He gave it away for the firſt time on the third of May 1580. It was afterwards provided with new regulations by Chriſtian V. on the firſt of December 1693. The badge of this order is a white enamelled elephant ſurmounted with a caſtle, ſet in diamonds. The chain conſiſts of two elephants and two caſtles alternately. It is worn, ſuſpended by a ſky-blue watered ribbon, over the left ſhoulder. The motto is: "Magnanimi pretium." On the left breaſt the knights wear an octagon ſilver ſtar. The number of the knights, beſides the ſovereign, is limited to thirty. It confers the title of excellency, and can be beſtowed only upon perſons profeſſing the proteſtant religion. The ſecond order of knighthood in Denmark is the Danebrog order. It derives its name from the once celebrated royal banner called the Danebrog, which was loſt in the war with the inhabitants of Ditmarſh, a province of Holſtein. It is reported to have been founded by Waldemar II. in 1219: but it is more probable that Chriſtian V. was its real founder on the 12th of October 1671. The ſtatutes of the order were only ſigned on the 1ſt of September 1693. The badge of the Danebrog order is a white ribbon edged red, worn ſcarf-wiſe over the right ſhoulder, having at its end a ſmall white enamelled croſs with diamonds. In the centre of this croſs are the letters W. for Waldemar, and C. V. for Chriſtian V. with the royal crown, and underneath the word RESTITUTOR. The motto of the order is: "Teſſera Fidelium." The knights wear an octagon ſilver ſtar on the right breaſt. Any perſon not of royal blood, who is to be made a knight of the Elephant, muſt firſt be a knight of the Danebrog, and have worn its badge at leaſt for a few days. The number of knights was originally limited to 50; but in 1787 there were not leſs than 193 knights of the Danebrog.

The Daniſh court was formerly very ſplendid and expenſive: it is now one of the moſt economical in Europe, though the number of perſons attached to the court be ſtill very great. In 1783 there were 296 chamberlains, and 91 gentlemen of the bed chamber, 218 of whom had been appointed by Chriſtian VII. The national theatre of Copenhagen is partly a royal eſtabliſhment.

The adminiſtration of the kingdom is in the hands of a privy council, in which the king preſides. The number of its members is not limited. Subordinated to the privy council are the following five departments: 1. The Daniſh chancery, which ſuperintends the courts of juſtice, eccleſiaſtical affairs, public education, patents, privileges, &c. for Denmark and Norway. 2. The German chancery, which tranſacts the ſame buſineſs for Sleſwick and Holſtein. 3. The department of foreign affairs. 4. The financial college or board of revenue; and, 5. The treaſury. There is a miniſter at the head of each of theſe departments.

The fundamental laws of Denmark are the royal law of 1665, which fixes the conſtitution, and the law of the 15th of January 1776, called the Indigenate's Law, which excludes foreigners from public offices, unleſs they be naturalized. In civil and criminal matters, Denmark acknowledges no laws but the Danſke Low, or code of Chriſtian III. publiſhed in 1683. It has been often reviſed, and a great many ſtatutes have been added. An abridgement has been publiſhed in Engliſh under the title of "The Daniſh Laws faithfully tranſlated for the Uſe of the Engliſh Inhabitants of the Daniſh Settlements in America;" London, 1756, 8vo. in which the tranſlator has omitted the ſecond book, and the ſections relating to the peaſants. This Daniſh code is conciſe, clear, and plain, and remarkable for its mildneſs and equity. Even lord Moleſworth, who judges ſo unfavourably of every thing Daniſh, is reluctantly obliged to praiſe the Daniſh code of laws. The courts of juſtice are divided into three claſſes, *viz.* the inferior courts, the ſuperior courts, and the ſupreme tribunal of Copenhagen. Inferior courts are in the country: 1. The herretſdinge, compoſed of one judge, herretsfoget, and eight aſſeſſors, choſen among the reſpectable houſekeepers of the diſtrict (herred), called ſtokemen, beſides a clerk called ding or herredſkriver. A herred, or diſtrict, generally conſiſts of 40 or 50 pariſhes. Theſe courts are held once a week. 2. The birkdinge, or courts of juſtice on the eſtates of the noblemen, which are not

not ſubmitted to the juriſdiction of the herretſdinge. 3. The city juriſdictions, or byetinge, aſſiſted by a certain number of aſſeſſors choſen among the moſt reſpectable houſekeepers of the place, and called dingmen. At Copenhagen, however, all the inhabitants without diſtinction are, ſince 1771, under a ſeparate court, called the "Court and Town Juriſdiction," (Hof und Stadt Gericht) from which the appeal goes directly to the ſupreme tribunal. But from all other inferior courts of juſtice, the appeal firſt goes to the ſuperior courts, called landdinge, which are compoſed of country judges, called landdommers, and are held once a month. The clerks are called landdingſherer. There are five landdinge in Denmark, one for Zealand, at Ringſtædt; one for Funen and Langeland, at Odenſee; one for Jutland, at Wyborg; one for Laland and Falſter at Marieboe; and the fifth at Bornholm.

The ſupreme tribunal of Copenhagen is the higheſt court of juſtice for all the Daniſh dominions. It ſits almoſt the whole year, and is always opened with great ceremonies by the king himſelf in the beginning of March, on the ancient Herredag or Danehoev.

Although the adminiſtration of juſtice in the inferior courts is expeditious, and not very expenſive, yet in order to check the ſpirit of litigation, too prevalent among the Danes, conciliatory committees have been annexed to the inferior courts of juſtice ſince the year 1795. See COPENHAGEN.

The police in Denmark is vigilant and good. A Board of Health (Mediciniſche Collegium) watches over the health of the people, and has appointed a committee for promoting vaccination. (See COPENHAGEN.) But the moſt intereſting inſtitution is the Lying-in Hoſpital, where all midwives in the Daniſh dominions muſt have ſtudied before they are allowed to exerciſe their profeſſion. It is properly a kind of foundling hoſpital, in which mothers may not only place their children, but where they may alſo be delivered. All pregnant women, of whatever condition, religion, or country they may be, are admitted without being aſked any queſtions; they are even allowed to come in maſks, and to continue maſked all the time they are there. The beſt accommodations coſt fifteen dollars *per* week. There are other apartments for twelve and eight dollars, that is about a guinea and a half. This intereſting aſylum is ſaid to have produced a viſible diminution in the number of infanticides, which the mild laws of Denmark rarely puniſh with death. A Board of Alms (Pflege Anſtalts Collegium) ſuperintends the maintenance of the poor, who are ſupported entirely by private charity. No beggars are ſeen on the road or in the ſtreets. The number of charitable foundations in Denmark is very conſiderable, and if the country offers few traces of opulence, it affords, however, no veſtiges of poverty. The meaneſt cottages are clean and comfortable. Denmark, though a proteſtant country, has preſerved ſeveral richly endowed ladies' convents, which afford an excellent education to the daughters of poor noblemen, and in which they find a comfortable aſylum until they are married. The priſons are kept in the ſtate recommended by the immortal Howard. See COPENHAGEN.

The revenues of the crown in Denmark ariſe chiefly,

1. From the demeſnes and the quit-rents paid for thoſe that have been ſold.
2. From the Sound dues. See ELSINEUR.
3. From cuſtom-houſe dues on exports and imports.
4. From the mines, mint, poſt, and ſtamp office.
5. From the land-tax, which varies in the different provinces, and is paid either for the ſuppoſed produce of the ground, or for the number of ploughs, as in Sleſwick and Holſtein, where each plough pays 5*l.* 12*s.* ſterling annually. The duty paid by the ſaw-mills in Norway, is conſidered as a branch of this tax. Every ſaw-mill pays 6*l.* ſterling annually.
6. From the exciſe dues on wine, ſpirits, beer, malt, cattle, leather, and ſeveral articles of food. It alſo includes the marriage-tax, confined to Copenhagen, where the higher ranks pay 10*l.* ſterling on marrying. The tax comes gradually down as low as four ſhillings.
7. From the tax on rank and honours. All the ſubjects of the king of Denmark are claſſed in nine different claſſes. The firſt pays annually 16*l.* ſterling; the ſecond 14*l.*; the third 8*l.*; the fourth 6*l.*; the fifth 3*l.* 4*s.*; the ſixth 3*l.*; the ſeventh 2*l.* 8*s.*; the eighth 1*l.* 12*s.*; the ninth 1*l.* 4*s.*

Penſions of 80*l.* annually, or above, pay ten *per cent.*; from 70 to 80 excluſive, eight; from 60 to 70, ſeven; from 50 to 60, five; from 40 to 50, four; from 30 to 40, three; from 20 to 30, two. Widows pay half of the rank and penſion-tax.

8. From the poll-tax in Denmark Proper.
9. From the profits which the royal lotteries, eſtabliſhed at Copenhagen and Altona, leave to the crown. They are expoſed to great variations. During fourteen years, *viz.* from 1773 to 1787, the gain of the crown amounted to 820 423*l.* ſterling; but from 1787 to 1791, the public regained 403,672 ſterling, leaving a balance of 416,751*l.* ſterling, for the ſpace of eighteen years. The average produce of this gambling impoſt cannot, therefore, be valued at more than 20,000*l.* ſterling, annually.
10. From the impoſts levied in the Daniſh Weſt India iſlands, which uſed to leave an annual clear revenue of about 30,000*l.* ſterling.

On particular emergencies, extraordinary contributions are levied. Thus, on the 5th of January 1807, an additional tax of 1*l.* 4*s.* was laid on every plough, for defraying the expences attending the marching and quartering of the troops in Sleſwick and Holſtein.

The exact amount of the whole annual revenue of Denmark is not known. It may, however, be eſtimated at eight millions of dollars, or 1,600,000*l.* ſterling. In 1784, Mr. Coxe rated it at 1,400,000*l.*, but he acknowledges, in a note to the fifth edition, that it has ſince been increaſed. From 1785 to 1787, Mr. Toze ſuppoſes it to have been 7,270,172 dollars or 1,440,000*l.* Profeſſor Norman of Roſtock, eſtimated it in 1803, at 7,800,000 dollars, or 1,560,000*l.* ſterling. The expenditure, which in former times frequently exceeded the receipts, had not only been made to balance of late years; but there was even a conſiderable ſum appropriated as a ſinking fund for the payment of the national debt, which had been reduced to little more than two millions and a half ſterling. The perilous ſituation in which Denmark has been recently placed, has cauſed an iſſue of exchequer bills, which it will be neceſſary to fund, and which will no doubt raiſe the national debt again to what it was in the year 1790, namely, four millions ſterling.

The military force of Denmark is partly mercenary, and partly a national militia. The former is on a regular eſtabliſhment, and continues in actual ſervice all the year round. It is made up of foreign recruits, who coſt the crown very large ſums, but whoſe number is not very great, and of national recruits, who enliſt for a bounty.

The Daniſh army is properly compoſed of two diſtinct corps, the Daniſh and Norwegian troops, differing very much in their conſtitution.

In Denmark each pariſh (lage) furniſhes one foot ſoldier or cantoniſt, who receives common pay during the four weeks of exerciſe, an annual extra gratification of 1*l.* ſterling,

ling, and four-pence for each Daniſh mile he has to travel to and from his regiment. Men above 36 years of age are free from the conſcription. The horſes for the cavalry are furniſhed by the land-owners, and country clergy for the cantoniſts, and kept by them for an annual gratification from the treaſury. They may uſe theſe horſes for their own perſonal ſervice, but they muſt always keep them in good condition.

In Norway a lage, or diſtrict, furniſhing a man, conſiſts of two complete farms, and the whole army is compoſed of cantoniſts, without any regular troops. The time of ſervice is fixed at nine years, at the end of which they are obliged, in caſe of need, to ſerve ſix years in garriſon towns on the frontiers. The horſes are found and kept by the land-owners, who may employ them to their own uſe. The annual exerciſes laſt only twelve days. The cantoniſts are exerciſed by companies, and every fourth year only by battalions.

The Daniſh regular troops receive new cloathing every third year, the national cantoniſts only every twelfth year. The pay of a common ſoldier is 3*d.* a day, that of a horſeman 3½*d.* with bread. Invalids are provided for in ſeven garriſon companies, and in the hoſpital at Eckernforde. There is a ſchool for one hundred cadets for the land ſervice eſtabliſhed at Copenhagen. Fifty are educated at the expence of government, and fifty on paying for their board. There are two other ſchools of the ſame kind, one at Chriſtiania in Norway, and the other at Rendſburg in Holſtein. In 1799, public lectures were inſtituted at Copenhagen for the inſtruction of non-commiſſioned officers.

The whole Daniſh army conſiſts of 74,791 men, and coſts annually 393,000*l.* ſterling.

On the 19th of January 1801, a new national militia was organized by the name of *Landvaern*. It was to conſiſt of thoſe men, who, having attained their 36th year, are diſmiſſed from the army, and they were to ſerve merely on emergencies, without being incorporated in the army. This ſervice was to be limited to the age of 45. Two regiments of nearly 6000 men each were actually organized in the ſpring of 1801, when the Engliſh threatened the coaſt; and this auxiliary force has been lately called out and differently regulated. In the towns it extends to every male inhabitant capable of bearing arms.

The Daniſh fortreſſes are, Copenhagen, Cronenburg, Corſöer, Nyeborg, Fredericia, and Fladſtrand in Denmark, Rendſburg and Gluckſtadt in Holſtein, Frederickſhald, Aggerhuus near Chriſtiania, Frederickſwærn in Norway, and Vardochus in Finmark. The principal arſenals are at Copenhagen, Rendſburg, Aggerhuus, and Frederickſtadt. The war office is compoſed of a preſident and five aſſeſſors, and has under it three different departments for the cavalry, infantry, and the the fortreſſes.

According to the official Daniſh gazette of the 15th October, 1803, the Daniſh navy conſiſted at that time of 19 ſhips of the line, 15 frigates, 8 brigs, and 13 gun-boats. On the 1ſt of January 1807, the number of officers in the Daniſh fleet was 2 admirals, 2 vice admirals, 3 rear admirals, 10 commodores, 15 commanding captains, 25 captains, 30 captain-lieutenants, 55 firſt lieutenants, and 66 ſecond lieutenants. But as the Daniſh navy has been entirely annihilated, we ſhall defer the account of every thing relating to this ſubject to the article NORWAY (which ſee), under which we ſhall alſo endeavour to ſtate the external relations of Denmark, which are at this moment diſturbed by the war.

With regard to the national character of the Danes, they have always been juſtly conſidered as a brave, generous, and grateful people, hoſpitable and enlightened, attached to their country, but rather ſlow, addicted to pleaſure, intemperate in their food, litigious, and of an iraſcible and revengeful diſpoſition. Coxe's Travels, vol. v. Fr. Thaarup's Statiſtik der Daeniſchen Monarchie, 1796. J. P. Catteau. Tableau des Etats Danois, 1802. C. G. Kuttner's Travels through Denmark in 1798 and 1799. Nord Litéraire, and Archives du Nord.

DENN, a town of Arabia, in the country of Yemen; 40 miles E. of Zebid. N. lat. 14° 15′. E. long. 43° 43′.

DENNEHOUT, a town of Flanders; 5 miles S. of Aloſt.

DENNIS, JOHN, in *Biography*, was the ſon of a ſadler, and born in London in the year 1657. He received his grammar learning at Harrow ſchool, and from thence he was admitted at Caius college, Cambridge. Here he remained ſeveral years, took his degree of M A., and then made the tour of France and Italy. Upon his return, he made himſelf known as a poet and dramatic writer; but neither in theſe departments, nor in political controverſy, in which he engaged, did he make any diſtinguiſhed figure. The public gave him little credit for real talents, and he was often diſguſted and irritated that his labours were ſo ill received. As a critic he is beſt known; his violence in that character procured for him the appellation of "Dennis the Critic;" and his want of temper involved him in perpetual diſputes with the principal writers of the day. Addiſon and Pope did not eſcape his laſh; the latter retorted upon him with equal ſeverity. Toward the cloſe of life Dennis was much diſtreſſed in his circumſtances. As a politician, he had ever eſpouſed the whig party, and when his fortune, which had never been conſiderable, was reduced, he obtained, through the intereſt of the duke of Marlborough, a place in the cuſtom-houſe, which his wants or his extravagance obliged him in a few years to ſell, reſerving, however, an annuity for a certain term. This he outlived, and when he moſt needed the comforts of life he found himſelf completely deſtitute of every thing. To poverty was added the affliction of blindneſs. A play was acted at the Hay-market for his benefit, for which his old opponent, Pope, wrote a prologue, which would have been highly creditable to his candour, had he not taken the advantage of ſneering at the man whom he profeſſed to benefit. Dennis, at that period, was too old or too imbecile to be affected by this inſtance of diſingenuity, which he ſurvived but three weeks; he died on the 5th of Jan. 1734, in the 77th year of his age. In the Biographia Britannica we have a long account of the writings of Mr. Dennis, longer, perhaps, than would be thought neceſſary, by readers in general. Of this, the excellent writer, Dr. Kippis, ſeems aware, and apologizes, by ſaying, that the "article will not be found totally deſtitute of utility. It will add ſomething to the great body of the literary hiſtory of England, and it may ſerve to diſplay the unhappy effects that reſult from the extravagance of ſelf-opinion; an extravagance which is uſually more incident to ſecondary authors, than to thoſe who occupy the higheſt ranks of genius and learning." Biog. Brit.

DENNIS, in *Geography*, a poſt town of America, in the ſtate of Maſſachuſetts, and county of Barnſtaple, incorporated into a townſhip in 1793; it is 80 miles S.E. from Boſton, and 8 from Barnſtaple, and contains 1408 inhabitants. This town comprehends the villages of Nobſcuſſet, of 52 houſes, and Suet of 36 houſes.

DENNIS *Creek*, an American creek, in Cape May county, N. Jerſey; 219 miles from Waſhington.

DENOMINATION, from *denomino*, of *de* and *nomen*, a name, a name impoſed on any thing uſually expreſſing ſome quality predominant therein.

Hence, as the qualities and forms of things are of two kinds, *viz.* internal and external, denomination becomes twofold.

DENOMINATION, *internal*, is that founded on the intrinſic form; thus Peter is denominated learned on account of his learning, which is ſomething internal.

DENOMINATION, *external*, is that founded on, or ariſing from, the external form. Thus, a wall is ſaid to be ſeen and known, from the viſion and cognition employed upon it; and thus Peter is denominated honoured, by reaſon of honour, which is not in the perſon honoured, but in him that honours.

DENOMINATOR, in *Arithmetic*, a term only uſed in ſpeaking of fractions, or broken numbers. See FRACTION.

The denominator of a fraction is the number or letter below the line; ſhewing into how many parts the integer is ſuppoſed to be divided by the fraction.

Thus, in the fraction $\frac{7}{12}$ ſeven twelfths, the number 12 is the denominator, and ſhews that the integer is here divided in 12 parts. So in the fraction $\frac{a}{b}$, b is the denominator.

The denominator always repreſents an integer.

The number above the line, 7, is called the numerator.

DENOMINATOR *of a ratio* is the quotient ariſing from the diviſion of the antecedent by the conſequent.

Thus, 6 is the denominator of the ratio 30 : 5, becauſe 5)30(6. The denominator is what we otherwiſe call the exponent of the ratio.

DE NON RESIDENTIA CLERICI REGIS, in *Law*, the name of an ancient writ, the form whereof ſee 2 Inſt. fol. 624. for excuſing a parſon employed in the king's ſervice for non-reſidence.

DENS CANIS, in *Botany*, *Dog's Tooth violet*. See ERYTHRONIUM.

DENSCHENDORF, in *Geography*, a town of Denmark, in the iſland of Funen; 4 miles W. of Berg.

DENSHIRING, in *Agriculture*, a term formerly applied to the operation of paring off the ſurface of graſs lands, and burning the materials thus produced by ſmothering fire. See PARING and BURNING.

DENS LEONIS, DANDELION. See LEONTODON.

DENSITY, (from the Latin *denſitas*) cloſeneſs, or compactneſs. *Denſity* and *rarity* are oppoſite or relative terms, both referring to the quantity of matter contained in a given ſpace. Take two veſſels, A, and B, of equal capacities. Fill A looſely with cotton, and ſuppoſe it to contain one pound weight of cotton; let two pounds of cotton be forced into the veſſel B; then the cotton in A is ſaid to be rare with reſpect to the cotton in B, and the cotton in B is ſaid to be denſe with reſpect to the cotton in A. Alſo the denſity of the cotton in B is ſaid to be double the denſity of the cotton in A, becauſe it contains a double quantity of it in the like ſpace; and if three pounds of cotton were forced into the veſſel B, then the denſity of it would be treble that of the cotton in A, &c. So that the denſity is proportionate to the quantity of matter contained in a given ſpace. It is evident, that if the capacity of the veſſel B be double that of the veſſel A, then, in order to produce in B a denſity of cotton double that of the cotton in A, four pounds of cotton muſt be forced into B; for if in this caſe the capacity of B be ſuppoſed to be divided into two parts, each part would be equal to A, and each part would contain two pounds of cotton. This explanation, which we have for the ſake of perſpicuity applied to the filling of veſſels with cotton, muſt be applied to all other bodies of any other kind. Hence we learn the following evident and general deductions, or theorems, concerning the relative proportions of the denſities, the bulks, and the weights of bodies.

I. The denſity is directly proportional to, or is as the quotient of the weight divided by the bulk.

II. The weight is as the product of the denſity multiplied by the bulk.

III. The bulk is as the quotient of the weight divided by the denſity.

If the denſity be called D, the bulk B, and the weight W; then theſe three theorems are, according to the algebraical notation, expreſſed in the following manner; (α being the ſign of conſtant proportion.)

$$\text{I. } D \alpha \frac{W}{B}.$$
$$\text{II. } W \alpha BD.$$
$$\text{III. } B \alpha \frac{W}{D}.$$

Therefore, when two bodies, as M and N, are to be compared together with reſpect to their denſities, weights, and bulks; call the denſity, weight, and bulk of M, reſpectively D, W, B; alſo call the denſity, weight, and bulk of N, reſpectively, d, w, b; then the compariſon for the above three caſes ſtands thus:

$$\text{I. } D : d :: \frac{W}{B} : \frac{w}{b}.$$
$$\text{II. } W : w :: BD : bd.$$
$$\text{III. } B : b :: \frac{W}{D} : \frac{w}{d}.$$

One numerical application of the firſt caſe, will ſufficiently illuſtrate the practical uſe of theſe theorems. Let the weight of the body M be 10 ounces, and its bulk five cubic inches; alſo let the weight of the body N be nine ounces, and its bulk three cubic inches, then the denſity of the body M is to the denſity of the body N, as $\frac{10}{5}$ is to $\frac{9}{3}$; or as two to three. In the preceding paragraphs we have taken it for granted, that the quantity of matter is proportionate to its weight; and, indeed, with bodies of the ſame kind of matter this can hardly be doubted; for inſtance, a lump of gold which weighs ſix pounds, muſt contain twice as much matter as is contained in another lump of gold which weighs three pounds. But with matter of different kind, it is impoſſible to ſay with certainty, that the weights are proportional to the quantities of matter. The weight of a body is meaſured by the force with which the ſubſtance of that body is attracted by the earth; therefore, if the attraction between the earth and a body A, be greater than the attraction between the earth and another body B, then thoſe bodies may contain equal quantities of matter, and have unequal weights. But, in truth, we have no determinate knowledge of the real and intimate eſſence of matter. We diſtinguiſh matter, or bodies, by their properties; and it is impoſſible to ſay, whether matter conſiſts of ſomething eſſential and endowed with ſuch properties, or it is only an aſſemblage of thoſe properties. The moſt general idea is that, *cæteris paribus*, the quantity of matter is proportionate to its ſenſible weight; and in this we muſt for the preſent acquieſce.

The limits of denſity are likewiſe unknown to us. Air is one of the moſt elaſtic of the ponderable fluids known: and experiments ſhew, that a given quantity of air may be compreſſed into a ſpace ſmaller and ſmaller, (and of courſe it may be rendered more and more denſe) in proportion to the power which is applied to compreſs it; ſo that with a double

double force it may be contracted into half the ſpace; with a treble force, it may be contracted into a third part of the original ſpace, and ſo on: and human art has not been able to aſcertain how far this condenſation may be carried on. It has alſo been obſerved, that by removing the preſſure a quantity of air will be enabled to expand itſelf; nor has any limit been diſcovered to this expanſion. Other bodies are compreſſed, and become more denſe in conſequence of the application of an adequate force; but they do not follow the ſame regularity as air; nor do they recover their entire original bulk when the preſſure is removed. All metallic bodies, by preſſing, laminating, or hammering, may be permanently reduced into a ſmaller ſpace, or rendered more denſe; but it is not in our power to ſay how far their denſity may be increaſed.

The ſuſceptibility of condenſation ſhews, that the primitive particles of bodies cannot be in perfect contact with each other; but that they muſt contain a great many pores or vacuities. Indeed, ſir Iſaac Newton was of opinion, that even gold which is the denſeſt body next to platina, is likely to contain more pores or vacuities than real ſolid matter. It is, however, to be obſerved, that this opinion is more verbal, than real; for when in common language we talk of pure gold, or pure ſilver, or pure water, &c. we mean that the gold or the ſilver is unmixed with other metals, or that the water contains no ſolid extraneous matter; but we forget, that the element of heat, or caloric, and the electric fluid are mixed with it. The firſt of theſe fluids is manifeſted by its being expelled in the act of hammering, or preſſing; as under that operation the metallic ſubſtance is unavoidably heated. The exiſtence of the electric fluid in conſiderable quantity is rendered more than probable by the phenomena of galvaniſm. See GALVANISM. Upon this conſideration, therefore, a piece of pure gold, as we call it, is in reality a mixture of gold, caloric, and electricity. Hence, if the real particles of gold are not quite in contact with each other, they are kept apart by the other components of the mixed body, *viz.* by the caloric, and by the electric fluid. It ſeems, then, likely, that if we conſider the gold, the caloric, and the electric fluid as the component parts of the mixed body, which in common language we call pure gold, all theſe parts may be abſolutely in contact with each other. The conſequence of this concluſion would be, that the lump of this pure gold could not be compreſſed into a ſmaller ſpace, unleſs ſome of the ingredients are ſqueezed out of it; and this, in fact, takes place; for the caloric is expelled in the form of ſenſible heat whenever gold is compreſſed. The ſame reaſoning may be applied to all other kinds of compreſſible bodies; and it will be found, that thoſe which are more compreſſible, give out more heat. Thus the compreſſion of air produces heat ſufficient to ſet fire to light combuſtible bodies.

The denſities of bodies are alſo increaſed by cooling, or by the abſtraction of heat. This law, however, is not general; or rather, it does not obtain throughout the whole extent of the ſcale of heat. Water, for inſtance, becomes denſer and denſer by cooling, as far as about the 40th degree of Fahrenheit's thermometer; but below that degree the bulk of water is expanded by farther cooling; which is evidently owing to a cryſtallization, *viz.* to the particles of water diſpoſing themſelves in a peculiar order. The ſame thing, under certain limitations, has been obſerved in various other bodies.

The inveſtigation of the natural and acquired denſities of bodies has, at all times, and eſpecially of late, been particularly attended to by the moſt able philoſophers, as being a ſubject intimately connected with, and ſubſervient to, various inportant branches of natural philoſophy, and to the arts. The denſities of ſolids and fluids are, in fact, their ſpecific gravities, the knowledge of which every body knows to be extenſively uſeful. See SPECIFIC GRAVITY.

The mutual preſſure of fluids upon each other, alſo, of ſolids upon fluids, and *vice verſa*, which are of the utmoſt importance in hydraulics, in naval architecture, &c. is entirely dependent upon their peculiar denſities. See HYDRAULICS and NAVAL ARCHITECTURE. In chemical operations, the denſities of fluids, and eſpecially of ſaline ſolutions, are carefully attended to: for the cryſtallization, and the ſeparation of ſalts, entirely depend upon the proper degree of denſity to which the brine is brought. See CHEMISTRY, SALTS, and CRYSTALLIZATION.

The inveſtigation of the various denſities of the atmoſphere at different times, and at different heights above the ſurface of the earth, enables us, beſides other uſes, to meaſure altitudes by the barometer.

With reſpect to the various denſity of the atmoſphere it will be neceſſary to give a general idea in this place, the more intricate part of it being treated of under the articles ATMOSPHERE, ATMOSPHERICAL LOGARITHMIC, and BAROMETER.

Air actually taken in bottles, at different heights above the ſurface of the earth, (as far as human beings could aſcend,) and afterwards examined with all due precautions, has been found to be leſs denſe according as it was taken at a greater height. Alſo the numerous experiments that have been performed on the compreſſibility and elaſticity of the atmoſpherical air, prove, that by the application of preſſure, the air may be condenſed into a ſpace inverſely proportional to the force which is applied to it; that by removing the preſſure, the air expands in proportion to the quantity of preſſure which is removed; and by remaining a certain time under preſſure, the air loſes no part of its elaſticity. And to theſe properties we know no limits. Therefore, from all theſe facts we may ſafely conclude, that the air of the atmoſphere is denſeſt neareſt to the ſurface of the earth, where it is preſſed by the weight of the whole altitude of the atmoſphere; that it is leſs denſe according as the place is more diſtant from the ſurface, becauſe the ſuperincumbent air is leſs high; and laſtly, that it is impoſſible for us to ſay how far the atmoſphere is extended, becauſe we are not acquainted with the utmoſt limits of the air's expanſibility.

Beſides the compreſſion ariſing from the weight of the ſuperincumbent air, which undoubtedly is the principal cauſe of the various denſity of the atmoſphere; other cauſes concur in the production of that effect. In ſhort all the concurring cauſes are, as far as we know: 1. The various quantity of ſuperincumbent air at different altitudes; 2. The decreaſing attraction of the earth, or the decreaſing weights of bodies, in proportion to the ſquares of the diſtances from the centre of the earth; 3. The action of heat and cold; 4. The admixture of vapours and other fluids; and, 5. The attraction of the ſun and the moon.

From the abovementioned facts, the denſities, and of courſe, the preſſures of the atmoſphere, for different altitudes above the ſurface of the earth, are calculated on the ſuppoſition of the air's denſity, being affected only by the maſs or weight of the ſuperincumbent air; then, thoſe denſities are corrected according as the actual ſtate of the principal of the other concurring cauſes may ſeem to require. Laſtly, the barometer, by which we meaſure theſe denſities or preſſures at different altitudes, will of courſe, indicate the correſponding altitude. See BAROMETER, and the other articles above referred to.

DENSITY *of the Sun and Planets.* To determine the

denſity

denſity of the ſun and planets, is a problem in phyſical aſtronomy, not more intereſting from the information we derive from its reſult, than from the nature of the method by which the ſolution is obtained.

To the antient mathematicians, who certainly were not deficient in their powers of reaſoning, nothing could have appeared more completely out of the reach of human intellect, than to determine by the abſtract properties of number or quantity, any thing relating to the internal ſtructure of bodies, ſo remote and inacceſſible.—Conſiderations of ſome intricacy occur when we wiſh to ſolve this problem, with the greateſt exactneſs our data admit of;—but before we proceed to theſe computations, we would wiſh to give ſuch an explanation of the general nature of the method by which they are effected, as may be intelligible and ſatisfactory to thoſe who may not be familiar with the application of the Newtonian philoſophy, to queſtions of this nature.

The hypotheſis, which it is neceſſary to admit before we can attempt the ſolution of this problem, is that of univerſal gravitation. This ſuppoſes that all bodies (at leaſt thoſe in queſtion) attract each other, in proportion directly to their maſſes or quantities of matter, and inverſely as the ſquares of their diſtances. 1. This hypotheſis is in fact nothing but the enunciation, in the form of theorem, of a very univerſally obſerved phenomenon, and is by no means invalidated by the objections that have been made to it, that it endows matter with metaphyſical and occult qualities. When we ſay that it is the nature of iron to be attracted by the magnet, we mean nothing more, than that every piece of iron on which the experiment has been made, has, without exception, obeyed the magnetic impulſe. The Newtonian hypotheſis, on which all phyſical aſtronomy is built, aſſerts nothing more of gravitation. In every caſe, as far as our obſervation reaches, the reſult anſwers to the ſuppoſition. As it is not abſolutely impoſſible, but that iron may exiſt which is not magnetic, ſo in the regions of the univerſe, worlds may exiſt not ſubject to the laws of attraction. Nor is that ſpecies of attraction which we here conſider any otherwiſe occult or metaphyſical, than as an agent, with whoſe nature and mode of action we are at preſent entirely unacquainted. Its action is doubtleſs communicated through ſome intermediate medium, and two bodies, in what we call free ſpace, probably approach each other, becauſe it would require a greater effort in them to remain at reſt, or to move in any other direction. When we ſee a feather forcibly drawn to a piece of excited ſealing wax, we attribute the phenomenon to the effect of the electric fluid, a name we have given, by analogy, to this extraordinary agent, whoſe nature we know as little of, as of the nature of gravity, and which moſt probably neither reſembles a fluid, nor any other form of matter with which we are acquainted. But to return more immediately to the ſubject—

We are now to ſhew by what train of reaſoning we arrive at the knowledge of the comparative quantity of matter which the ſun and planets contain, relatively to that in the earth.

If a heavy body, for inſtance a cannon ball, be ſuffered to deſcend from a ſtate of reſt, by no other impulſe than its own weight, it will fall towards the earth with a continually increaſing velocity, and will deſcribe about 16 feet in the firſt ſecond of time. This initial velocity of 16 feet in a ſecond, may be taken as a ſtandard meaſure of the attractive power of the earth.

It is demonſtrated by mathematicians, and we will here take it for granted, that the attractive force of a large ſpherical maſs of matter will be the ſame, let the dimenſions of the globe, into which that matter is compreſſed, be what they may. So that if the whole maſs of the earth could be compreſſed into a central point, its attractive force would remain the ſame, and would at 4000 miles diſtance, that is at the ſame diſtance as before, (4000 miles being equal to the earth's radius) cauſe a heavy body to move towards it with an initial velocity of 16 feet in the firſt ſecond of time.

If we ſuppoſe the ball, inſtead of deſcending from a ſtate of reſt, to be projected horizontally from a cannon, it will ſtill equally obey the attractive power of the earth, and will deſcend exactly 16 feet from its horizontal direction in the firſt ſecond of time. If the earth were really compreſſed into a ſmall central ſpace, as we juſt now ſuppoſed, the ball would circulate round it, and would deſcribe a curve, the nature of which would depend on the velocity of projection; but it would always have this property, that at the point of its origin, it would deviate from its tangent 16 feet in the firſt ſecond of time. If the ball be taken up 60 times as far from the centre of the earth, (namely to the diſtance of the moon) the attractive power of the earth will then be diminiſhed 3600 times, (3600 being the ſquare of 60) becauſe the force decreaſes, as the ſquare of the diſtance increaſes; and the ball will deſcend from a ſtate of reſt with an initial velocity of only the $\frac{1}{3600}$th part of 16 feet; and if it be projected as before, ſo as to deſcribe an orbit round the earth, that orbit would deflect from its tangent $\frac{16}{3600}$ feet. And in fact the moon itſelf is found to deflect this quantity from its tangent, which curious coincidence was the firſt confirmation Newton obtained of the truth of his hypotheſis.

If then we could find in our planetary ſyſtem, a ſatellite or ſecondary body, revolving round its principal in an orbit equally diſtant from its centre, as the moon from the centre of the earth, we ſhould eaſily perceive whether that planet contained more or leſs matter than the earth, by obſerving how much the orbit of the ſatellite deflected from the tangent in one ſecond of time. If the deflection was equal to that of the moon we ſhould conclude, the maſs of the planet to be equal to that of the earth; if we found it greater or leſs, it would indicate the maſs of the planet to be greater or leſs in the ſame proportion.

The planet Jupiter affords an obvious example to illuſtrate this reaſoning; its firſt ſatellite revolves round it at a diſtance nearly equal to that of the moon from the earth, but in one ſecond it deflects from its tangent 256 times as much as the moon does. The maſs of Jupiter is therefore 256 times greater than that of the earth. The principles of the calculation are not materially different for ſatellites at different diſtances, it is only neceſſary to compute what the attractive power would be at equal diſtances. The maſs of a planet being thus found, and its magnitude determined by obſervation, its relative denſity may be computed according to the principles deſcribed in the former part of this article.

We ſhall now proceed to explain the practical methods that are uſually employed for the ſolution of this problem—

It has been before ſtated, that if of theſe three things, namely, the magnitude, the maſs, and the denſity of a body, any two be given, the other may be found. The magnitudes of the ſun and planets are here ſuppoſed to be determined by obſervation; to aſcertain their denſities, we begin by computing their maſſes.

The maſs of a planet may be computed by comparing the velocity in its orbit round the ſun, either with the velocity of its ſatellite, or with the force of gravity at its ſurface. If the planet has no ſatellite, aſtronomers have recourſe to a method much leſs accurate, depending on the effect which

by

by obſervation the planet is found to produce in diſturbing the motions of the other planets. For the determination of the denſity of Mercury, La Place prefers deducing it from analogy, by obſerving the law of the denſities of the reſt of the planets relatively to their diſtances from the ſun; but it muſt be acknowledged, that ſuch determination is little better than mere conjecture.

The firſt of the above methods is founded upon a theorem, derived from the doctrine of central forces.

Let F repreſent the attractive force of the ſun,
T the periodic time of the planet, whoſe maſs we wiſh to determine,
r the radius of the obit of the planet,
r' the radius of the orbit of the ſatellite.
F′, the attractive force of the planet upon its ſatellite.
T′, the periodic time of the ſatellite.
M, the maſs of the ſun.
M′, the maſs of the planet.

It will then appear that $M : M' :: \frac{r^3}{T^2} : \frac{r'^3}{T'^2}$.

For by the principles of central forces,

$$F : F' :: \frac{r}{T^2} : \frac{r'}{T'^2};$$

and ſince we ſuppoſe the attractive force of the planet upon its ſatellite to vary inverſely, as the ſquare of the diſtance

$$F' : f :: r^2 : r'^2.$$

Multiplying theſe two proportions, and dividing by F′,

$$F : f :: \frac{r^3}{T^2} : \frac{r'^3}{T'^3};$$

but $F : f$, are the attractive forces of the ſun and planet, upon a particle of matter, placed at equal diſtances, and are evidently proportionate to the maſſes. Therefore, $M : M' :: \frac{r^3}{T^2} : \frac{r'^3}{T'^2}$.

Example.—To find the maſs of Jupiter.

$r : r' :: 63662 : 7964.7,$
$T : T' :: 365.256 : 16.689.$

Therefore $M : M' \frac{(63662)^3}{(365.256)^2} : \frac{(7964.7)^3}{(16.689)^2} :: 1 : \frac{1}{1066.08}$.

But, as the force which retains Jupiter in its orbit, is the ſum of the attractions of Jupiter and the ſun, the denominator muſt be increaſed by unity, and the maſs of Jupiter will be $\frac{1}{1067.08}$.

In the ſame manner, La Place finds Saturn $\frac{1}{3359.4}$.

The Georgian $\frac{1}{19504}$.

The ſecond method conſiſts in determining the diſtance which a planet (as the earth) deflects from its tangent in one ſecond, by comparing its angular velocity, with the mean radius of its orbit; and having found by experiment the ſpace which a heavy body deſcribes in one ſecond by the force of gravity at the ſurface of the planet, we can compute the ſpace it would fall through in the ſame time, if removed to the diſtance of the ſun, and ſince at equal diſtances the attractive force is proportionate to the maſſes, we can deduce the ratio of the maſſes from that of the attractive forces. By this method the maſs of the earth is found to be $\frac{1}{329630}$ that of the ſun.

The maſſes of Venus and Mars have been eſtimated by the ſecular variation which thoſe bodies produce on the ſolar ſyſtem. La Place concludes the maſs of Mars $\frac{1}{1846082}$, and that of Venus $\frac{1}{383137}$, the ſun being unity. Theſe quantities were obtained by the ſecular diminution of the obliquity of the ecliptic, and from the acceleration of the mean motion of the moon.

The denſities of ſpherical bodies are, as their maſſes, divided by the cubes of their ſemi-diameters.

The diameters of the planets being found by obſervation, and their maſſes by the above methods, the denſities of the planets appear to be as follows:

Sun	1.0000
Earth	3.9393
Jupiter	0.8601
Saturn	0.4951
Georgian	1.1376

Mr. Vince, in his Aſtronomy, gives us the following method of finding the denſities of the planets:

Put d = the denſity of the central body,
m = its diameter,
a = its quantity of matter,
P = the periodic time of the revolving body,
D = the mean diſtance of the revolving body from its central body,
S = the ſine of the angle under which m appears at the diſtance D, to radius unity.

Then a varies as $d m^3$, but P^2 varies as $\frac{D^3}{a}$, which varies as $\frac{D^3}{d m^3}$, hence d varies as $\frac{D^3}{m^3 P^2}$. But $S = \frac{m}{D}$; hence d varies as $\frac{1}{S^3 P^2}$, we will therefore aſſume $d = \frac{1}{S^3 P^2}$.

For the ſun.—If we take the earth as the revolving body, P = 365, 25639 days, according to M. de la Caille s = ⊙.0093155 = ſin. 32′, 1″, 5, the mean apparent diameter of the ſun, hence $d = \frac{1}{0.0093155^3 \times 365.25639^2} =$ 9.2722.

For the earth.—Here we muſt take the moon for the revolving body, therefore P = 27.32167 days according to Mayer, S = 0.033155 = ſin. 1° 54′, the mean angle under which the earth's mean diameter appears at the moon, hence $d = \frac{1}{0.033155^3 \times 27.32167^2} = 36.7569.$

For Jupiter.—Mr. Pound has obſerved the greateſt elongation of its fourth ſatellite to be 8′ 16″, and the correſponding diameter of Jupiter to be 39″, hence the ſine S of the angle under which the diameter of Jupiter appeared at that ſatellite at that time was 0.07869. Alſo P = 16.68898 days, according to M. Wargentin; hence $d = \frac{1}{0.07862^3 \times 16.68898^2} = 7.3857.$

For Saturn.—According to Mr. Pound, the greateſt elongation of its fourth ſatellite is 2′ 58″, and the correſponding diameter of Saturn = 18″; hence S = 0.10112. Alſo P = 15.9454 days, according to Dr. Halley, hence $d = \frac{1}{0.10112^3 \times 15.9454^2} = 3.8038.$

For the Georgian.—If we take the ſecond ſatellite, we have, according to Dr. Herſchel, its greateſt elongation = 44″.23, and the correſponding diameter of the planet =3″.90554,

$= 3''.90554$, hence S = 0.0883. Alſo P = 13.462 days, hence $d = \frac{1}{0.0883^3 \times 13.462^2} = 8.0149$.

The denſity of Venus was computed, by Dr. Maſkelyne, to be 1.024. M. de la Lande makes it 1.038.

The denſities of the planets, determined by this method, will be nearly as follows:

Sun	0.25226
Mercury	2.58330
Venus	1.02400
Earth	1.00000
Mars	0.65630
Jupiter	0.20093
Saturn	0.10349
Georgian	0.21805

Denſity of the Earth.

In the above computations, the ſun or the earth hath been aſſumed as the unity, from which the other denſities have been computed.

But it is a queſtion of no leſs intereſt to know the denſity of the earth itſelf, relatively to ſome known ſubſtance, for inſtance, water, which is what we uſually take as a ſtandard of compariſon, when we conſider the ſpecific gravities of other bodies.

Dr. Maſkelyne, the preſent aſtronomer royal, was the firſt perſon that determined experimentally the denſity of the earth by meaſuring the attractive force of the mountain Schehallien, on the plumb-line of a zenith ſector. He inferred the actual mean denſity of the earth to that of water as $4\frac{1}{2}$ to 1. The data for this determination were ſomewhat uncertain, as it was requiſite to have given the internal ſtructure of the mountain, which could not be known but by conjecture.

But the late experiments of Mr. Cavendiſh have left us very little uncertainty upon this ſubject; he concludes the mean denſity of the earth to be $5\frac{1}{2}$ greater than water.

The experiment of Mr. Cavendiſh is founded on the ſame principle as that of Dr. Maſkelyne; the reader will find a very minute deſcription of every part of the proceſs in the Philoſophical Tranſactions, for 1798, from which we can only give an extract of the more material circumſtances. To render the object of the experiment more intelligible, it may not be improper to give a ſhort explanation of the principle on which it is founded.

If a ball *a* (*Plate* IX. *Aſtronomy*, *fig.* 60.) be ſuſpended by a thread in the manner of a pendulum, and a large ball A, be placed on one ſide of it, if the attraction of A be ſenſible on the ſmaller ball, it will be deflected from its vertical poſition and will aſſume a new one, as *á*, where it will remain in equilibrio. And as it is demonſtrated by the elementary principles of mechanics, that the attractive power of the ball A is to the attractive power of the earth as the arc *aá* is to radius: therefore when we know the attractive power of 100 weight of lead, for inſtance, at the diſtance A *a*, we can calculate how many hundred weight muſt be placed at 4000 miles diſtance, or at the centre of the earth; to retain the ball in equilibrio at *á*, this weight is evidently that of the whole earth. Now to render the ſmall arc *a á* ſenſible, it is evident we muſt either have a pendulum of an exceſſive length, or the ball A of an enormous weight.

In Dr. Maſkelyne's experiment the latter circumſtance was choſen. The mountain repreſented the ball A, and the pendulum was the plumb-line of the zenith ſector; the former principle is adopted in that of Mr. Cavendiſh, and the ingenuity of the mechaniſm conſiſts in the ſubſtitution of a ſhort horizontal pendulum, equal in ſenſibility to a vertical one of immenſe length: for we ſhall find that the pendulum in the following experiments, vibrated only four times in an hour: now a pendulum ſuſpended vertically to have vibrated equally ſlow, and to have been therefore equally ſenſible to the attraction of the ball A, muſt have been between four and five hundred miles in length.

The apparatus conſiſts of a ſlender horizontal arm, about ſix feet long, having at its extremities two ſmall leaden balls of two inches diameter; this is ſuſpended by a fine wire 40 inches long, the whole incloſed in a narrow wooden caſe to defend it from wind. It is plain that if the wire is ſufficiently ſlender, a very minute force will be ſufficient to draw the balls on one ſide: for when left to themſelves they will aſſume a given poſition, in which they will remain at reſt, and upon being ſlightly deranged will vibrate, and their vibrations will be the quicker, as the tendency of the rod to aſſume a given poſition, is greater, which will entirely depend on the rigidity of the wire.

Small pieces of ivory, containing diviſions to the 20th parts of an inch are placed within the caſe; thoſe in the direction *a a''*, *b b''*, conſidered as plus; thoſe in the direction *a a'*, *b b'*, minus.

Two leaden weights about 508 *oz.* each, are brought by means of an apparatus without the caſe, into either of the poſitions W W, or *w w*, or they may be kept at right angles to the arm, in which caſe they have no tendency to produce motion in the ſmall balls *a* or *b*.

The object of the experiment is, next, to determine the time of the vibrations of the arm, and the angular deviation from its central poſition cauſed by the attraction of the leaden weights. The author, after deſcribing the apparatus, proceeds to give the minute detail of 17 ſets of experiments, of which the reſults were as follows:—

Experiments	Motion of Weight.	Motion of the Arm.	Ditto cor^{d}.	Times of Vibration.	Ditto cor^{d}.	Mean Denſity of the Earth.
1	0 to +	14.32	13.42			5.5
	+ to 0	14.1	13.17	14.55		5.61
2	0 to +	15.87	14.69			4.88
	+ to 0	15.45	14.14	14.42		5.07
3	+ to 0	15 22	13.56	14.39		5,26
	0 to +	14.5	13.28	14.54		5.55
4	0 to +	3.1	2.95		6.54	5.36
	+ to −	6.18		7.1		5.29
	− to +	5.92		7.3		5.58
5	+ to −	5.9		7.5		5.65
	− to +	5.98		7.5		5.57
6	0 to −	3.63	2.9			4.53
	− to +	5.9	5.71			5.62
7	0 to −	3.15	3.03	7.4		5.29
	− to +	6.1	5.9			5.44
8	0 to −	3.13	3.00	by mean	6.57	5.34
	− to +	5.72	5.54			5.79
9	+ to −	6.32		6.58		5.1
10	+ to −	6.15		6.59		5.27
11	+ to −	6.07		7.1		5.39
12	− to +	6.09		7.3		5.42
13	− to +	6.12		7.6		5 47
	+ to −	5.97		7.7		5.63
14	− to +	6.27		7.6		5.34
	+ to −	6.13		7.6		5.46
15	− to +	6.34		7.7		5.3
16	− to +	6.1		7.16		5.75
17	− to +	5.78		7.2		5.68
	+ to −	5.64		7.3		5.85

For

For the method of computing the denſity of the earth from theſe data, we ſhall give the author's own words.

"I ſhall firſt compute this on the ſuppoſition that the arm and copper rods have no weight, and that the weights exert no ſenſible attraction, except on the neareſt ball, and ſhall then examine what corrections are neceſſary on account of the arm and rods, and ſome other ſmall cauſes.

"The firſt thing is to find the force required to draw the arm aſide, which, as was before ſaid, is to be determined by the time of a vibration.

"The diſtance of the centres of the two balls from each other is 73.3 inches, and therefore the diſtance of each from the centre of motion is 36.65, and the length of a pendulum vibrating ſeconds in this climate is 39.14. Therefore if the ſtiffneſs of the wire by which the arm is ſuſpended is ſuch that the force which muſt be applied to each ball, in order to draw the arm aſide by the angle A, is to the weight of the ball as the arc of A to the radius, the arm will vibrate in the ſame time as a pendulum whoſe length is 36.65 inches, that is in $\sqrt{\frac{36.65}{39.14}}$ ſeconds; and therefore if the ſtiffneſs of the wire is ſuch as to make it vibrate in N ſeconds, the force which muſt be applied to each ball, in order to draw it aſide by the angle A, is to the weight of the ball as the arc of $A \times \frac{1}{N^2} \times \frac{36.65}{39.14}$ to the radius. But the ivory ſcale at the end of the arm is 38.3 inches from the centre of motion, and each diviſion is $\frac{1}{20}$th of an inch, and therefore ſubtends an angle at the centre, whoſe arc is $\frac{1}{766}$; and therefore the force which muſt be applied to each ball, to draw the arm aſide by one diviſion, is to the weight of the ball as $\frac{1}{766N^2} \frac{36.65}{39.14}$ to 1, or, as $\frac{1}{818N^2}$ to 1.

"The next thing is to find the proportion which the attraction of the weight on the ball bears to that of the earth thereon, ſuppoſing the ball to be placed in the middle of the caſe, that is, not to be nearer to one ſide than the other. When the weights are approached to the balls, their centres are 8.85 inches from the middle line of the caſe; but through inadvertence, the diſtance from each other of the rods which ſupport theſe weights, was made equal to the diſtance of the centres of the balls from each other, whereas it ought to have been ſomewhat greater. In conſequence of this, the centres of the weights are not exactly oppoſite to thoſe of the balls when they are approached together; and the effect of the weights in drawing the arm aſide, is leſs than it would otherwiſe have been in the triplicate ratio of $\frac{8.85}{36.65}$ to the chord of the angle, whoſe ſine is $\frac{8.85}{36.65}$, or in the triplicate ratio of the coſine of half this angle to the radius, or in the ratio of .9779 to 1.

"Each of the weights weighs 2,439,000 grains, and therefore is equal in weight to 10.64 ſpherical feet of water. And therefore its attraction on a particle placed at the centre of the ball, is to the attraction of a ſpherical foot of water, on an equal particle placed on its ſurface, as $10.64 \times .9779 \times \left(\frac{6}{8.85}\right)^2$ to 1. The mean diameter of the earth is 41800000 feet, and therefore if the mean denſity of the earth is to that of water as D to 1, the attraction of the leaden weight on the ball will be to that of the earth

thereon, as $10.64 \times .9779 \times \left(\frac{6}{8.85}\right)^2$ to 41800000 D :: 1 to 8739000 D.

"It is ſhewn therefore, that the force which muſt be applied to each ball, in order to draw the arm one diviſion out of its natural poſition, is $\frac{1}{818\,N^2}$ of the weight of the ball; and if the mean denſity of the earth is to that of water, as D to 1, the attraction of the weight on the ball is $\frac{1}{8739000\,D}$ of the weight of that ball: and therefore the attraction will be able to draw the arm out of its natural poſition by $\frac{818\,N^2}{8739000D}$, or $\frac{N^2}{10683\,D}$ diviſions: and therefore, if on moving the weights from the midway to a near poſition, the arm is found to move B diviſions, or if it moves 2 B diviſions, on moving the weights from one near poſition to the other, it follows that the denſity of the earth, or D, is $\frac{N^2}{10683\,B}$."

The remaining part of the paper of Mr. Cavendiſh is filled with the calculations neceſſary to find the corrections which are added to the table of experiments.

Theſe being applied, and a mean taken of all the experiments, the author concludes the mean denſity of the earth to be 5.48 times greater than that of water.

DENTAL, Dentalis, from *dens*, a *tooth*, is applied to certain letters, in the pronunciation whereof the teeth have a principal ſhare.

Grammarians, and eſpecially the Hebrew ones, diſtinguiſh the letters into dental, labial, guttural, lingual, palatal, &c.

DENTALIS, in *Anatomy*, a term which has been applied to the nerves and blood-veſſels of the teeth.

DENTALIUM, in *Conchology*, a genus of univalves of a tubular form, ſtraight or only ſlightly curved, with an undivided cavity open at both ends. Animal a terebella.

Species.

Elephantinum. Shell with ten ribs, ſlightly curved and ſtriated. Linn.—*Denticulus elephanti*, Rumpf.—*Dentalis*, Argenv.

Inhabits the Indian and European ſeas, and is about four inches long; the ſhell is deeply grooved, green with the tip white.

Aprinum. Shell with ten ribs, ſlightly incurved and ſmooth. Mart.

Native of the ſame ſeas as the former, and is by ſome conſidered as a variety.

Arcuatum. Shell ribbed, curved, ſubulate, and of one colour. Gualt. Country unknown; colour greeniſh.

Striatulum. Shell with eight ribs and eight ſtriæ; tip acute, green and tipped with white. Mart. Native of the Sicilian ſeas.

Sexangulum. Shell with ſix ribs and ſtriated. Schroet. Diſcovered in a foſſil ſtate at Loretto.

Dentalis. Shell with twenty ſtriæ, ſlightly curved and interrupted. Rumpf.

Found in the Mediterranean, and is ſometimes red, or reddiſh at the tip.

Entalis. Shell round, ſlightly curved, continued and ſmooth. Linn. Donov. Brit. Shells, &c. Native of European ſhores; about an inch and half in length.

Arietinum. Shell round, curved, continued, and ſmooth. Müll.

Inhabits the ſhores of Scandinavia; reſembles the laſt, but is much ſmaller.

Corneum. Shell round, ſlightly curved, interrupted and opake. Schroet.

Length an inch and a quarter. This ſhell is ſmooth, horny, yelloviſh brown, with an obtuſe rounded tip, and inhabits the African ocean.

Politum. Shell round, ſlightly curved, continued, and marked with crowded annular ſtriæ. Gualt.

Native of Indian and European ſeas, and meaſures about an inch and a half in length.

Eburneum. Shell round, ſlightly curved, continued, and marked with remote annulations. Gmel. Inhabits the ſame country as the former.

Minutum. Shell round, ſtraightiſh, ſmooth, and minute. Plancus. Native of the Mediterranean.

Faſciatum. Shell very finely ſtriated, ſlightly curved, and grey, with darker bands. Martini.

Inhabits Sicily. This ſhell is minute, ſolid, and marked with about four or five duſky cinereous or fuſcous bands.

Nebulosum. Shell arcuated, very ſmooth and white, ſpotted and clouded with fulvous. Gmel. Native of the Sicilian ſeas.

Rectum. Shell ſtraight, with double or triple ſtriæ, and annulated. Gualt. Country unknown.

Fossile. Shell roundiſh, and ſomewhat obtuſe, with very fine equal ſtriæ. Schroet. Found foſſil near Loretto.

Annulatum. Shell round and obliquely ſtriated. Guettard. Occurs in a foſſil ſtate.

Radula. Shell ſomewhat arched and rather obtuſe, with decuſſate ſtriæ, the longitudinal ones granulated. Schroet. Found in the ſame ſtate as the former in Piedmont. Length one inch.

Pellucidum. Shell horny, flexile, ſtraightiſh, round and ſmooth. Schroet.

Native of the Northern ſeas. The length is two inches and a quarter; colour pale honey.

Interruptum. Shell with decuſſating ſtriæ, all which are ſmooth; the longitudinal ſtriæ with finer interrupted ones. Schroet.

This and the following are found in a foſſil ſtate in Piedmont.

Vitreum. Shell hyaline, very glabrous and ſubarcuated. Schroet.

DENTARIA, in *Botany*, (from the toothed ſtructure of the root, whence it has been ſuppoſed, without any real foundation, to be uſeful in diſorders of the teeth.) Toothwort, or Coral-wort, Linn. Gen. 337. Schreb. 441. Willd. Sp. Pl. v. 3. 478. Juſſ. 239. Claſs and order, *Tetradynamia Siliquoſa*. Nat. Ord. *Siliquoſæ*, Linn. *Cruciferæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of four leaves, which are ovate-oblong, cohering longitudinally, obtuſe, deciduous. *Cor.* cruciform. Petals four, roundiſh, obtuſe, ſcarcely emarginate, flat, with claws as long as the calyx: nectary four glands at the baſe of the germen. *Stam.* Filaments ſix, awl-ſhaped; four of them as long as the calyx, two ſhorter; anthers oblong-heart-ſhaped, erect. *Piſt.* Germen oblong, the length of the ſtamens; ſtyle very ſhort and thick; ſtigma obtuſe, emarginate. *Peric.* Pod long, round, of two cells and two elaſtic valves, which roll back when ripe; partition a little longer than the valves. *Seeds* numerous, ſomewhat ovate.

Eſſ. Ch. Pod burſting elaſtically, the valves rolling back, ſhorter than the partition; ſtigma emarginate; Calyx-leaves cohering longitudinally.

Seven ſpecies are deſcribed in Willdenow; three only were known to Linnæus. The roots of all, as far as we are informed, are perennial, fleſhy, white, notched in ſuch a manner as to reſemble the human fore teeth. Stem ſimple, herbaceous. Leaves compound, ſerrated, ſmooth. Flowers in a terminal corymb, purpliſh, or white, large and handſome, reſembling thoſe of *Lunaria* or Honeſty. 1. D. *enneaphylla*. Linn. Sp. Pl. 912. Jacq. Auſtr. t. 316. Leaves three together, ternate, ſerrated, without any glands between the leaflets. A native of Auſtria and Italy, in mountainous ſtony places. Flowers pale yelloviſh. 2. D. *glandulosa*. "Leaves three together, ternate, deeply toothed, with an awl-ſhaped gland between their leaflets. Stamens half as long as the corolla." Willd. Sp. Pl. v. 3. 478. Found by Waldſtein and Kitaibel in Hungary, and diſtinguiſhed by Willdenow from the former. Flowers purple, larger. Leaves narrower. 3. D. *laciniata*. Willd. 479. Leaves three together, ternate, bluntiſh, toothed; lateral leaflets deeply divided. This, a native of Pennſylvania, was originally ſent by Kalm to Linnæus, who took it for his own D. *pentaphyllos*, a ſpecies he had adopted from authors without ſeeing it, but which is a very different and much larger plant. 4. D. *bulbifera*. Bulbiferous Coral-wort. Linn. Sp. Pl. 912. Engl. Bot. t. 309. Lower leaves pinnate; upper ones ſimple. A native of ſome places in the middle and ſouth of England, as at Harefield, Beaconsfield, Tunbridge, &c. but a doubtful Swiſs plant. Known by ſcaly purple *gemmæ* or buds produced in the boſoms of its leaves, by which it is propagated like the *Lilium bulbiferum*, and like that it conſequently ſeldom perfects ſeed. 5. D. *micraphylla*. "Leaves all pinnate; leaflets linear-lanceolate, unequally toothed. Willd. 479. Known only by Willdenow's account, who had it from Siberia, and compares its leaves to the *Cardamine*, v. 3. t. 65. of Gmelin's Sib. Flowers purple, but with narrower petals than in the following, of which Willdenow ſuſpects it may be a variety. 6. D. *pinnata*. Lamarck Encycl. v. 2. 268. Ait. H. Kew. v. 2. 386. Willd. 480. (D. pentaphylla α, Linn. Sp. Pl. 912. D. heptaphyllos. Cluſ. Pann. 453. Garid. Prov. t. 28. Ger. em. 985. Geſn. Faſc. t. 1. f. 2.) Leaves all pinnate; leaflets lanceolate, pointed, acutely ſerrated. Found in the Alps of France and Switzerland. A very large and handſome ſpecies, confounded by Linnæus and Haller with the following. The flowers are uſually of a light roſe-colour. 7. D. *pentaphyllia*. Linn. Sp. Pl. 912, β and γ. Willd. 480. Leaves digitate; leaflets five. Of this there are two ſuppoſed varieties, both natives of the Alps of Switzerland. The β of Linnæus is Dentaria 7, Cluſ. Hiſt. v. 2. 122. f. 2; (Geſn. Faſc. t. 1. f. 1, B; Camer. Epit. 704.) This has the root very remarkably and acutely toothed, and the leaves are ſaid to be ſmooth. The γ of Linnæus is Dentaria 6, Cluſ. Hiſt. v. 2. 122. f. 1; (Geſn. Faſc. t. 1. f. 1, A; Bauh. Hiſt. v. 2. 901.) In this the root is rather knotty and as it were jointed, *nodoſo-articulata*, than toothed, and the leaves are deſcribed rough to the touch. Garidel's tab. 29, though taken by him for the former, appears by the root to be this variety. There is the greateſt reaſon to believe theſe two diſtinct ſpecies, though ſince Caſpar Bauhin united them, no botaniſt has ſeparated them, nor have we materials ſufficient for the purpoſe. They deſerve the attention of the curious botaniſt, and are worthy of a place in our gardens.

Dentaria. See Lathræa, Tozzia, and Orobanche.

Dentaria, in *Gardening*, affords plants of the herbaceous flowery, hardy, perennial kind; of which the ſpecies cultivated

cultivated are the five-leaved dentaria, or tooth-wort (D. *pentaphylla*), bulbiferous dentaria, or coral-wort, (D. *bulbifera*.)

The firſt ſort riſes with a ſtrong ſtalk a foot and a half high, with a leaf at each joint, compoſed of five lobes, four inches long, and near two broad in the wideſt part, ending in acute points, and deeply ſerrate; they are ſmooth, and ſtand on long footſtalks; the flowers grow in looſe ſpikes at the top of the ſtalks, are ſmall, and of a bluſh colour. It is a native of Switzerland, &c.

The ſecond kind has a perennial root: the ſtem is ſimple, a foot in height; the lower leaves have three pairs of leaflets, and an odd one, which is confluent with the pair below it; they are bluntly lanceolate and ſerrate; the leaves above theſe have five leaflets, and the upper leaves are trifid or ſimple, acutely lanceolate, ſerrate; the flowers are in cluſters on the tops of the ſtalks, and fleſh-coloured or purple. The ſcaly bulbs in the axils of the upper leaves, falling off, take root, and propagate new plants; ſo that it rarely produces ſeed. It is a native of Sweden, flowering in April and May.

Method of Culture.—In theſe plants the propagation is effected by ſowing the ſeeds in a light ſandy ſoil, where the ſituation is ſhaded, either in the autumn, as ſoon as they are perfectly ripened, or in the early ſpring. The former is the better ſeaſon, where the ſoils are ſufficiently dry. They are alſo capable of being increaſed by parting the roots and planting them out, where there is a due degree of moiſture and ſhade, in the autumn or ſpring; and in the latter ſort they may be raiſed by planting the bulbs produced on the ſides of the ſtems.

Afterwards, the only culture the plants ſtand in need of, is that of keeping them clean from weeds, and in the firſt method removing ſuch plants as may be too much crowded to proper ſituations in the ſpring. They moſtly flower and produce ſeeds in the ſecond year's growth.

Theſe are a ſort of plants which are well adapted to the borders and other parts of ſhady walks, and other ſimilar compartments; where they grow well, and have an ornamental effect, as well as afford variety.

DENTATA Vertebra, in *Anatomy*, the ſecond vertebra of the neck; ſo called from a peculiar proceſs, which it poſſeſſes. See Spine.

DENTATUM Folium. See Leaf.

DENTED, Indented, *toothed*. See Indented.

Dented *Wheel*, in *Mechanics*. See Wheel.

DENTELLA, in *Botany*, (in alluſion to the minute teeth of the corolla, on which the generic character is founded.) Forſt. Gen. 13. t. 13. Schreb. 124. Willd. Sp. Pl. v. 1. 972. Juſſ. 200. Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, in five deep awl-ſhaped ſegments. *Cor.* of one petal, funnel-ſhaped, longer than the calyx; tube gradually dilated upwards; limb regular, in five equal ſpreading ſegments, each of them with three acute teeth, the middle one of which is the longeſt. *Stam.* Filaments five, equal, ſhort, awl-ſhaped, inſerted into the baſe of the tube; anthers oblong, erect. *Piſt.* Germen inferior, roundiſh, hairy; ſtyle cylindrical, ſhort, and thick; ſtigmas two, ſpreading, obtuſe, longer and thicker than the ſtyle. *Peric.* Capſule globoſe, of two cells, crowned with the calyx. *Seeds* ſeveral, ovate.

Eſſ. Ch. Calyx ſuperior, in five deep ſegments. Corolla funnel-ſhaped, in five ſegments, each with three teeth. Capſule of two cells, with many ſeeds.

The only known ſpecies is D. *repens*; Forſt. Prod. 17. Willd. Sp. Pl. v. 1. 972. (Oldenlandia repens; Linn. Mant. 40. Burm. Ind. 38. t. 15. f. 2, very bad, with an erroneous ſynonym from Hort. Mal. v. 10. t. 31. Alſine ſpergula ind. or. &c.; Pluk. Amalth. 10. t. 356. f. 5. Cruſta ollæ minima; Rumph. Amboin. v. 6. 460. t. 170. f. 4, good.) A native of various parts of the Eaſt Indies; found by Forſter in New Caledonia. It is ſaid by Rumphius to be a weed in the gardens of Amboyna, and by Burmann to grow in wet places at the coaſt of Coromandel. Root annual, according to Burmann. Stems ſeveral, proſtrate, branched, leafy, ſquare, ſmooth, taking root at their joints. Leaves oppoſite, ſtalked, elliptic-lanceolate, entire, ſmooth, reſembling thoſe of thyme. Flowers axillary, ſolitary, nearly ſeſſile. Corolla rather longer than the leaves, ſlender, white, often with a purpliſh tinge. Capſule nearly globular, the ſize of a pepper-corn, clothed all over with prominent, jointed, obtuſe, pellucid hairs, which render it very conſpicuous and remarkable. The plant is not known in our gardens, nor has it been found of any uſe.

DENTELLARIA. See Plumbago *Europæa*.

DENTES, in *Anatomy*. See Cranium and Teeth.

Dentes *lactei*, or *decidui*, the firſt, or temporary ſet of teeth; for an account of which, ſee Cranium.

DENTEX, in *Ichthyology*, a ſpecies of *Sparus*; which ſee.

DENTICI, Luigi, in *Biography*, a Neapolitan gentleman, who publiſhed at Rome, in 1553, two dialogues on muſic. Of theſe, though the ſubject turns chiefly upon the muſical proportions, and modes of the ancients; in attempting to explain which, Boethius ſeems to have been the author's principal guide; yet, in the ſecond dialogue, we have an account of what was then a *modern* concert, from which an idea may be formed of the ſtate of practical muſic at Naples, when this book was written. One of the interlocutors, ſpeaking with rapture of a performance which he had heard at the palace of Donna Giovanna d'Arragona, tells us that the principal muſicians who played on inſtruments, and were of the firſt claſs, were Giovan Leonarda de l'Harpa Napolitano, Perino da Firenze, Battiſta Siciliano, and Giaches da Ferrara; and that the ſingers were Giulio Ceſare Brancazzo, Franciſco Biſballe, Conte de Briatico, Scipione di Palla, and a ſoprano, whoſe name, as his performance was cenſured, the author has concealed; but of the others, he ſays, they were moſt perfect muſicians, and ſung in a wonderful manner. It appears by this dialogue, that the vocal performers were not accompanied by a band, but that each ſung to his own inſtrument. "Pochi muſice ſi travano che cantono ſopra gli ſtormenti che m'abbian finito di contentare, perche tutti errano in qualche coſa, o nella intonatione, o nella pronontiatione, o nel ſuonare, o nel fare i paſſaggi, a vero nel remettere & rinforzare la voce quando biſogna; le quali coſe, parte per arte & parte per natura s'acquiſtano." "There are few muſicians," ſays the author, "who ſing to their inſtruments, that have entirely ſatisfied me: as they have almoſt all ſome defect of intonation, utterance, accompaniment, execution of diviſions, or manner of diminiſhing and ſwelling the voice occaſionally; in which particulars both art and nature muſt conſpire to render a performer perfect." The interlocutors then celebrate the talents of two female ſingers: Donna Maria di Cardona Marcheſe della Padula, and Signora Fagiola, as being poſſeſſed of all the requiſites of vocal perfection.

It may be concluded from this converſation, that the ſoprano among the male ſingers was an evirato; that much art and refinement were expected in vocal performers, beſides ſinging in time and tune; and that, by the titles of count

and marchioneſs given to ſome of the perſonages whoſe talents are celebrated, whether they are regarded as profeſſors or diletanti, it appears that the ſucceſsful cultivation of muſic in the city of Naples was at this time in great eſtimation.

DENTICLES, in *Architecture*. See DENTILS.

DENTIDIA, in *Botany*, a Chineſe plant, of which we have no knowledge but from Loureiro's Flora Cochinchinenſis, 369. He deſcribes it as belonging to the *Didynamia Gymnoſpermia*, and gives the following Eſſ. Ch. Three upper ſegments of the calyx minutely toothed. Upper lip of the corolla ſhorteſt, four-cleft; lower entire. D. *nankinenſis* is the only ſpecies, a native of Nankin, carefully cultivated at Canton for its beauty, and called *Kiām năn tſū ſū*. It has the colour and ſcent of *Meliſſa cretica*. The ſtem is herbaceous, annual, upright, a foot high; firm, ſquare, ſtraight, purple, ſmooth, with branches croſſing each other. Leaves oppoſite, on long ſtalks, kidney-ſhaped, concave, reflexed, ſmooth, fringed, of a browniſh purple hue. Spikes axillary, ſquare. Flowers red and white. Loureiro. It is very probable this plant may belong to ſome genus already known. The deſcription accords in many points with *Perilla ocymoides*, Linn. which is a native of China.

DENTIFORM, in *Mineralogy*, according to Werner, is the form in which metallic or native ſilver is often found, where it is longiſh and tortuous, and thicker at the bottom than the top, where it ends in a point.

DENTIFORMIS PROCESSUS, the ſame as *Pyrenoides*.

DENTIFRICE, any ſubſtance to rub the teeth with, in order to clean or faſten them. The term is derived from the Latin *dens*, *a tooth*, and *frico*, *I rub*.

Dentifrices are commonly employed in the form of powder, which are either purely mechanical or chemical in their operation. It is uſual for dentiſts to keep their tooth-powders as a ſecret; but the compoſition of moſt of them is very well known to medical men, though concealed from the public in general. Very little ſkill is required to form a good tooth-powder for ordinary uſe, provided care be taken not to admit ingredients which deſtroy the enamel of the teeth. If perſons uſe them daily, the dentifrices ſhould be leſs harſh or gritty, and contain leſs acid matter, than when they are uſed only once a week.

The powders generally recommended for this purpoſe are, levigated coral, calcareous earths, cuttle-fiſh, myrrh, calcined bone, burnt bread or ſponge, charcoal, pumice-ſtone, ſoot, &c. to which is added a ſmall proportion of alum, cream of tartar, or common ſalt. But the acid ſubſtances uſed too freely will deſtroy the teeth, and compenſate badly for the whiteneſs they produce.

Any of the above powders may be mixed up with honey or butter, and will then form a kind of electuary for rubbing the teeth. Spirituous and aſtringent lotions are alſo employed with the ſame view, or to harden the gums; and not unfrequently the powder of caſcarilla, or Peruvian bark, is had recourſe to, when the gums are ſpongy and apt to bleed.

Many perſons are ſo averſe from all dentifrices, that they clean their teeth with a hard bruſh alone, or the end of a root prepared on purpoſe, rinſing their mouth afterwards with water. Now and then, however, it is requiſite to ſcrape the tartareous matter from the roots of the teeth, which is called *ſcaling* them; elſe, it will be impoſſible to preſerve their natural whiteneſs, and keep them fixed cloſely to the gums. The tartar is alſo injurious in decaying the teeth, when it accumulates for a long time. See TEETH.

DENTILS, in *Architecture*, an ornament in cornices of a notched or toothed form; whence its name, from *dentes*, Lat. teeth. (See *Plates* XXVIII. XXIX. of *Architecture*.) The dentils are cut upon a ſquare member, which is called by Vitruvius denticulus, and by Engliſh authors dentil-band. The proportions are thus given by the former writer; the denticulus is to be equal in height to the middle facia of the architrave, and its projection to be the ſame as the height; the width of the dentils is one-half of the height, and the interval between them two-thirds of this quantity.

DENTISCALPRA, in *Surgery*, is the ſcraping inſtrument employed for removing the extraneous matter which collects upon teeth, and forms a cruſt. The tartar, which is left on the teeth, where this operation has been long neglected, will ſometimes ſeparate the gums, produce ſome degree of ulceration, and cauſe a fœtid breath. See DENTIFRICE and TEETH.

DENTIST, is an artizan who confines himſelf to the extraction of teeth, and to ſeveral operations required by their defects, redundancies, accidents, or diſorders. The word dentiſt is French, and the moſt popular practitioners in this department have come from France; ſo, likewiſe, have the moſt ample and regular treatiſes on the ſubject, ſome of which are tediouſly prolix and frivolous. The head ſurgeons in London deem this branch of their art beneath notice, and generally decline interfering in it, except by giving their advice occaſionally: though manual operations on the teeth, and the mechanical formation of theſe organs, in caſes of defect, conſtitute a very profitable buſineſs in ſuch a large metropolis; ſo that dentiſts are often known to get ſeveral thouſand pounds *per annum* by their profeſſion!!

DENTITION, in *Anatomy*, the proceſs by which the teeth, after they have advanced to a certain ſtage of their formation, come through the gum, in order to take their place in the mouth. As there are two different ſets of teeth contained in the mouth at different ages, and accommodated, by their ſize and number, to the differences which obtain in the jaw-bones of the child and the older ſubject, ſo we have the firſt and the ſecond dentition. As the gum appears to be divided by the tooth in this proceſs, it is uſually called, in common language, the cutting of the teeth. The age at which each tooth comes through the gum, and the ſucceſſion in which theſe organs appear in both dentitions, have been already fully detailed in the deſcription of the teeth given under the article CRANIUM. We have only to obſerve, further, in this place, that the gum makes way for the advancing tooth by a proceſs of abſorption. That the tooth, in coming towards the alveolar ſurface of the jaw, is reſiſted by the gum, which is a firm and tough ſubſtance, and is thrown into a ſtate of conſiderable tenſion by the preſſure which it experiences. Being of a vaſcular and ſenſible nature, it is irritated in this way, and conſiderable pain enſues, with more or leſs derangement of the whole conſtitution. The latter often proceeds ſo far as to terminate fatally; and, conſequently, the time of the firſt dentition is regarded as one of particular danger to the child. That all this miſchief ariſes merely from the irritation cauſed by the preſſure of the tooth, is rendered obvious from this circumſtance; that it will ceaſe entirely if the gum be divided. The part grows thinner and thinner, where it is preſſed by the tooth, and a perforation takes place at laſt, through which the projecting edge or point may be diſcerned; and then the proceſs is finiſhed, without any further unpleaſant occurrences. The ſecond dentition is not attended with the ſame circumſtances as the firſt; ſince the permanent teeth come into places left for them by the temporary ones.

DENTITION.

Dentition, in *Phyſiology* and *Medicine*, the production of the teeth.

The time and mode of the formation and growth of the teeth have been amply treated of under the article Cranium. It remains for us to deſcribe, in this place,

The Diſeaſes of Dentition.—The teeth at their firſt formation, and for ſome time while growing, are completely incloſed within the ſockets and gums, and in their growth they act upon the incloſing parts, in ſome degree, as extraneous bodies. Hence, while the operation of growth is going on in them, another operation is effected, namely, a decay of that part of the gum and ſocket that covers the tooth, in conſequence of the preſſure of the latter, and which becomes the cauſe of many diſagreeable and even dangerous ſymptoms. This preſſure induces inflammation and ulceration of the gums, but ſuppuration ſeldom accompanies it. Hunter on the Teeth, part ii. p. 114.

As theſe morbid changes take place at an early age, indeed almoſt begin with life, when the irritability of the whole ſyſtem is extremely great, the ſymptoms which enſue are not merely local, but affect the conſtitution at large in various ways, and excite a great variety of maladies. Theſe ſymptoms are in fact ſo various in different children, and often in the ſame child, that it is difficult to conceive them to be of the ſame origin. They become leſs various, however, and leſs hazardous, as the children advance in age; ſo that the double teeth of the child, and ſtill more ſo the ſecond ſet of teeth, or thoſe of the adult, are uſually cut without producing much diſturbance.

The firſt ſymptoms are local, and appear to be accompanied with pain, as the child is reſtleſs, uneaſy, and rubs his gums, and carries every thing to his mouth. There are alſo generally inflammation, heat, and ſwelling of the gums, and an increaſed flow of ſaliva. A general ſtate of fever follows, which is ſometimes ſlight and ſometimes violent, and is very remarkable both for its ſudden riſe and declenſion: ſo that in the firſt hour of his illneſs the child ſhall be perfectly cool, and in the ſecond flaſhed and burning hot, and in the third temperate again. The local ſymptoms which enſue in diſtant parts, are various and complicated; for the appearance they put on is in ſome degree determined by the nature of the parts which they affect. Theſe ſymptoms we ſhall deſcribe in the order of their moſt frequent occurrence.

Diarrhœa, coſtiveneſs, loſs of appetite, eruptions on the ſkin, eſpecially on the face and ſcalp, cough, ſhortneſs of breath, with a kind of convulſed reſpiration, ſimilar to that obſervable in the hooping-cough, ſpaſms of particular parts, either by intervals or continued, an increaſed ſecretion of urine, and ſometimes a diminution of that ſecretion, a diſcharge of matter from the penis, with difficulty and pain in making water, imitating exactly a violent gonorrhœa. The lymphatic glands of the neck are at this time apt to ſwell, and if the child has a ſtrong tendency to the ſcrofula, this irritation will promote that diſeaſe. There may be other circumſtances connected with this diſorder, which we do not aſcertain, the patients in general not being able to expreſs their feelings.

Many of the ſymptoms of this diſeaſe are dangerous, namely, the conſtitutional ones, and alſo thoſe local ſymptoms which attack a vital part. The fever, indeed, ſeldom laſts ſo long as to be fatal; but the convulſions, eſpecially when univerſal, frequently are ſo. Local convulſions, if not in a vital part, although often very violent, do not kill; and when any part not vital ſympathizes, the patient is generally free from danger; a ſecurity to the whole being obtained by the ſufferings of a part, which is of little conſequence to life.

In the very irritable habits of infants a general ſympathy is excited by local irritations; and hence general fever and general convulſions, from the irritated gums in dentition. But as the conſtitution ſtrengthens, each part, in ſome degree acting for itſelf, acquires its own peculiarities; ſo that when a local diſeaſe takes place in a child that is very young, it is capable of calling forth a general ſympathy; but as the child advances, the conſent of parts in the conſtitution becomes leſs general: but ſome one part is found which has a greater aptitude than the reſt to fall in with the local irritation, and it ſympathizes according to its own peculiar action. By the age of ſix years, few parts ſuffer but thoſe immediately affected; and in adults, who cut their teeth, we almoſt always find the pain and other ſymptoms confined to the part, or only local ſympathy taking place, ſuch as a ſwelling of a ſide of the face.

But as the ſymptoms become more confined, the ſuffering part is often much more violently affected. Therefore we find that, in adults, the pain of cutting a grinder is frequently exceſſive, and the local inflammation is very conſiderable, and often of long continuance. This is not the caſe with children; their pain does not appear to be ſo very conſiderable, and we are certain that the local inflammation is not great; that it is confined to the very parts which ſuffer, and is not diffuſed over the face; ſo that, in children, the ſymptoms of ſympathy are often more violent than thoſe of the parts themſelves.

The pains from dentition in the adult are often periodical, having their regular and fixed periods, from which circumſtance they are often ſuppoſed to be agueiſh, and the bark is adminiſtered, but without effect. Medicines for the rheumatiſm are likewiſe given with as little ſucceſs; when a tooth will appear, and diſcloſe the cauſe of the complaint: and by lancing the gums the cure is often performed; but the diſeaſe will recur, if the gum happens to heal over the tooth, which it will very readily do, if the tooth is pretty deep. As theſe teeth are generally ſlower in their growth than the others,, and more eſpecially thoſe which come very late, they become the cauſe of many returns of the ſymptoms.

The remedies for the diſeaſes ariſing from dentition can in general only be of a temporizing nature, as the diſorders cannot be altogether removed, till the cauſe ceaſes; except indeed, when the tooth is covered by a very thin portion of the gum, in which caſe the ſymptoms may be ſometimes ſpeedily removed by lancing it. Where this cannot be immediately done, and the general ſymptoms of fever, or convulſions, appear, palliative meaſures muſt be adopted. Gentle laxatives, if the bowels are bound, diaphoretics, and ſmall doſes of ſome anodyne, muſt be adminiſtered; and the uſe of the warm-bath muſt be added, as the moſt effectual anodyne, when convulſions occur. If a diarrhœa ſhould come on, and in a gentle degree only, it may be allowed to go on; or if ſevere, it may be reſtrained. But often the ſympathetic derangement of the bowels becomes itſelf an irritating cauſe, and by ſympathy with the brain, contributes to excite fever, and even convulſions. When, therefore, the bowels are much diſordered, when there is obviouſly much griping pain, when the ſtools are offenſive, and of a morbid appearance, they ſhould be cleared by a little calomel and rhubarb, or other laxatives. The uſe of laxative medicines is alſo particularly ſerviceable in removing the cutaneous eruptions, which appear during the irritation of teething; ſuch as the cruſta lactea, ſtrophulus, or red-gum, &c.

When the local inflammation is ſlight, it ſeems deſirable to gratify the inſtinctive propenſity, which children manifeſt, to rub and preſs the gums; and a piece of wax, or of liquorice root, or ſome ſubſtance of that ſoft kind, appears to be preferable to the hard, unyielding coral, or glaſs, which

is generally employed for that purpoſe. It would be altogether ſuperfluous to mention the numerous abſurd remedies, which ignorance and ſuperſtition have introduced, at different times, to aid the proceſs of dentition; and eſpecially as local applications to the gums. The reader will find them amply detailed in Henlock's Practical Treatiſe on Dentition, 1742. Perhaps a ſhort ſpecimen will ſatisfy him. "There were indeed among the remedies to the gums, ſome few that were in vogue; freſh butter and honey were in pretty general eſteem, perhaps for the toothſomeneſs of them above many others. The brain of a ſucking pig, and the milk of a bitch (whatever averſion this might raiſe in the parent) were commended by ſome for a peculiar property; but more particularly the brain of a hare, which ſeems to carry the univerſal applauſe of the ancients; yet the doubts among them about the beſt mode of uſing it, give reaſon to believe, that it was often recommended upon bare credit. But above all, in neceſſitous caſes, if we may depend upon rhe teſtimony of Hartman (as mentioned by Burnet) the freſh blood of a cock's comb is truly praiſeworthy; for this, ſays he, being only once, or twice at moſt, anointed on the gums with the finger, cauſes a production of the teeth without difficulty, and free from accidents. This we find alſo recommended by Silvius and Waldſchmidt." Loc. Cit. p. 33. All this, however, is ſcarcely leſs prepoſterous than the wearing of certain necklaces, in our own day, for the purpoſe of alleviating difficult dentition.

"With reſpect to lancing the gums, there was formerly much difference of opinion. But Mr. Hunter ſays, "As far as my experience has taught me, to cut the gum down to the tooth, appears to be the only method of cure. It acts either by taking off the tenſion upon the gum, ariſing from the growth of the tooth, or by preventing the ulceration, which muſt otherwiſe take place. It often happens, particularly when the operation is performed early in the diſeaſe, that the gum will re-unite over the teeth; in which caſe the ſame ſymptoms will be produced, and they muſt be removed by the ſame method. I have performed the operation above ten times upon the ſame teeth; where the diſeaſe had recurred ſo often, and every time with the abſolute removal of the ſymptoms.

"It has been aſſerted, that to cut the gum once will be ſufficient, not only to remove the preſent, but to prevent any future bad ſymptoms from the ſame cauſe. This is contradictory to experiment, and the known laws of the animal œconomy: for frequently the gum, from its thickneſs over the tooth, or other cauſes, muſt neceſſarily heal up again, and the relapſe is as unavoidable as the original diſeaſe. A vulgar prejudice prevails againſt the practice, from an objection, that if the gum is lanced ſo early, as to admit of a re-union, the cicatrized part will be harder than the original gum, and therefore the teeth will find more difficulty in paſſing, and give more pain. But this is alſo contrary to facts; for we find that all parts, which have been the ſeat either of wounds or ſores, are always more ready to give way to preſſure, or any other diſeaſe, which attacks either the part itſelf, or the conſtitution. Therefore each operation tends to make the paſſing of the teeth eaſier." Hunter on the Human Teeth, Part ii. p. 121. See INFANTS, *Diſeaſes of*.

DENTON, WILLIAM, in *Biography*, the youngeſt ſon of ſir T. Denton of Hilleſden, in Buckinghamſhire, was born at Stow, in April 1605. He received his education at Magdalen Hall in Oxford, where he was initiated into the practice of medicine, under Dr. Henry Aſhworth. In 1634 he took his degree of doctor, and going ſoon after to reſide in London, he was appointed phyſician to the king, Charles I. During the troubles which ſucceeded, he continued to practiſe in his profeſſion in London, but acted during that time with ſo much moderation, that on the reſtoration of Charles II. he was made one of his phyſicians in ordinary, and was ſoon after admitted fellow of the college of phyſicians. He lived to ſee another revolution, and the acceſſion of king William and queen Mary, to whom, in 1689, he dedicated, "Jus Regiminis," being a juſtification of defenſive arms in general, ſhewing that the revolution was the juſt right of the kingdom. He died at his houſe in Covent Garden, on the 9th of May 1691, and was buried at Hilleſden. His daughter was married to George Nicholas, ſon of ſir Edward Nicholas, ſome time ſecretary of ſtate under the kings Charles I. and II. The titles of his works, which are all on political ſubjects, follow: "Horæ Subſecivæ, or a treatiſe ſhewing the Original, Grounds, Reaſons, and Provocations, neceſſitating our ſanguinary Laws againſt Papiſts, made in the Days of Queen Elizabeth," 1664, 4to. "The Burnt Child dreads the Fire, or an Examination of the Merits of the Papiſts," relating to England, moſtly from their own pens, in juſtification of the late act of parliament, for preventing dangers which may happen, from popiſh recuſants. London, 1675, 4to. "Jus Cæſaris et Eccleſiæ vere dictæ," 1681, fol. To this the author added, on a ſingle ſheet, "An Apology for the Liberty of the Preſs." Wood's Athenæ, Oxon.

DENTON, in *Geography*, a town of America, the chief and poſt town of Caroline county, in Maryland, on the E. ſide of Choptank creek, the E. main branch of Choptank river. It is regularly laid out, has a few houſes, and lies 7 miles S. of Greenſborough, and 37 S. S. E. of Cheſter.

DENTZHEIM, a town of Germany, in the circle of the Lower Rhine, and electorate of Treves; 10 miles N. E. of Treves.

DENUDATION, from *de*, and *nudus*, naked. See EXFOLIATION.

DENUDATION, in *Geology*. This term has lately been introduced, to expreſs thoſe diſappearances of the upper ſtrata of the earth in particular diſtricts, by which the lower ſtrata are partially expoſed to view. The late ingenious Mr. Whitehurſt, after a careful examination of the mineral lime-ſtone diſtrict of Derbyſhire, was led to conclude (pages 155, 156, and 165, of his Enquiry concerning the earth, 1ſt edit.) that the ſtrata of grit and ſhale, now found only in broken and detached maſſes, variouſly diſpoſed over the north part of Derbyſhire, once univerſally prevailed, or were ſuperincumbent upon the lime-ſtone diſtrict. This lime-ſtone diſtrict, whoſe limits, through the county of Derby, Mr. Pilkington has ſince pretty accurately deſcribed, in the map prefixed to his "View of Derbyſhire," extends ſome diſtance into Staffordſhire, and is every where at its edge ſurrounded and covered by ſhale, this ſhale by grit-ſtone, and this grit-ſtone by a coal-ſhale, &c. as the recent obſervations of Mr. Smith and his pupils have ſhewn. It alſo appears, that ſmaller patches of the mineral lime-ſtone are expoſed or denudated at Aſhover, and at Crich in Derbyſhire, ſurrounded and covered by ſhale, which is again covered by grit-ſtone and coal-ſhale, as above-mentioned. On the ſouth ſide of the river Thames, a much larger denudation of the ſtrata has happened, in the counties of Surry, Kent, Suſſex, and Hants, as mentioned in our article COAL, bounded by thoſe tracts of high chalk land, known by the names of the North, and the South-Downs, and their connecting chalk range through Hampſhire; the oppoſite extremity being bounded by the Engliſh channel, or more properly, perhaps, by the oppoſite chalk cliffs on the coaſt of France. This laſt denudated diſtrict, called the Wealds of Kent, Suſſex, and Surry, was examined by Mr. Farey in the autumn of 1806, and a ſection acroſs the Surry and Suſſex Wealds, was prepared.

(See

(See Dr. Dickſon's Agricultural Magazine, vol. ii. p. 30.) The denudated diſtricts of Derbyſhire above-mentioned, were alſo examined by the ſame gentleman, and ſections croſſing two of them, were drawn laſt autumn, preparatory to a mineralogical ſurvey of the whole county, which is now going on. From one of theſe ſections, Mr. White Watſon, the well known mineralogiſt and ſtatuary of Bakewell, has ſince prepared a tablet for the inſpection of the curious, containing all the ſubſtances compoſing the principal ſtrata of Derbyſhire, inlaid in their proper poſitions, ſo as to exhibit a miniature ſection acroſs the county, from Nottinghamſhire to Cheſhire, in paſſing through the towns of Boſſover, Cheſterfield, Bakewell, and Buxton. The inquiries thus making, promiſe to throw a great light upon, if not entirely to explain, the cauſes of the ſtupendous denudations above mentioned, and of others perhaps ſtill larger, which the ſtrata of the Britiſh iſlands exhibit, and of which we ſhall not fail to collect every particular in our power, for the information of our readers on this curious and important ſubject.

Some of the characters by which a denudated tract of country are diſtinguiſhed are the following: 1ſt, the ſame is ſurrounded, in great part, or in whole, by upper ſtrata in the ſeries; 2d, the edges of theſe upper ſtrata have not that indented or fingered form, which is almoſt invariably poſſeſſed by the endings of ſtrata, (ſee that article:) 3d, the edges of the upper ſtrata ſhew evident ſigns of rupture in their abrupt and broken edges, and are often very ſtraight in their direction; 4th, the ſtrata, for ſome diſtance round a denudation, generally riſe or incline towards the ſame; but in ſome rare inſtances, as at Crich (ſee that article), the ſtrata are wholly, or in part, horizontal, or nearly ſo, and the edges of the ſtrata next above the lower or denudated ſtrata may, in that caſe, no where appear on the ſurface, as the ſtrata will all do, in ſucceſſive rings, round the denudation, when they riſe towards it; 5th, the denudated ſtratum, or loweſt one expoſed, frequently forms the higheſt ground of the diſtrict, and riſes generally on all ſides towards a central part, which is much diſlocated and broken by ravines and fiſſures; 6th, the ſucceſſive rings of ſtrata round a denudation, often form diſtinct riſes like ſteps, the top or plane of each of which generally correſponds with ſome parting or looſer ſtratum, where the ſtrata had leſs adherence to each other than in the ſolid maſs of each ſtratum; 7th, denudated diſtricts have ſeldom any rolled pebbles or alluvial matters on them, however thickly they may be diſtributed on the ſtrata which ſurround or form the edges of the denudation: of this the great Suſſex denudation furniſhes a remarkable inſtance; 8th, within denudated diſtricts, it is not uncommon to find patches often of conſiderable extent, having more of the ſuperincumbent ſtrata upon them, than on the parts which ſurround them, and yet the top of the upper of theſe accumulated ſtrata are ſeldom higher than the ſurrounding ground; and, on the other hand, iſolated patches of lower ſtrata are frequently ſeen on the ſurface, ſurrounded by higher ſtrata in the ſeries, and yet theſe inferior denudations ſeldom have their ſurface lower, but often much higher than the ſurrounding ground; of this, Crich-hill abovementioned may be cited as an inſtance; for the great Derbyſhire and Staffordſhire denudation, in the diſappearance of the upper ſtrata, extends much beyond both this place and Aſhover, which alſo is an inferior denudation, within the verge of the great one; and, 9th, all the denudations which have been examined in England, ſeem to be largeſt in extent in a direction nearly approaching to N.W. and S.E. The above obſervations, which have been often repeated with others, perhaps, which are noted in the travelling common-place book of the writer, but were never yet collected out, tend, as he thinks, clearly to ſhew, that denudated diſtricts were, moſt of them, at ſome period, heaved up to a much greater height than at preſent, and that the higher or moſt projecting of theſe lifted parts of the earth were ſcalped or torn away, and no veſtige of them left! That theſe denudations, or ſcalpings of the country, did not take place from volcanic exploſions, or the action of any power from beneath, caſting away the ſuperincumbent ſtrata, will, he thinks, appear evident, becauſe all ſuch cauſes muſt have had the greateſt effect in tearing up the loweſt ſtrata, which moſt confined its action, and ſcattering them in the form of a crater; while the borders of ſuch a diſlocated diſtrict muſt have remained ſtrewed with the diſplaced fragments of ſtrata, as the flanks of volcanic mountains are known to be.

It is preſumed, that the new theory on this ſubject, which Mr. Farey firſt ſhortly promulgated in the Philoſophical Magazine, vol. xxv. p. 45, and vol. xxviii. p. 120. and of which we have ſince given ſome further illuſtrations in our articles COLLIERY, CONTINENT, and others, will ſatisfactorily account for the phenomena of denudation, in ſhewing, that a power once acting from above, on known mechanical principles, was adequate to effects ſtill greater than any which he has examined on the ſurface of the globe, or has contemplated from the writings and deſcriptions of others, ſtupendous as theſe appear to be, and which the all-wiſe Creator has, as in all his other works, brought about by means the moſt ſimple, and who, out of a period of apparent violence and diſorder, which muſt baffle all attempts at deſcription, at length brought about a ſtate of the terraqueous globe, ſo perfectly fitted for the habitation and uſes of the numerous beings, ſince created for its habitation, that the moſt fertile imagination cannot, it is preſumed, ſuggeſt one alteration in the cruſt of the earth, which would really improve the condition of the animate beings who inhabit it. The minute examination of the intereſting diſtrict in and near Derbyſhire, which the gentleman alluded to has undertaken to make, under the liberal patronage of the worthy preſident of the Royal Society of London, will, we truſt, ſoon enable us, by their publication, to enter more fully into his theory, and the application of the ſame to the facts of the Britiſh ſtrata, as the articles referring to them occur in our work.

DENUNCIATION, DENUNCIATIO, a ſolemn publication, or promulgation of any thing.

All veſſels of enemies are lawful prize after denunciation, or proclamation of war.

The deſign of the denunciation of excommunicated perſons is, that the ſentence may be the more fully executed; that the perſons may be known, the entrance into the church refuſed them, and that other people may be warned not to have any communication with them.

DENUTAR, in *Geography*, a town of Egypt on the Nile; 8 miles N.E. of Shabur.

DENYS, JOHN, in *Biography*, doctor in medicine, of Montpelier, where he received his education, is only remembered for the zeal with which he recommended the tranſfuſion of blood for the cure of diſeaſes. Dr. Lower had publiſhed in the Philoſophical Tranſactions for the year 1666, an account of the effects of tranſfuſing the blood of one animal into the veins of another, but Denys was probably the firſt who tried the experiment on the human body, of which he gave an account in the Journal Des Savans for the year 1667. The following year he publiſhed "Lettre Ecrite à M. de Montmor touchant une nouvelle maniere de guerir pluſieurs maladies par la tranſfuſion du ſang," 4to. Paris. In this he tells

us he had reſtored to his reaſon a lunatic, and had cured a M. de Boude, a Swiſs, but his patients unfortunately dying, the parliament prohibited any further experiments being made on human ſubjects

Denys, James, a native of Leyden, rendered himſelf famed as the diſciple, coadjutor, and, at length, the ſucceſſor of M Rau, the lithotomiſt, and not leſs ſo for his ſkill in the art of midwifery, on which ſubject he has left one of the beſt works extant. He was the phyſician and man-midwife to the college for improving the practice of midwifery, which was inſtituted at Leyden in the year 1719. In 1731, he publiſhed "Obſervationes chirurgicæ de calculo renum, veſicæ, urethræ, lithotomia, veſicæ punctura, &c." 8vo. The volume contains many valuable obſervations on the ſigns, by which it may be diſcovered whether there is a ſtone in the bladder, and a deſcription of a great variety of ſtones, differing in their appearance and texture, of which he appears to have made a large collection. The diſeaſe is very common in Holland; in Batavia it is very rare. He cut out a ſtone from the knee of one of his patients, and took from the bladder of a ſubject he diſſected, a large ſtone, having ſeveral branches, which had given the perſon no diſturbance in his life-time. His treatiſe on midwifery, publiſhed in 1733, is written in the Dutch language. It has not been tranſlated, Haller ſays, and is, therefore, leſs known than for its merit it deſerves. Haller Bib. Chir.

Denys, Jacques, a painter of hiſtory and portrait, was born at Antwerp in 1645, and going in his youth to Rome and Venice, ſpent ſome years in copying the works of Raphael, Julio Romano, Guido, and Titian; thus forming his taſte of deſign and colouring from the compoſitions of thoſe celebrated maſters. Having been invited by the archduchеſs of Mantua to her court, he was taken into her ſervice; and not long after he obtained permiſſion to viſit Florence, where he painted the portraits of the duke of Tuſcany and his family: in conſequence of which, he received valuable preſents, and was honoured by the duke with letters patent, expreſſing his eſteem of the artiſt's talents and perſonal merit. On his return to Mantua, he finiſhed ſeveral grand hiſtorical compoſitions for his patroneſs, and adorned the principal apartments of the palace with his excellent performances. Attached to his country, from which he had been abſent in Italy for 14 years, he returned to Antwerp, loaded with riches and honours. His reception was highly honourable; but he ſoon after died, much regretted in every part of Europe, whither his fame had extended. Moſt of his works are in Italy; nevertheleſs, at Antwerp there is to be ſeen an "Ecce Homo" of his painting, which, with regard to deſign and colouring, is altogether in the ſtyle of Vandyck; and in the ſame city there is a portrait, beautifully coloured, and painted with ſingular freedom and force. He was remarkable for correctneſs of deſign, and boldneſs of colouring; and his manner is ſaid to have more of the ſchool of Italy than that of Flanders. Pilkington.

Denys, *St.* in Latin *Fanum Sancti Dionyſii*, or *Sanctus Dionyſius in Francia*, as it was emphatically called, *Saint Denys en France*, in *Geography*, is an ancient town of France, chief place of a diſtrict of the ſame name, in the department of the Seine, with a population of 4425 individuals. Its canton contains 11,510 inhabitants, diſtributed in eleven communes, upon a territorial extent of $51\frac{6}{10}$ kiliometres. The diſtrict counts four cantons, 36 communes, a territorial extent of 208 kiliometres, and 42,984 inhabitants. The ſoil of the diſtrict is uncommonly fertile, and produces all ſorts of corn. The town, which has a ſub-prefect, and ſome calico manufactures, is ſituated on a fine plain on the river Crould, not far from the Seine, ſix miles N. of Paris. Lat. 48° 56′ 8″. But St. Denys is chiefly famous for a celebrated abbey of Benedictines, which was founded here by king Clothar, in the year 600 of our era, and greatly improved by his ſon Dagobert, and by ſeveral ſucceeding French kings. The church is built of the fineſt free-ſtone, in the true Gothic ſtyle, and much admired. It contained a very rich treaſury, and the crown jewels, and was the place of interment for the kings of France, and their families. The firſt king buried here was Dagobert. Among the moſt remarkable monuments in this church, were thoſe of Louis XII. and his queen, Henry II. with his conſort and children, Bertrand du Gueſcelin, conſtable of France, and marſhal Turenne. During the exceſſes of the French revolution, and in particular towards the end of the year 1792, the church of St. Denys was robbed of its treaſure; its tombs were opened, the aſhes of the kings ſcattered in the wind, the bones of thoſe more recently buried were thrown into a hole dug for the purpoſe, the inſcriptions defaced, the monuments overturned, mutilated, carried away, or robbed of every gold and gilt ornament. The building of the temple itſelf was conſiderably damaged; but ſome of the monuments were ſaved from the deſtructive fury of the mob, in a tolerable condition, and preſerved in the muſæum of French monuments at Paris, eſtabliſhed by Mr. Le Noir, in the former church of the Petits Auguſtins, Fauxbourg St. Germain, which is now a national eſtabliſhment. It was at the ſame revolutionary epoch, that the name of St. Denys was changed into that of La Franciade, which the town bore, until Bonaparte placed himſelf at the head of the French government: and ſince this extraordinary man has aſſumed the imperial purple, the church has been repaired, and ornamented with two windows, which are much admired for their uncommonly fine painted glaſs. In the nave, on the right hand, two beautiful expiatory altars have been placed, one for the Merovingian, the other for the Carlovingian race. Between theſe altars is a column deſtined to be adorned with the portraits of the ſix French monarchs, who were at the ſame time emperors. On the left ſide of the nave is an expiatory altar for the third dynaſty of the Capets. In the centre is the principal altar, with marble ſtair-caſes leading to the choirs. The vault, which contained the tombs of the kings, is completely reſtored, and provided with a magnificent gate of gilt braſs. It is deſtined for the princes of the fourth, or Napoleon dynaſty. The eldeſt ſon of Louis Bonaparte, (king of Holland) an infant, has lately been interred in this vault with imperial ſolemnity. There are ſeveral other ſmall towns of the name of St. Denys, in France, as St. Denys in the department of Oude, nine miles ſouth of St. Papoul; St. Denys d'Anjou, in the department of Mayenne, five miles S. W. of Sable; St. Denys de Candé, which is now ſimply called Candé, the chief place of a canton, in the diſtrict of Segré, department of Maine and Loire, with 948 inhabitants, ſix communes, and a population of 6343 individuals for the whole canton, which has an extent of 285 kiliometres; St. Denys de Jargeau, in the department of the Loiret, with a bridge over the Loire, 12 miles S. E. of Orleans; St. Denys de Gaſt, in the department de la Manche, 12 miles S. by E. of Coutances.

Denys, a ſmall river of America, in the ſtate of Maine, and county of Waſhington, 22 miles E. of Machias. Its ſource is in a pond about ſix or eight miles long, and about two miles wide, called Medabemps, in which are the extremities of four townſhips or plantations. After running a ſouth-eaſterly courſe about 15 or 20 miles,

it

it joins the N. branch of Kobbeſkook, and paſſing by Eaſtport on the N. diſcharges itſelf into the Weſt paſſage, between Campo Bello and the Main. In 1794, the country between this river and Machias was a wilderneſs; the banks of this river were at this time thinly ſettled by a regular and well-diſpoſed people.

DENYSVILLE, a poſt town of Waſhington county, in the ſtate of Maine; 27 miles E. of Machias.

DEOBRIGA, in *Ancient Geography*, a municipal town of Spain, in the country of the Autrigons; according to Ptolemy and the Itinerary of Antonine.—Alſo, a town of Spain in Luſitania.

DEOBRIGALA, a town of Spain, in the Tarragoneſe territory.

DEOBSTRUENT Medicines, are thoſe to which are attributed powers of removing obſtructions, which have taken place in any of the veſſels of the body. This general term, according to the older writers on the Materia Medica, includes a variety of medicines of different qualities; thus Alſton obſerves, in different obſtructions, relaxants, reſolvents, attenuants, evacuants, and ſtimulants, are indicated, according to the nature of the obſtructing liquids, whether phlegmatic or inflammatory, acrid, or not acrid, &c. See his Mater. Medica, vol. i. p. 51. But Dr. Cullen has properly baniſhed this as a general term; both becauſe it includes medicines of various powers; and becauſe the theory, upon which the term is founded, is falſe, or at leaſt altogether gratuitous. For there are no juſt grounds for the ſuppoſition, that certain diſorders conſiſt of obſtructions to the circulation, depending upon a matter filling up the veſſels; that the matter is of a certain acrimony, to be corrected by certain medicines; or that any medicines are known capable of penetrating, as ſuch, to the veſſels of any particular viſcus. The only mode in which obſtructions, as they have been called, can be removed, is, by the uſe of local ſtimulants to the veſſels of the part, where that is practicable, or of general ſtrengtheners to the ſyſtem where it is not, or of both combined.

DEODAND, in *Law*, denotes any perſonal chattel, which is the immediate occaſion of the death of any reaſonable creature, and which is forfeited to the king, to be applied to pious uſes, and diſtributed in alms by his high almoner; (1 Hal. P. C. 419. Fleta, l. 1. c. 25. Staunf. P. C. 20, 21.) though formerly deſtined to a more ſuperſtitious purpoſe. In the blind days of popery, it ſeems to have been originally deſigned as an expiation for the ſouls of ſuch as were ſnatched away by ſudden death; and for that purpoſe ought properly to have been given to holy church; in the ſame manner as the apparel of a ſtranger, who was found dead, was applied to purchaſe maſſes for the good of his ſoul: this may account for that rule of law, that no deodand is due, where an infant under the age of diſcretion is killed by a fall *from* a cart, or horſe, or the like, not being in motion, (3 Inſt. 57. 1 Hal. P. C. 422.); whereas if an adult perſon fall from thence and is killed, the thing is certainly forfeited. The true ground of this rule ſeems to be, not as ſir Matthew Hale ſtates it, becauſe an infant is not able to take care of himſelf, but becauſe the child, by its want of diſcretion, was preſumed incapable of actual ſin, and therefore needed no deodand to purchaſe propitiatory maſſes; whereas every adult, who died in actual ſin, ſtood in need of ſuch atonement, according to the humane ſuperſtition of the founders of the Engliſh law. Such is the law, if a perſon be killed by a fall from a thing ſtanding ſtill. But if a horſe, or ox, or other animal, of his own motion, kill as well an infant as an adult, or if a cart run over him, they ſhall in either caſe be forfeited as deodands; which is grounded upon this additional reaſon, that ſuch misfortunes are in part owing to the negligence of the owner, and therefore he is properly puniſhed by ſuch forfeiture. "Omnia quæ movent ad mortem," ſays Bracton (l. 3. c. 5.) "ſunt deo danda," *i. e.* what moves to death is deodand. A ſimilar puniſhment was in like caſes inflicted by the Moſaical law (Exod. xxi. 28.); "if an ox gore a man or a woman, that they die, then the ox ſhall be ſurely ſtoned, and his fleſh ſhall not be eaten; but the owner of the ox ſhall be quit." And among the Athenians (Æſchin. cont. Cteſiphon.) whatever was the cauſe of a man's death, by falling upon him, was exterminated or caſt out of the dominions of the republic. By our ancient law, a well in which a perſon was drowned, was ordered to be filled up, under the inſpection of the coroner. (Flet. l. 1. c. 25. § 10.) Where a thing not in motion is the occaſion of a man's death, that part only which is the immediate cauſe is forfeited; as if a man be climbing up the wheel of a cart, and is killed by falling from it, the wheel alone is a deodand (1 Hal. P. C. 422.); but wherever the thing is in motion, not only that part which immediately gives the wound, (as the wheel, which runs over his body,) but all things which move with it and help to make the wound more dangerous, (as the cart and loading, which increaſe the preſſure of the wheel.) are forfeited. (1 Hawk. P. C. c. 26.) It is of no importance whether the owner were concerned in the killing or not; for if a man kills another with my ſword, the ſword is forfeited as an accurſed thing. And, therefore, in all indictments for homicide, the inſtrument of death and the value are preſented and found by the grand jury, (as that the ſtroke was given by a certain penknife, value ſix-pence) that the king, or his grantee, may claim the deodand: for it is no deodand, unleſs it be preſented as ſuch by a jury of twelve men. (3 Inſt. 57.) No deodands are due for accidents happening upon the high ſeas, that being out of the juriſdiction of the common law; but if a man fall from a boat or ſhip in freſh water, and is drowned, it hath been ſaid, that the veſſel and cargo are in ſtrictneſs of law a deodand. (3 Inſt. 58. 1 Hal. P. C. 423. Molloy de jur. marit. 2. 225.) But juries have of late very frequently taken upon themſelves to mitigate theſe forfeitures, by finding only ſome trifling thing, or part of an entire thing, to have been the occaſion of the death. And in ſuch caſes, although the finding by the jury be hardly warrantable by law, the court of king's bench hath generally refuſed to interfere on behalf of the lord of the franchiſe, to aſſiſt ſo unequitable a claim. (Foſter of homicide, 266.) If a perſon wounded by any accident, as of a cart, horſe, &c. die within a year and a day after, what occaſioned it is deodand; ſo that if a horſe ſtrikes a man, and the owner afterwards ſell the horſe, and the party that was ſtricken die of the ſtroke, the horſe, notwithſtanding the ſale, ſhall be forfeited as deodand, (Plowd. 260. 5 Rep. 110.) The goods and chattels of felo de ſe, &c. were univerſally held to be deodands, and are now forfeitable to the crown. See Felo de se.

Deodands, and forfeitures in general, as well as wrecks, treaſure-trove, royal fiſh, mines, waifs, and eſtrays, may be granted by the king to particular ſubjects, as a royal franchiſe; and, indeed, they are for the moſt part granted out to the lords of manors, or other liberties; to the perverſion of their original deſign. Blackſt. Com. Book i.

DEOGIRE, or Deogur, in *Geography*, a town of Hindooſtan, in the country of Berar; anciently a capital city, and the reſidence of the rajah of Goondwareh, or, as he is called in the Ayin Acbaree, the Goondrajah: 55 miles N. N. W of Nagpour, and 75 N. E. of Ellichpour. N. lat.

the towns of Italy, which threw off the ſovereignty of the empire, and formed themſelves into independant republics. Conrad was now prevailed on to join a cruſade againſt the Saracens, and took the croſs from the hands of Bernard. He accordingly ſet out for Paleſtine, at the head of ſixty thouſand men. Under his banners a troop of females rode in the attitude and armour of men; and the chief of theſe Amazons, from her gilt ſpurs and buſkins, obtained the epithet of the "golden-footed dame." This expedition proved unfortunate: one half of his troops periſhed by ſickneſs, occaſioned, it is believed, through unwholeſome proviſions, furniſhed by the treachery of the Greek emperor, Manuel Comnenus. Conrad, with the remainder, joined Louis VII. king of France, in the ſiege of Damaſcus, exhibiting great proweſs, but without any ſucceſs. The ſiege was raiſed, and the emperor returned to Germany, where he was overwhelmed with public calamity and private affliction, by another revolt of Guelph, and by the death of his eldeſt ſon. This laſt event preyed on his mind, and evidently affected his health. Aware of his approaching end, he was anxious to provide for the ſucceſſion, and recommended his nephew, Frederic Barbaroſſa, to the ſtates of the empire, as a prince of known courage and tried talents. His recommendation was approved, and Conrad died in a ſhort time after, at Bamberg, in the 14th year of his reign. He left one ſon by his empreſs Gertrude, whoſe tender age precluded him from taking any ſhare in the government.

CONRAD IV., the laſt emperor of Germany of this name, was duke of Suabia, and ſon of the emperor Frederick II. He was declared ſucceſſor to his father in 1250, but pope Innocent IV. refuſed to confirm the election. Conrad, notwithſtanding the denunciations of the pontiff, marched into Italy, in order to take poſſeſſion of the kingdom of the two Sicilies, which had been bequeathed to him by his father. He took the city of Naples after an eight months' ſiege: afterwards Capua and Aquino opened their gates to him. He did not long enjoy his ſucceſs: in 1254, he fell ſick, and died in the flower of youth, leaving one ſon, named Conradin, who, at the early age of fourteen, was beheaded by the orders of Charles of Anjou; and in him ended the line of Suabia. Moreri. Univer. Hiſt. Gibbon's Rom. Empire.

CONRAD is a name diſtinguiſhed in literary hiſtory, as well as among the princes of the earth; but as none of that appellation have become very illuſtrious by their works, we ſhall briefly notice them and their writings in a ſingle paragraph. The firſt was a German abbot of the Benedictine order, about the commencement of the tenth century: he wrote "A Continuation of the Hiſtory of France;" and on that account has, by ſome biographical writers, been ſuppoſed a Frenchman; by others, he has been confounded with Conrad of Cologne, who was author of the life of S. Wolphemius. Towards the concluſion of the eleventh century, *Conrad*, biſhop of Utrecht, flouriſhed, to which office he had been raiſed by his pupil, the emperor Henry. He is chiefly known by a work, entitled, "Apologia de Unitate Eccleſiæ conſervanda, et Schiſmate inter Henricum IV. Imp. ac Greg. VIII. Pont. Max." He wrote alſo a ſpirited defence of the imperial right on the ſubject of inveſtitures. The biſhop was aſſaſſinated in his palace, A. D. 1099, by a Frieſland architect, in revenge for having inſtructed him in the method of erecting maſſy buildings on a ſwampy ſoil, and afterwards employing a rival in conſtructing the collegiate church of which the biſhop was founder.—*Conrad* of Sheurn, a German monk, lived in the thirteenth century, and was author of "A Chronicle," and of more than fifty volumes on different ſubjects, chiefly hiſtorical, of which John of Aventine made much uſe in compoſing part of his annals. By his various writings, this monk obtained the honourable epithet of "philoſopher."—*Conrad* of Lichtenau, abbot of Urſberg, in the thirteenth century, was author of "A chronological Hiſtory," extending from Belus, king of Aſſyria, to the year 1449, which was afterwards continued, by an anonymous writer, to the reign of Charles V. It was originally printed at Straſburg, in 1537, and afterwards, with the continuation, in 1569, at Baſil. It created enemies, by ſome reflections on the wars carried on between the German emperors and the popes. The ſame author is ſaid to have written the lives of the ſaints, in 12 books; but they have not come down to us, and probably were never publiſhed.—*Conrad* of Mentz flouriſhed in the thirteenth century, and is known by a work, entitled, "Chronicum Rerum Moguntiarum," from the year 1140 to 1250, which was firſt publiſhed in 1535, and has undergone ſeveral different impreſſions.—About the ſame period lived *Conrad* of Marpurg, who was the firſt perſon of Germany that received the infamous commiſſion of inquiſitor from the papal ſee; an office which he executed with ſo much cruelty, that at length he fell a ſacrifice to the indignation of popular clamour. He wrote "The Life of the Princeſs Elizabeth of Thuringia," who has obtained a place among the ſaints.—*Conrad* is the name of two Dominican monks, natives of Saxony, in the fourteenth century. One was a member of the chapter of his order in that province, and the other appointed by the pope vicar-general of Saxony, in the year 1350. The former publiſhed, among many other things, "A Commentary on the Book of Job;" "A Concordance to the Bible;" "The Student's Dream;" and "A common-place Book for the Uſe of Preachers."—*Conrad* of Aſti, a Piedmonteſe Dominican monk, was author of "Commentaria in Jus Canonicum," and other pieces. He died in the year 1470.—In the ſixteenth century appeared *Conrad Leontinus*, a learned German Ciſtertian monk, who appears to have been well acquainted with the beſt writers in profane and ſacred literature, and to have maintained an intimate correſpondence with the moſt learned men of his time. He publiſhed, in the year 1507, at Baſil, "Nicholas de Lyra's Commentary on the Bible, with marginal Notes."—There were ſeveral others of this name, but it is needleſs to mention them all. *Conrad* of Mur, canon of the church of Zurich, lived in the thirteenth century, and is known for his treatiſe on the ſacraments, and the lives of the popes: and *Conrad* of Saxony wrote "A Chronicle," and ſome hiſtorical works, to which no date is aſſigned. Moreri.

CONRI, FLORENCE, a Franciſcan friar, was born in the province of Connaught, about the year 1560, and was ſent at an early age into Spain, as a ſtudent in theology and the philoſophy of the times. When he had finiſhed his ſtudies, he travelled into the Low Countries, where he acquired great reputation among the Catholics, by his aſſiduity and zeal in illuſtrating and defending the doctrines of St. Auguſtine. He was author of ſeveral tracts on theological ſubjects, among which were "The Mirror of the Chriſtian Life;" an "Iriſh Catechiſm," printed at Louvain, in 1626; and "Tractatus de Statu parvulorum ſine Baptiſmo decedentium ex hac Vita," Lovanii, 1624. As a politician, he was fixed on to conciliate his countrymen to the meaſures of the court of Spain, when Philip III. attempted the conqueſt of Ireland, during the reign of Elizabeth. On the failure of that enterprize he eſcaped from

mappes, Lys, Eſcaut or Scheldt, Deux-Nethes, Meuſe Inferieure, Ourthe, and Dyle. 2. The northern region contains 11 departments, *viz.* Pas de Calais, Du Nord, Aiſne, Seine and Marne, Seine, Seine and Oiſe, Eure and Loire, Eure, Seine Inferieur, Somme, and Oiſe. 3. The north-eaſt region includes 10 departments, *viz.* Ardennes, Meuſe, Moſelle, Bas-Rhin, Haut-Rhin, Voſges, Haute-Marne, Aube, Marne, and Meurthe. 4. The eaſtern region comprehends 11 departments, *viz.* Cote d'Or, Haute-Saone, Doubs, Leman, Mont-Blanc, Iſere, Loire, Saone and Loire, Jura, Ain, and Rhone. 5. The ſouth-eaſt region contains 12 departments, *viz.* Haute-Loire, Ardeche, Drome, Hautes-Alpes, Baſſes-Alpes, Alpes-Maritimes, Var, Bouches du Rhine, Gard, Vaucluſe; and the two departments of the iſland of Corſica, *i. e.* Golo and Liamone; the Elbe and its dependencies, Capraia, Pianoſa, Palmajola, and Monte Chriſto, united to the French territories in 1802, form a diſtinct department. 6. The ſouthern region comprehends 9 departments, *viz.* Correze, Cantal, Lozere, Herault, Pyrenées Orientales, Aude, Tarn, Lot, and Aveiron. 7. The ſouth-weſt, or Garonne, region includes 9 departments, *viz.* Gironde, Dordogne, Lot and Garonne, Haute-Garonne, Ariege, Hautes-Pyrenées, Baſſes-Pyrenées, Les Landes, and Gers. 8. The weſtern region contains 9 departments, *viz.* Loire Inferieure, Mayenne and Loire, Indre and Loire, Vienne, Haute-Vienne, Charente, Charente-Inferieure, Vendée, and Deux-Sévres. 9. The north-weſt region comprehends 9 departments, *viz.* Manche, Calvados, Orne, Sarthe, Mayenne, Morbihan, Finiſterre, Cotes du Nord, and Ille and Vilaine. 10. The central region includes 9 departments, *viz.* Loir and Cher, Loiret, Yonne, Nievre, Allier, Puy de Dome, Creuſe, Indre, and Cher. Piedmont, united to the French republic in 1802, includes the 6 following departments, *viz.* Doire, Seſia, Marengo, Tanaro, Stura, and Po. See a more particular account of each department under its appropriate article.

An alphabetical Liſt of Departments, ſpecifying their Relations to the Provinces into which France was formerly divided, together with their Extent, Subdiviſions, and Population, according to M. Haſſenfratz, &c.

Departments.	Chief Towns.	Provinces, &c. to which they belonged.	Extent in French Leagues.		Circles.	Cantons.	Population.
			Length.	Breadth.			
Ain	Bourg	Dombes, Breſſe, Buguey	22	17	9	49	307,756
Aiſne	Laon	Flanders, Hainault, &c.	36	17	4	63	407,905
Allier	Moulins	Bourbonnais	34	20	6	59	267,126
Alps, Lower	Digne	Upper Provence	35	20	5	43	168 937
—— Upper	Gap	Gapencais, Embrunais, &c.	34	30	4	39	120,485
—— Maritime	Nice	County of Nice			3	20	96,585
Ardeche	Privas	Vivarais, Cevennes	26	17	6	66	247,612
Ardennes	Sedan	Sedan, Rethelais, and Porcien	278 ſq. leag.		5	34	263 936
Arriege	Mezieres	Rethelais, Porcien, Sedan	25	17	3	28	197,889
Aube	Troyes	Champagne Proper	28	22	6	53	288,885
Aude	Carcaſſone	Lower Languedoc	30	22	6	45	239,642
Aveiron	Rodes	Rouergue, Marche	35	31	9	81	371,835
Bouches du Rhone	Aix	Lower Provence	30	20	5	40	446,645
Calvados	Caen	Caen, Beſſin, Bocage, &c.	32	32	6	71	391,332
Cantal	Aurillac	Upper Auvergne	24	22	4	20	239,972
Charente	Angouleme	Angoumois	30	25	6	44	339,789
Charente, Lower	Saintes	Saintonge, Aunis	40	22	7	47	438,042
Cher	Bourges	Upper Berri	35	24	7	42	207,341
Correze	Tulle	Lower Limozin	22	20	4	40	269,767
Corſica	Baſtia	Corſica, 2 departments	34	17			247,779
Cote d'Or	Dijon	Montagne, Auxois, Dijonnais	32	25	7	88	342,980
Cotes du Nord	St. Brieux	Upper Bretagne	30	15	9	81	523,860
Creuſe	Gueret	Marche	20	19	7	35	238,352
Dordogne	Perigueux	Beſançon in Franche-Compté	30	30	10	72	433,743
Doubs	Beſançon	Beſançon	26	15	6	51	219 642
Drome	Valence	Valentinois, Diois			6	62	246,687
Dyle	Bruxelles	Part of Dutch Brabant	181 ſq. leag.		3	30	363,956
Eſcaut	Gand	Part of Auſtrian Flanders	159 ſq. leag.		4	41	595,258
Eure	Evreux	Pays d'Ouche, in Normandy	30	27	6	55	407,352
Eure and Loire	Chartres	Beauce	28	26	6	40	256,656
Finiſterre	Quimper	Lower Bretagne			9	80	285,730
Forets	Luxembourg	Luxembourg and Buillon			4	27	199,011
Gand	Nimes	Lower Languedoc	30	25	8	57	313,464
Garonne, Upper	Toulouſe	Upper Languedoc	43	26	8	55	456,337
Gers	Auch	Armagnac, Condomois, &c.	17	12	6	45	315,854
Gironde	Bourdeaux	Bordelois, Blayois, &c.	34	30	7	72	497,391
Herault	Montpellier	Lower Languedoc	35	20	4	52	290,126
Jemmappe	Mons	Auſtrian Hainault			5	28	408,688
Ille and Villaine	Rennes	Upper Bretagne	27	22	9	79	519.169

Departments.	Chief Towns.	Provinces, &c. to which they belonged.	Extent in French Leagues.		Circles.	Cantons.	Population.
			Length.	Breadth.			
Indre - -	Chateauroux -	Lower Berri - - -	24	20	6	48	229,768
Indre and Loire -	Tours - -	Touraine - - -	27	24	7	35	272,925
Iſere - -	Grenoble - -	Greſivaud, &c. in Dauphiné -	36	24	4	91	365,380
Jura - -	Lons-le-Saunier -	Dole and Aval, in Franche Comté	24	16	6	62	282,200
Lake Leman -	Geneva - -	Gex, Savoy, Geneva - -			3	19	96,000
Landes - -	Mont de Marſan -	Landes, Chaloſſe, &c. - -	26	25	4	25	257,387
Loir and Cher -	Blois - -	Blaſois, Sologne - -	34	23	6	30	200.227
Loire, Upper -	Le Pui - -	Velay, Cevennes - -	26	17	3	32	216,150
—— Lower -	Nantes - -	Upper Bretagne - - -	30	27	9	53	331,270
Loire - -	Montbriſon - -	Forrez, in Lyonnais - -	24	12	3	43	322,966
Loiret - -	Orleans - -	Orleanais - - -	30	24	6	59	285,766
Lot - -	Cahors - -	Quercy, in Guienne - -	34	30	7	48	443,667
Lot and Garonne	Toulouſe - -	Upper Languedoc - -	23	18	9	72	411,808
Lozere - -	Mende - -	Gevaudan, Cevennes - -	18	15	7	52	142,110
Lys - -	Bruges - -	Auſtrian Flanders - -			3	28	475,118
Manche - -	St. Lo - -	Cotentin, Avranchin - -	35	14	7	63	463,320
Marne - -	Reims - -	Remois, Pertois - - -	33	30	6	73	348,885
—— Upper -	Chaumont - -	Baſſigny, in Champagne - -	29	19	6	71	223,010
Mayenne - -	Laval - -	Upper Maine - - -	22	16	7	68	323,607
Mayenne and Loire	Angers - -	Anjou - - -	26	21	8	99	445,500
Meurthe - -	Nancy - -	Lorraine, Toulois - -	26	16	9	74	351,161
Meuſe - -	Baſ-ſur-Ornain -	Barrois, Verdunois - -	33	16	8	79	268,108
—— Lower -	Mæſtricht - -	Liege, Gueldre - - -			3	30	216,566
Mont Blanc - -	Chambery - -	Savoy - - -	30	34	6	75	423,635
Mont Terrible -					2	13	49,311
Mont Tonnerre -	Mayence - -	Electorate of Mentz, &c. -	20	19	4	37	280,000
Morbihan - -	Vannes - -	Lower Bretagne - -	27	20	9	70	281,565
Moſelle - -	Metz - -	Meſſin, Luxembourg, &c. -	45	17	9	76	328,365
Deux Nethes -	Antwerp - -	Part of Brabant - -	19	13	1	23	153.981
Nievre - -	Nevers - -	Nivernais - - -	24	23	9	47	235,699
Nord - -	Douay - -	French Flanders, Hainault, &c.	44	10	8	59	447,910
Oiſe - -	Beauvais - -	Beauvoisis - - -	27	18	9	76	385,206
Orne - -	Alençon - -	Marches, Alençon, &c. - -	32	15	6	51	348,972
Ourthe - -	Liege - -	Liege, Limbourg - -	12	12	5	36	310,444
Pas de Calais -	Arras - -	Artois, Calaiſis, &c. - -	37	15	8	85	532,739
Puy de Dôme -	Clermont - -	Lower Auvergne - - -	35	22	8	71	516.593
Pyrenées, Lower -	Pau - -	Bearn, Baſquis - - -	16	10	6	44	138,339
——— Upper -	Tarbes - -	Bigorre, in Gaſcogne - -	20	16	5	30	188,690
——— Eaſtern -	Perpignan - -	Rouſillon - - -	28	15	3	25	114,158
Rhine, Lower -	Straſbourg - -	Lower Alſace - - -	30	15	5	30	415,080
——, Upper -	Colmar - -	Upper Alſace, Sundtgaw, &c.	24	14	3	25	283,252
Rhine and Moſelle	Coblentz - -	Electorate of Treves - -	25	12	3	30	372,000
Rhone - -	Lyon - -	Lyonnais, Beaujolais - -	20	9	2	32	323,177
Roer - -	Aix-le-Chapelle -	Juliers and Cologne - -	23	13	4	40	324,960
Sambre and Meuſe	Namur - -	Namur and Liege - -	20	15	4	26	150,754
Soane, Upper -			26	17	6	48	264,111
Soane and Loire -	Maçon - -	Autonais, Maconnais, &c. -	34	24	7	90	442,600
Sarre - -	Treves - -	Treves, Deuxponts, &c. - -	39	14	3	31	440,000
Sarthe - -	Le Mans - -	Lower Maine - - -	25	20	9	33	347,837
Seine - -		Part of Iſle de France - -	6	5	8	17	947,472
—— Lower -	Rouen - -	Roumois, Pays de Caux, &c. -	35	20	7	64	536,400
Seine and Marne -	Melun - -	Gatinais and Brie - -	32	16	5	37	296.467
Seine and Oiſe -	Verſailles - -	Mantais, Vex in Francais - -	24	18	9	59	471,612
Sevres Deux -	Niort - -	Lower Poitou - -	32	12	6	50	259,122
Somme - -	Amiens - -	Ponthieu, Santerre, &c. - -	34	16	5	72	381,760
Tarn - -	Alby - -	Upper Languedoc - -	30	20	5	48	289,148
Var - - -	Draguignan - -	Lower Provence - -	30	20	9	80	275,472
Vaucluſe - -	Avignon - -	Venaiſſin and Orange - -	15	10	4	52	200 500
Vendee - -	Fontenay - -	Saintonge, Aunis - -	24	21	6	58	305,610
Vienne - -	Poi - -	Upper Poitou - - -	24	13	6	49	257.953
Vienne, Upper -	Limoges - -	Upper Limoſin - - -	26	12	5	40	266.910
Voſges - -	Epinal - -	Pays des Voſges - - -	26	16	9	60	289,054
Yonne - -	Auxerre - -	Auxerrois - - - -	29	25	7	69	364,969

DEPARTMENT, in *Juriſprudence*, ſignifies diſtribution, diviſion, or allotment of certain employments among ſeveral perſons. Thus the great officers of ſtate, &c. have each their ſeveral departments: and the buſineſs of the ſecretaries of ſtate in particular, is generally divided into two partitions; the one officiating for the ſouthern, the other for the northern department: though ſometimes another is added on particular occaſions.

DEPARTURE, or DEPARTER, in *Law*, a term properly applied to a perſon, who firſt pleading one thing in bar of an action, and that being replied to, waves it, and inſiſts on ſomething different from his firſt plea.

Or, it may be applied to a plaintiff, who, in his replication, ſhews a new matter different from that in his declaration. (Plowd. 7, 8. 2 Inſt. 147.) So if a man plead a general agreement in bar, and in his rejoinder allege a ſpecial one, it ſhall be adjudged a departure in pleading. The defendant hereupon demurreth, becauſe it was a departure from the declaration.

This departure in pleading, if it were allowed, might occaſion endleſs altercation. Therefore the replication muſt ſupport the declaration, and the rejoinder muſt ſupport the plea, without departing out of it, as in the caſe of pleading no award made, in conſequence of a bond of arbitration, to which the plaintiff replies, ſetting forth an actual award: now the defendant cannot rejoin that he hath performed this award; for ſuch rejoinder would be an entire departure from his original plea, which alleged, that no ſuch award was made; therefore he hath now no other choice but to traverſe the fact of the replication, or alſo to demur upon the law of it.

DEPARTURE *in deſpite of the court*, is when the tenant, or defendant, after appearing to the action brought againſt him, and having a day over in the ſame term, does not appear at the day, but makes a *default*. This is a *departure in deſpite of the court*; and therefore he ſhall be condemned. See DEFAULT.

The departure is always on the part of the tenant, or defendant; and its entry is, *Quod prædictus A, licet ſolemniter exactus, non revenit, ſed in contemptum curiæ receſſit.*

DEPARTURE, in *Navigation*, is the eaſting or weſting of a ſhip, with reſpect to the meridian from which it departed or ſailed. Or, it is the difference of longitude, either eaſt or weſt, between the preſent meridian the ſhip is under, and that where the laſt reckoning or obſervation was made. This departure, any where but under the equator, muſt be accounted according to the number of miles in a degree proper to the parallel the ſhip is under. See SAILING.

DEPESTA, in *Antiquity*, a wine veſſel which the Sabines, on any feſtival day, ſet on the table of their gods.

DEPHLEGMATION, in *Chemiſtry*. This term is applied to the abſtraction of the phlegm, or merely watery part of any ſubſtance, and may be performed in ſeveral ways. Thus, ſpirit of wine is dephlegmated by diſtillation, and the *phlegm* remains in the alembic. Sulphuric acid, on the other hand, is dephlegmated by boiling, and the phlegm riſes firſt, and is diſſipated in vapour.

DEPHLOGISTICATED AIR. See OXYGEN.

DEPHLOGISTICATED *Nitrous Air*. See NITROUS OXYD.

DEPHLOGISTICATED *Nitrous Acid*. See NITROUS *Acid*.

DEPILATORY, in *Medicine*, a plaiſter, or medicine, applied on any hairy place, in order to bring off the hair. The word is formed of the particle *de*, and *pilus*, *hair*.

Depilatories are principally compoſed of lime and orpiment, which is very cauſtic, and even a dangerous mineral.

DEPIZNANO, in *Geography*, a town of Naples, in the province of Calabria Citra; three miles S. S. W. of Coſenza.

DEPLOY, in *Military Tactics*, means the expanſion of a body of troops, previouſly compacted in column, &c. ſo as to offer a larger front; generally for the purpoſe of performing ſome evolution, or of arranging a line, or of directing an attack, in ſome direction leaſt expected by the enemy. This deception is moſtly carried into eff-ct by allowing the front to keep its poſition, or to continue advancing, while the rear diviſions open abruptly, (or, if the ſituation demands, gradually,) ſo that the enemy remain in a ſtate of incertitude as to the extent and direction of the evolution, until it has been nearly completed, and its intention has been partly effected.

Where an army moves in ſeveral columns, it is often expedient to cauſe their ſeveral ſub-diviſions to deploy, ſo as to bring the whole into line, either to the front, or to the flank. In performing this evolution, fixed points muſt be aſcertained to direct the march of the ſeveral ſub-diviſions; ſo that they may all proceed directly to their reſpective ſtations, without making any circuitous movements.

The term "deploy" is derived from the French word *deployer*, which ſignifies to unfold, to open, to expand, or to diſcloſe. The military reader will perceive, that the term is extremely appropriate to the change which takes place from the column to the formation in line.

DEPONENT, DEPONENS, in the Latin *Grammar*, a term applied to verbs which have active ſignifications, but paſſive terminations, or conjugations, and want one of their participles paſſive.

Such is *minor*, *I threaten*, which has for participles *minans*, *minaturus*, and *minatus*, but no *minandus*, which ſhould be the participle paſſive.

They are called *deponents*, as having depoſited, or laid aſide their paſſive ſignification.

DEPONENT, in a legal ſenſe, a perſon who makes a *depoſition* or *affidavit*, which ſee.

DEPOPULATION, the act of waſting, deſtroying, deſolating, or unpeopling a place. Coke, Inſtit. part. iii. fol. 204.

DEPOPULATORES AGRORUM, in our *Statutes*, ſuch as depopulate or diſpeople lands.

It appears by the ſtatute 4 Hen. IV. c. 2. that theſe were great offenders by the ancient law, and that the appeal or indictment againſt them ought not to be in a general, but in a ſpecial manner. They got their name of *depopulatores agrorum*, becauſe by proſtrating or decaying the houſes and habitations of the king's people, they depopulate towns. Coke, 3 Inſt. fol. 204.

DEPORTATION, from *deporto*, *I carry away*, a ſort of baniſhment in uſe among the Romans, whereby ſome iſland, or other place, was allotted to a criminal for the place of his abode, with a prohibition from ſtirring out of the ſame upon pain of death.

Ulpian makes this difference between *deportation* and *relegation*; that the former confined the party to one certain place for ever; whereas relegation was frequently revoked, and allowed the exile a little more liberty.

By *deportation* a perſon loſt the rights of a Roman citizen.

DEPOSIT, DEPOSITUM, a thing put into the hands of another, to be kept gratis.

The civilians divide *depoſitum* into *ſimple* and *judiciary*.

DEPOSIT, *Judiciary*, is that whoſe property is conteſted between ſeveral perſons, and depoſited in the hands of ſome third perſon, by decree of a judge.

DEPOSIT, *Simple*, is either voluntary, or neceſſary. Neceſſary is that done in caſe of hoſtility, ſhipwreck, fire, &c.

Innholders are reſponſible for the baggage brought to them. as being a *neceſſary depoſit*.

DEPOSITARY, in the French law, a perſon entruſted as keeper or guardian of any thing.

Ordinary depoſitaries are not to warrant the thing left with them, in caſe it be loſt or ſtolen. They are only to anſwer for a fraud, or breach of faith; not for negligence. But a *neceſſary depoſitary*, as an innkeeper, is accountable for a theft or robbery, if there have been any negligence in the caſe: and by the Engliſh law, even whether there were any negligence or not.

DEPOSITIO, in *Grammar*, is a name which the Latins gave to the final cadence, which terminates, as it were, the meaſure of the verſe. The Greeks called it αποθεσιν, and καλαλεξιν. Hence ariſeth the diſtinction of verſe into four ſpecies, viz. *acatalectic*, *catalectic*, *brachycatalectic*, *and hypercatalectic*.

DEPOSITION, DEPOSITIO, among the *Ancients*, a ceremony obſerved immediately upon a perſon's expiring, and was a ſolemn manner of laying the corpſe upon the ground. See BURIAL.

DEPOSITION, in *Geology*. The phenomena of the ſtratification obſervable in the cruſt of the earth, can leave no manner of doubt, that the ſame was formed by matters depoſited or precipitated from a fluid, in which the whole was once immerſed; on this point almoſt all writers are now agreed, and their principal differences of opinion ariſe on the manner of this depoſition, that is, whether the ſame was mechanical, and the matters depoſited, only the ruins or detritus of former mountains or ſtrata, or precipitations in conſequence of recent chemical unions in the ſuperincumbent fluid; or, whether both of theſe cauſes have not operated, and perhaps at the ſame period of time. It may fairly perhaps be obſerved, that the exiſtence of the primeval mountains, whoſe diſintegration is ſuppoſed above in many caſes, never has been and never can be proved, and that the phenomena of the endings of the ſtrata are altogether irreconcileable with mechanical depoſition, the Britiſh ſtrata being found to fall ſhort of each other in extent weſtward, as the ſeries is aſcended, and none of the matter peculiar to any ore ſtratum is found depoſited upon the endings of the inferior ſtrata: the chalk ſtrata for inſtance, and in a certain determinate line, paſſing through or near to Wantage, Watlington, Prince-Riſborough, Wendover, Tring, Ivinghoe, Dunſtable, Hitchin, Baldock, Royſton, &c. and beyond this line to the north-weſtward, no beds of chalk are found (in Britain at leaſt,) covering the vaſt ſucceſſion of ſtrata, whoſe ſituations are lower in the ſeries, and whoſe lines of endings are conſequently farther to the weſtward, although the alluvial or rounded fragments of chalk and its attendant extraneous foſſils, are plentifully diſtributed on the ſurface in certain directions, for a great diſtance from the endings of the chalk ſtrata, indicate the exiſtence of vaſt tides or inundations, proceeding from the S.E. towards the N.W. over even the higheſt hills, at a period ſubſequent to the depoſition and hardening of the ſtrata. (See SATELLITIC *Tides*.) That chemical affinities acted, both in the formation of the ſeveral ſubſtances themſelves in the univerſal fluid or ocean, and alſo in this depoſition upon the plane of the ſtratum laſt depoſited, in preference to any other part of the bottom of the fluid, ſeems very evident, and it ſeems alſo, that theſe affinities have been further active in ſome particular ſtrata, in forming vaſt accumulations of particular matters, within the limits of the ſtrata in which they are imbedded, and with which they are coeval: that curious aſſemblage of ſtrata, called, in our article COAL, the "red earth" for inſtance, has in ſome inſtances vaſt concretions or accumulations of rock-ſalt in it, as at the Wyches in Cheſhire and Worceſterſhire; in other inſtances gypſum is imbedded therein, as in various parts of Nottinghamſhire, Derbyſhire, &c.; and the recent obſervations of Mr. Farey, a pupil of Mr. Smith's, ſeem to render it more than probable, that the vaſt accumulation or cryſtals of ſienite and ſlate, which abound in Charnwood Foreſt in Leiceſterſhire, are concretions in theſe ſame ſtrata of red earth, as thoſe of the Malvern hills and other places alſo probably are. See STRATA.

DEPOSITION, in *Law*, a teſtimony given in court by a witneſs upon oath.

In chancery, depoſition is a teſtimony ſet down in writing, by way of anſwer to the interrogatories exhibited in chancery, where ſuch witneſs is called *deponent*.

For the purpoſe of the examination of witneſſes, interrogatories are framed, or queſtions in writing; which, and which only, are to be propoſed to the witneſſes in the cauſe. Theſe interrogatories muſt be ſhort and pertinent; not leading ones; (as, "did you not ſee this," or, "did you not hear that?") for if they be ſuch, the depoſitions taken upon them will be ſuppreſſed, and not ſuffered to be read. For the examination of witneſſes in or near London, there is an "Examiner's Office" appointed; but for ſuch as live in the country, a commiſſion (ſee COMMISSION) to examine witneſſes is uſually granted to four commiſſioners, two named of each ſide, or any three or two of them, to take the depoſitions there. And if the witneſſes reſide beyond ſea, a commiſſion may be had to examine them there upon their own oaths, and (if foreigners) upon the oaths of ſkilful interpreters. And it hath been eſtabliſhed (Atk. 21.) that the depoſition of an heathen, who believes in the Supreme Being, taken by commiſſion in the moſt ſolemn manner, according to the cuſtom of his own country, may be read in evidence. The commiſſioners are ſworn to take the examinations truly and without partiality, and not to divulge them, till publiſhed in the court of chancery; and their clerks are alſo ſworn to ſecrecy. The witneſſes are compellable by proceſs of ſubpœna, as in the courts of common law, to appear and ſubmit to examination. When their depoſitions are taken, they are tranſmitted to the court with the ſame care that the anſwer of a defendant is ſent. When all the witneſſes are examined, then, and not before, the depoſitions may be publiſhed; by a rule to paſs publication; after which they are open for the inſpection of all parties, and copies may be taken of them. After a witneſs is fully examined, the examinations are read over to him, and the witneſs is at liberty to alter, or annul any thing, after which he ſigns them, and then, but not before, the examinations are complete, and are deemed good evidence. (1 P. Wms. 415.) The ſame practice prevails in the commons, in eccleſiaſtical cauſes.

Depoſitions in the chancery, after a cauſe is determined, may be given in evidence in a trial at bar in B. R. in a ſuit for the ſame matter, between the ſame parties, if the party that depoſed be dead; but if he be living, he muſt appear in perſon in court to be examined. (1 Lil. Abr. 445.)

Depoſitions of informers, &c. taken upon oath before a coroner, upon an inquiſition of death; or before juſtices of peace on a commitment or bailment of felony, may be given in evidence at a trial for the ſame felony; if

if it be proved on oath that the informer is dead, or unable to travel, or kept away by the procurement of the priſoner; and oath muſt be made, that the depoſitions are the ſame that were ſworn before the coroner or juſtice, without any alteration. (2 Hawk. P. C.) Depoſitions taken before a coroner cannot be given in evidence upon an appeal for the ſame death; becauſe this is a different proſecution from that in which they were taken:—and it has been adjudged, that the evidence given by a witneſs at one trial, could not, in the ordinary courſe of juſtice, be made uſe of againſt a criminal, on the death of ſuch witneſs, at another trial. (2 H. P. C.) The depoſitions of witneſſes abroad, and of ſuch are aged or going abroad *de bene eſſe*, to be read in evidence, if the trial could be deferred till after their death or departure, are now frequently effected by mutual conſent in trials at common law, if the parties are open and candid; and this may be done indirectly at any time, through the channel of a court of equity. When the cauſe of action ariſes in India, and a ſuit is brought upon it in any of the courts of Weſtminſter, the court may iſſue a commiſſion to examine witneſſes upon the ſpot, and tranſmit the depoſitions to England. Stat. 13 Geo. III. c. 63.

Deposition is alſo uſed for the ſequeſtering, or depriving a perſon of his dignity and office.

This depoſition only differs from abdication, in that the latter is ſuppoſed voluntary, and the act of the dignitary, or officer himſelf; and the former of compulſion, being the act of a ſuperior power, whoſe authority extends thereto. Accordingly, ſome ſay the depoſition, and ſome the abdication of king James II.

Depoſition does not differ from deprivation: we ſay indifferently, a depoſed, or deprived biſhop, official, &c. See Deprivation.

Depoſition differs from ſuſpenſion, in that it abſolutely and for ever ſtrips or diveſts a prieſt, &c. of all dignity, office, &c. whereas ſuſpenſion only prohibits, or reſtrains, the exerciſe thereof.

Depoſition only differs from degradation, in that the latter is more formal, and attended with more circumſtances, than the former; but in effect and ſubſtance they are the ſame; thoſe additional circumſtances being only matter of ſhow, firſt ſet on foot out of zeal and indignation, and kept up by cuſtom, but not warranted by the laws or canons. See Degradation.

DEPOT. This term, when applied to military matters, ſignifies a depoſit, or reſerve for ſtores, proviſions, &c. alſo a ſtation for the reception, and training of recruits. The difficulty of removing large quantities of ammunition, &c. on emergency, added to the great diſtreſs occaſioned to armies, whether victorious or defeated, by the removal of depots from the vicinity of their *points d'apui*, (which are generally towns ſtrongly fortified, or *corps de reſerve* poſted in the moſt advantageous manner,) ſhews the abſolute neceſſity for rendering depots ſufficiently ſtrong to maintain themſelves for ſome weeks at leaſt, againſt even a very powerful force. The immenſe importance attached to the ſupplies of whatever an army may, from time to time, ſtand in need of, has been long underſtood on the continent, where every ſtrong hold is a depot, furniſhed according to its ſituation, extent, and ſtrength, with all thoſe articles indiſpenſible to an army taking the field. Some of theſe are capable of maintaining a garriſon of 30,000 men for a whole year; beſides providing arms, ammunition, and camp equipage, for an army of double that number. The great arſenal at Ulm was of this claſs, but was nearly exhaulted at the time of its ſurrender, when general Mack ſo iguominouſly loſt the flower of the Auſtrian army.

A depot ſhould be built in a peculiar manner: that is, it ſhould contain an immenſe pile of bomb-proof buildings, of which the loweſt tier ſhould be reſerved for the preſervation of proviſions requiring to be kept cool; this ought to be below the ſurface of the area; the ground-floor ſhould be allotted to artillery, and ordnance ſtores, the walls and piers being furniſhed with ſtrong wooden battens, (projecting a little to obviate the danger of damp,) for the ſupport of muſquets, carabines, piſtols, ſwords, halberts, bayonets, pikes, and every deſcription of ſmall arms. The ſecond floor ſhould be devoted to the receipt of camp equipage, and the upper to the lodgment of ready filled cartridges. The great magazines for powder ſhould be ſeparate: the whole of the principal, or body of the place, ſhould be caſemated for the accommodation of troops, and pierced (though perhaps maſked) for the reception of heavy cannon. The whole of the outworks ſhould be of the beſt materials, and on the moſt compact ſyſtem of defence.

Ten ſuch depots, advantageouſly ſituated, each capable of ſupplying ſtores, &c. to an army of 50 or 60,000 men; and demanding not more than 5000 for their defence, reſpectively, would give a moſt deſireable acceſſion of ſtrength to our national defence; and, in the moment of doubtful conteſt, inſpire our armies with confidence. At preſent we do not perceive, throughout the kingdom, any depot capable of affording ſuch ſupplies, or of reſiſting even a moderate force, for ſuch a time as might either enable a diſcomfited corps to rally, or diſtant ones to afford them relief.

DEPRECATION, from *deprecor, I intreat*, in *Rhetoric*, a figure whereby the orator invokes the aid or aſſiſtance of ſome one; or prays for ſome great evil or puniſhment to befall him who ſpeaks falſely, either himſelf or his adverſary.

DEPRECATORY, or Deprecative, in *Theology*, a term applied to the manner of performing ſome ceremonies in the form of prayer.

Among the Greeks, the form of abſolution is deprecatory; being conceived in theſe terms, *May God abſolve you!* whereas in the Latin, and even in ſome of the reformed churches, it is in the declarative form, *I abſolve you.*

DEPRESSED Leaf, in *Botany*. See Leaf.

DEPRESSION *of Equations*, in *Algebra*. See *Equation*.

Depression *of the Pole*, in *Aſtronomy*. So many degrees as you ſail, or travel from the pole towards the equator, ſo many you are ſaid to depreſs the pole, becauſe it becomes reſpectively ſo much lower or nearer to the horizon.

Depression. If the zenith diſtance of an object exceeds 90°, its exceſs above that quantity, or its angular diſtance from the horizon, is called the depreſſion.

In nautical obſervations it is neceſſary to know the depreſſion or dip of the ſea, to correct the apparent altitude of an obſerved object.

In trigonometrical ſurveys it is by means of the obſerved depreſſion that the height of one ſtation above the level of the other is computed, and likewiſe the quantity of the terreſtrial refraction.

The method of calculating theſe depreſſions is founded on this theorem. The ſum of the depreſſions of two objects, as ſeen reciprocally from each other, is equal to the arc they intercept on the ſurface of the earth.

Let A, B (*Pl.* IX. *Aſtronomy, fig.* 61.) be two ſtations unequally diſtant from the centre of the earth C; A′ B A, B′ A B their depreſſions below their reſpective horizons, it is evident, that ſince both the ∠ C and the ſum of the angles A′ B A and B′ A B are complements of the angle C to two right angles, the angle C = ∠ A′ B A + ∠ B′ A B.

The

The following method is given by Delambre for finding the quantity of terreſtrial refraction.

Let C be the centre of the earth (*Pl.* IX. *Aſtronomy, fig.* 62.), A and B two ſignals. If from the point A, we obſerve the point B, it will appear at B′, by the effect of the refraction; the point A will, when ſeen from B, for the ſame reaſon appear at A′.

Let the apparent zenith diſtances

$$Z\,A\,B' = \delta \text{ and } V\,B\,A' = \delta'$$

and the angles of refraction,

$$B\,A\,B' = r \quad A\,B\,A' = r'$$

The true zenith diſtances will be

$$Z\,A\,B = \delta + r = D$$
$$V\,B\,A = \delta' + r' = D'.$$

Therefore $Z\,A\,B + V\,B\,A = \delta + \delta' + r + r'$. (1)

And becauſe the ſum of the exterior angles of a triangle is equal to the two interior and oppoſite

$$\angle Z\,A\,B = C + A\,B\,C$$
$$\angle V\,A\,B = C + B\,A\,C,$$

and $Z\,A\,B + V\,B\,A = 180° + C = D + D'$. (2)

and $\delta + \delta' + r + r' = 180° + C$;

ſince r is nearly equal r'

$$r = \frac{C}{2} - \tfrac{1}{2}(\delta + \delta' - 180). \quad (3)$$

$$\frac{r}{C} = \frac{\frac{1}{2}C - \frac{1}{2}(\delta + \delta' - 180)}{C} = n. \quad (4)$$

and $r = n\,C$.

The quantity n varies extremely, according to the ſtate of the atmoſphere. In the trigonometrical ſurvey it was found to vary from $\frac{1}{4}$ to $\frac{1}{20}$.

The mean may be taken $\frac{1}{12}$ or $n = 0.08$. From the above equations we obtain

$$\angle Z\,A\,B = \delta + r = 90° + \tfrac{1}{2}C + \tfrac{1}{2}(\delta - \delta').$$
$$\angle V\,B\,A = \delta' + r' = 90° + \tfrac{1}{2}C + \tfrac{1}{2}(\delta - \delta').$$

Example.

Let δ be equal to 90° 15′ 30″.

δ' 89 57 50.

K the diſtance between the two ſignals = 93.522 feet.

Firſt find ∠ C - -	Log. K	= 4.97091
	R	= 5.31442
Co-log. ϱ the mean radius of the earth	ϱ	= 2.68000
	923″.8	= 2.96533

Angle C - = 15′ 23″.8

$\delta = 90° 15' 30''$

$\delta' = 89\ 57\ 50$

$\delta + \delta' - 180 = 0\ 13\ 20$

$\frac{\delta + \delta' - 180}{2} = 0\ 6\ 40$

$\frac{C}{2} = 7\ 42$

$r = nC =$ 1′ 2″

Log. r (62″)	= 1.79239
Co-log. C	= 7.03466
$n = 0.067$	= 8.82705

To find the difference in the heights of two ſtations above the level of the ſea, by obſerving their depreſſions.

Let C be the centre of the earth conſidered as a ſphere, A, B, two points unequally diſtant from the centre. If A B′ is a true level line or terreſtrial arc, B B′ = H will be the difference of the level of the two points A and B. If, moreover, $Z\,A\,B = D = \delta + r$ be the true zenith diſtance of the point B, then, ſince $B'\,A\,C = 90° - \frac{1}{2}C$.

$B\,A\,B' = 180° - Z\,A\,B - B'\,A\,C = 180° - D - 90° + \frac{1}{2}C = 90° - D + \frac{1}{2}C$.

$A\,B\,B' = A\,B'\,C - B\,A\,B' = 90° - \frac{1}{2}C - 90° + D - \frac{1}{2}C = D - C$.

In the triangle B A B′ making A B′ = K.

$$H = \frac{K \text{ ſin. } A}{\text{ſin. } B} = \frac{K \text{ ſin. } (90° + \frac{1}{2}C - D)}{\text{ſin. } (D - C)} = \frac{K \text{ coſ. } (\frac{1}{2}C - D)}{\text{ſin. } (D - C)}. \quad (1.)$$

If we ſuppoſe the angle B′ a right angle, then we ſhall have very nearly

$$H = K \cot. (\delta + r - \tfrac{1}{2}C). \quad (2.)$$

Relatively likewiſe to the level of the point A.

$$H = -K \cot. (\delta' + r - \tfrac{1}{2}C).$$

If we employ the expreſſion $H = K \cot. (\delta' + r - \frac{1}{2}C)$ it will be relatively to the point B.

It has been demonſtrated above, that

$$Z\,A\,B = 90° + \tfrac{1}{2}C + \tfrac{1}{2}(\delta - \delta')$$
$$V\,B\,A = 90° + \tfrac{1}{2}C - \tfrac{1}{2}(\delta - \delta)$$

therefore, $B\,A\,C = 180 - Z\,A\,B = 90° - \frac{1}{2}C + \frac{1}{2}(\delta - \delta')$

$$B'\,A\,C = 90° - \tfrac{1}{2}C.$$
$$B\,A\,B' = B\,A\,C - B'\,A\,C = \tfrac{1}{2}(\delta' - \delta)$$
$$B'\,B\,A = 180° - V\,B\,A = 90° - \tfrac{1}{2}C - \tfrac{1}{2}(\delta - \delta')$$

and $H = \frac{K \text{ ſin. } B\,A\,B'}{\text{ſin. } A\,B\,B'} = \frac{K \text{ ſin. } \frac{1}{2}(\delta' - \delta)}{\text{coſ. } \frac{1}{2}(\delta' - \delta + C)}$. (4.)

This formula is exact, but we may often take $\frac{1}{2}C = 0$, then, ſince $\frac{\text{ſin.}}{\text{coſ.}} = \text{tang.}$

$$H = K \text{ tang. } \tfrac{1}{2}(\delta' - \delta). \quad (5.)$$

Hence, we may obtain the height of a ſtation above the level of the ſea, by obſerving, when it is viſible, the horizon of the ſea. For let A B be a tangent from the obſerver at B to the ſea at A. Let C A = ϱ, B B′ = N.

Then, in the triangle C A B,

$$C\,B = \frac{\varrho}{\text{ſin. } (90° - C)} = \frac{\varrho}{\text{coſ. } C}.$$

$$B\,B' = N = \varrho \left(\frac{1 - \text{coſ. } C}{\text{coſ. } C}\right);$$

but 1 − coſ. C = ſin. C tang. $\frac{1}{2}$ C,

therefore, N = ϱ tang. C tang. $\frac{1}{2}$ C:

Alſo, $C = 90° - B = 90° - (180 - D) = D - 90°$, and $D = \delta + r$. Therefore, N = ϱ tang. $(\delta + r - 90°)$ tang. $\frac{1}{2}(\delta + \varrho - 90°)$. When r is unknown, it may be deduced from the equation $r = n\,C$.

But in practice it will be more convenient to transform N into ſome function of n, which may be effected thus.

$C = \delta - 90°$; neglecting the refraction, which may be done without ſenſible error, then $r = nC = n(\delta - 90°)$; ſubſtituting this laſt value in equation, (6.) and recollecting that tang. $m\,r = m$ tang. x, when x is very ſmall, and m does not much exceed unity, we ſhall have

$$N = \tfrac{1}{2}\varrho \text{ tang.}^2 (\delta - 90° + n)(\delta - 90°) = \tfrac{1}{2}\varrho \text{ tang.}^2 \big((1+n)(\delta - 90°)\big)$$

and very nearly

$$N = \tfrac{1}{2}\varrho\,(1 + n) \text{ tang.}^2 (\delta - 90°). \quad (7.)$$

Example I.

At the ſtation A, the zenith diſtance of the point B was obſerved 90° 15′ 30″; and at the ſtation B, the zenith diſtance of A was obſerved 89° 57′ 50″, the diſtance from A to B 93,522 feet; required the height of A above the level of B.

1ſt. By the exact formula $H = \frac{K \text{ ſin. } \frac{1}{2}(\delta' - \delta)}{\text{coſ. } \frac{1}{2}(\delta' - \delta + C)}$.

$\delta' =$

$\delta' = 89° 57' 50''$
$\delta = 90\ 15\ 30$
$\delta' - \delta = -\ 17\ 40$
$C = +\ 15\ 24$
$\delta' - \delta + C = -\ 2\ 16 = p.$

Log. fin. $\frac{1}{2}\delta' - \delta' = -\ 7.40985$
Log. K $= +\ 4.97091$
Cof. $\frac{1}{2}p$ $\quad 0.00000$
$-\ 240.3 = \quad 2.38076$

Therefore, B is 240.3 feet below the level of A.

Example II. *by formula* (5.).

Log. K $= 4.97091$
Tang. $\frac{\delta' - \delta}{2} = 7.40985$

$2.38076 = 240.3$ feet as above.

Example III.

When only δ is given. Equation (2.)

Let $n = 0.067$,
$H = K \cot.(\delta + 0.67\ C - 0.5\ C)$,
$= K \cot.(\delta + .433\ C)$
$\delta = 90° 15' 30''$
$-\ 433\ C = \quad 6\ 40$
$\quad 8\ 50$

Log. tang. $8' 50'' = 7.40985$
4.97091
$2.38076 = 240.3$ feet.

Example IV.

To find the height of a ſtation, by obſerving the depreſſion of the horizon of the ſea.

Let the obſerved depreſſion be $15' 25''$, required the height of the obſerver above the level of the ſea.

$N = \frac{1}{2}\varrho\ (1 + n)^2 \text{ tang.}^2 (\delta - 90°)$.

Log. 0.5 $= 9.69897$
Log. ϱ $= 7.32000$
Log. $(1.08)^2$ $= 0.06685$ } 7.08582.
Log. tang.^{2} $15' 25''$ $= 5.30344$
$2.38926 = 245$ feet.

The three firſt terms being conſtant, we have the following rule.

To the conſtant log. 7.08582 add twice the log. of the tangent of the depreſſion, and the ſum will be the logarithm of the number of feet required.

If the height of the obſerver be given, and the depreſſion is required, then the rule will be to the log. of the height in feet, add the conſtant log. 2.91418, and add likewiſe ten to the index, then half this ſum will be the log. tangent of the depreſſion required.

Example.

Let the height of the obſerver be 100 feet, required the depreſſion.

Log. 100 - 2.00000
Conſt. log. - 2.91418
14.91418
Log. tang. of the Depreſſion $= 9' 5'' - 7.45709$

Let the height of the obſerver be 245 feet.

Log. 245 2.38916
Conſt. log. 2.91418
5.30334
Log. tang. $7.65167 = 15' 25''$ = depreſſion required, the ſame as in Mr. Mendoza's table.

Having found the depreſſion for one foot $= 59''.1$, a table may be conſtructed by multiplying $59''.1$ by $\sqrt{\text{height of the obſerver}}$.

Example.

Log. $59''.1$ 1.77150
$\frac{1}{2}$ Log. 245 1.19458
$2.96616 = 925'' = 15'\ 25$. The ſame as above.

Table of the Depreſſion of the Horizon of the Sea.

Height of the Eye in Feet.	Dip. of the Horizon.	Height of the Eye in Feet.	Dip. of the Horizon.	Height of the Eye in Feet.	Dip. of the Horizon.	Height of the Eye in Feet.	Dip. of the Horizon.
	′ ″		′ ″		′ ″		′ ″
1	0 59	38	6 4	143	11 46	250	15 34
2	1 24	41	6 18	146	11 54	255	15 44
3	1 42	44	6 32	149	12 1	260	15 53
4	1 58	47	6 45	152	12 8	265	16 2
5	2 12	50	6 58	155	12 15	270	16 11
6	2 25	53	7 10	158	12 22	275	16 20
7	2 36	56	7 22	161	12 29	280	16 29
8	2 47	59	7 34	164	12 36	285	16 37
9	2 57	62	7 45	167	12 43	290	16 46
10	3 7	65	7 56	170	12 50	295	16 55
11	3 16	68	8 7	173	12 57	300	17 3.5
12	3 25	71	8 18	176	13 4	325	17 45
13	3 33	74	8 28	179	13 10	350	18 25
14	3 41	77	8 38	182	13 17	375	19 4
15	3 49	80	8 48	185	13 23	400	19 42
16	3 56	83	8 58	188	13 30	425	20 18
17	4 4	86	9 8	191	13 36	450	20 53
18	4 11	89	9 17	194	13 43	475	21 28
19	4 17	92	9 26	197	13 49	500	22 1
20	4 24	95	9 36	200	13 55		
21	4 31	98	9 45	203	14 2	550	23 6
22	4 37	101	9 54	206	14 8	600	24 7.5
23	4 43	104	10 2	209	14 14	650	25 5
24	4 49	107	10 11	212	14 20	700	26 3
25	4 55	110	10 19	215	14 26	750	26 58
26	5 1	113	10 28	218	14 32	800	27 51
27	5 7	116	10 36	221	14 38	850	28 43
28	5 3	119	10 44	224	14 44	900	29 35
29	5 18	122	10 52	227	14 50	950	30 19
30	5 24	125	11 00	230	14 56	1000	31 9
31	5 29	128	11 8	233	15 2	1500	38 8.5
32	5 34	131	11 16	236	15 7	2000	44 2.5
33	5 39	134	11 24	239	15 13	3000	53 56
34	5 44	137	11 31	241	15 19	4000	1 2 17.5
35	5 49	140	11 39	245	15 25	5000	1° 9′.38

The formulæ on a ſpheroid would be a little different from the above, but the corrections are too ſmall to be of any

practical utility. Nevertheleſs, it will be adviſeable in delicate inveſtigations, to attend to the nature of the curvature between the two ſtations. This may be eaſily done by the tables inſerted under the article DEGREE, where the radius of curvature is given both for the meridional and perpendicular degree.

Example. Let the latitude = 50°

Required the depreſſion at 5000 feet elevation in the direction eaſt or weſt; and likewiſe north and ſouth.

East or Weſt.		North or South.	
Log. 0.5	= 9.69897	Log. 0.5	= 9.69897
Log. *n*	= 7.32128	Log. rad.	= 7.32021
Log. $(1.08)^2$	= 0.06685	Log. $(1.08)^2$	= 0.06685
	7.08710		7.08603
Its com.	2.91290	Its com.	2.91397
Log. 5000	= 3.69897	Log. 5000	3.69897
	16.61187		16.61294
Tang. 1° 9′ 32″	= 8.30593	Tang. 1° 9′ 37″	= 8.30647

DEPRESSION *of the ſun*, or *of a ſtar*, is its diſtance from the horizon, below it, meaſured by an arch of the vertical circle, intercepted between it and the horizon.

DEPRESSION, in *Geology*, ſignifies either a lower part of ſmall extent, in a ſtratum, as Dr. Townſon defines the term, with reference to his figure, Philoſophy of Min. p. 221; or, it ſignifies thoſe greater depreſſions, or ſinkings down, which appear in the ſtrata. Many of theſe, it muſt be obſerved, are rather a riſing up, or elevation of the ſurrounding ſtrata, than an actual ſinking down of the part, ſaid to be depreſſed. M. Sauſſure has ſuppoſed, that the lake of Geneva in Switzerland, occupies the place of a depreſſed, or ſunken maſs of primitive rock; becauſe the ſurrounding ſtrata riſe towards the lake. This, we ſuppoſe, to be no uncommon caſe, but that ſo much of the Engliſh channel as lies oppoſite to the coaſt, between the chalk ſtrata at Dover, and at Beachy-Head, and the greater part of the Briſtol channel, may be conſidered as owing to depreſſions of the ſtrata, which occupy the bottoms of thoſe ſeas. See ELEVATION *of Strata*, and ABSORPTION *of Mountains*.

DEPRESSION, in *Surgery*, is the ſinking inwards of the ſkull, ſo as to preſs down upon the brain. This takes place when ſome part of the cranium has been injured by external violence. We have mentioned the ſymptoms ariſing from this cauſe, under the article COMPRESSION, to which the reader is therefore referred. See TREPANNING, and *Injuries of the* HEAD.

DEPRESSOR, in *Myology*, a name given to ſeveral muſcles, which have the power of drawing down the parts, in which they are inſerted.

DEPRESSOR *alæ naſi*, one of the muſcles attached to the cartilaginous part of the noſe. It is the depreſſor labii ſuperioris proprius of Douglas, l'inciſif moyen of Winſlow, l'abaiſſeur du nez of Bichat. It ariſes from the ſuperior maxillary bone in front of the inciſor and canine teeth, and aſcends in a ſtraight direction, to be inſerted into the ala of the noſe, where its fibres are mingled with thoſe of the compreſſor naris, and of the levator labii ſuperioris et alæ naſi.

It draws down the ala of the noſe, and the neighbouring part of the upper lip, which it preſſes againſt the teeth.

DEPRESSOR *anguli oris*, one of the muſcles of the mouth; for the deſcription of which, ſee DEGLUTITION.

DEPRESSOR *labiorum communis*; a name given by ſome to the depreſſor anguli oris, which ſee.

DEPRESSOR *labii ſuperioris alæque naſi*. See DEPRESSOR *alæ naſi*.

DEPRESSOR *labii ſuperioris proprius*. See DEPRESSOR *alæ naſi*.

DEPRESSOR *labii inferioris*, a muſcle of the lower lip, deſcribed alſo by the name of quadratus; for its deſcription ſee the account of the muſcles of the lips, in the article DEGLUTITION.

DEPRESSOR *oculi*, a name which has been ſometimes given to the inferior ſtraight muſcle of the eye. See EYE.

DEPRESSOR *maxillæ inferioris*, a name of the digaſtricus muſcle; for the deſcription of which, ſee the article DEGLUTITION.

DEPRIMENS, in *Anatomy*, a term applied to ſome muſcles which depreſs or draw down parts.

DEPRIMENS *biventer*. See DIGASTRICUS.

DEPRIMENS *humerum rotundus*, a name given by Spigelius to the teres major, which ſee.

DEPRIMENS *oculi*, the inferior ſtraight muſcle of the eyeball. See EYE.

DEPRIVATION, in the *Canon Law*, the act of bereaving, diveſting, or taking away a ſpiritual promotion, or dignity: as when a biſhop, vicar, prebend, or the like, is depoſed, or deprived of his preferment, for ſome matter, or fault, in fact, or in law. See DEPOSITION.

Deprivation is of two kinds; *à beneficio, & ab officio*.

DEPRIVATION *à beneficio* is, when for ſome great crime or defect a miniſter is wholly and for ever deprived of his living, or preferment: which differs from ſuſpenſion, in that the latter is only temporary.

DEPRIVATION *ab officio*, is when a miniſter is for ever deprived of his orders: which is the ſame, in reality, with what we otherwiſe call *depoſition* and *degradation;* and is uſually for ſome heinous crime deſerving death, and is performed by the biſhop in a ſolemn manner. See DEGRADATION.

Deprivation may alſo take place in conſequence of ſome particular clauſe in an act of parliament. The deprivation of biſhops, &c. is declared lawful by ſtatute 39 Eliz. c. 8. By the king's commiſſion, in whom the ſupremacy is lodged, a biſhop may be deprived; however, the canons direct, that a biſhop ſhall be deprived in a ſynod of the province: or, if that cannot be aſſembled, by the archbiſhop and 12 biſhops at leaſt, not as his aſſiſtants, but as judges. It has been adjudged, that an archbiſhop may deprive a biſhop for ſimony, &c. for he hath power over his ſuffragans, who may be puniſhed by the archbiſhop's court for any offence againſt their duty. (1 Salk. 134.) Deprivation may take place either, firſt, by ſentence declaratory in the eccleſiaſtical courts, for fit and ſufficient cauſes allowed by the common law; ſuch as attainder of treaſon or felony (Dyer 108. Jenk. 210.) or conviction of other infamous crimes in the king's courts; for hereſy, infidelity, groſs immorality, and the like: or, ſecondly, in purſuance of divers penal ſtatutes, which declare the benefice void, for ſome nonfeaſance or neglect, or elſe ſome malfeaſance or crime; as for ſimony (31 Eliz. c. 6. 12 Ann. c. 12.); for maintaining any doctrine in derogation of the king's ſupremacy, or of the 39 articles, or of the Book of Common Prayer (1 Eliz. c. 142. 13 Eliz. c. 12.); for neglecting after inſtitution to read the liturgy and articles in the church, or make the declarations againſt popery, or take the abjuration oath (13 Eliz. c. 12. 14 Car. II. c. 4. 1 Geo. I. c. 6.); for uſing any other form of prayer than the liturgy of the church of England (1 Eliz. c. 2.); or for abſenting himſelf 60 days in one year from a benefice belonging to a popiſh patron, to which the clerk was preſented by either of the univerſities (1 W. & M. c. 26.);—

in all which or ſimilar caſes the benefice is *ipſo facto* void, without any formal ſentence of deprivation, and avoidance by act of parliament, and no declaratory ſentence. If any parſon, vicar, &c. have one benefice with cure of ſouls, and take plurality, without a faculty or diſpenſation; or if he commit waſte in the houſes and lands of the church, called dilapidations; or if he obtained preferment in the church, by ſimoniacal contract; theſe have been held good cauſes for deprivation of prieſts. When a benefice is only voidable, but not void before ſentence of deprivation, the party muſt be cited to appear; there is to be a libel againſt him, and a time aſſigned to anſwer it, and alſo liberty for advocates to plead, and after all a ſolemn ſentence pronounced; though none of theſe formalities are required, when the living is made *ipſo facto* void. (Can. 122.) If the deprivation be for a thing merely of eccleſiaſtical cognizance, no appeal lies; but the party has his remedy by a commiſſion of review, which is granted by the king, of mere grace. (Moor. 781)

DEPTFORD, in *Geography*, is a large populous town, though not inveſted with the privilege of a market, in the county of Kent, England. Its name was anciently ſpelt *Depēford*, ſuppoſed to have been derived from a ford, through the Ravenſbourne river at this place. It was alſo formerly called *Deptford Strond* and *Weſt Greenwich*. The town conſiſts of two pariſhes, called Deptford St. Nicholas or the Lower Town, and Deptford St. Paul or the Upper Town. The latter was conſtituted a diſtinct pariſh in the year 1730. Deptford was anciently a ſmall fiſhing village, and continued of comparatively but little importance, till the Royal Dock was eſtabliſhed here by Henry VIII. in the beginning of his reign. Since that period, it has progreſſively increaſed; and its population, according to Mr. Lyſons, has augmented in the proportion of twenty to one within the laſt two centuries: though a conſiderable check was given to its increaſe in 1665 and 1666, during which years nearly nine hundred perſons died here of the plague. Deptford ſuffered ſeverely by a fire in 1652; and in 1671 the Lower Town was inundated by a flood which roſe to the height of ten feet in the ſtreets near the river, ſo that the inhabitants were obliged to retire to the Upper Town in boats: the adjoining marſhes were alſo overflowed, and about ſeven hundred ſheep, with a great number of oxen, cows, &c. were deſtroyed.

Deptford is noted for its docks, one of which, called the Royal Dock or King's Yard, was formed, as before obſerved, by King Henry VIII., but it has been greatly enlarged and improved ſince that period. All its concerns are managed under the immediate inſpection of the Navy Board: the reſident officers are, a clerk of the cheque, a ſtore-keeper, a maſter ſhipwright, and his aſſiſtants, a clerk of the ſurvey, a maſter attendant, a ſurgeon, and various inferior officers. The number of artificers and labourers employed here in time of war is about 1500: even in time of peace, the general number is upwards of 1000. The whole extent of the yard includes about thirty-one acres, which are occupied by various buildings; two wet docks, a double and a ſingle one; three ſlips for men of war; a baſon; two maſt-ponds; a model-loft; maſt-houſes; a large ſmith's ſhop, with about twenty forges for anchors; ſheds for timber, &c. The old ſtore-houſe is a quadrangular pile, and appears to have conſiſted originally only of one range of buildings on the north ſide; where, on what was formerly the front, is the date 1513, together with the initials H. R. in a cypher, and the letters A. X. for Anno Chriſti. The buildings on the eaſt, weſt, and ſouth ſides of the quadrangle have been erected at different times; and a double front, towards the north, was added in 1721. Another ſtore-houſe, parallel to the above, and of the ſame length, having ſail and rigging-lofts, was completed a few years ago; and there is alſo a long range of ſmaller ſtore-houſes, built under the direction of ſir Charles Middleton about the year 1780. The other buildings conſiſt of various workſhops and houſes for officers. Oppoſite to the yard, affixed to the ſide of a veſſel lying at anchor in the river, is a curious machine for removing and hoiſting maſts. At a ſhort diſtance from the King's Yard, cloſe to the river, is the Victualling Office, ſometimes called the Red Houſe, from its ſtanding on the ſide of a large range of ſtore-houſes, conſtructed with red bricks, which was burned down in July 1639, and all its ſtores conſumed. It was afterwards rebuilt, and included in the grant of Sayes court to ſir John Evelyn in 1726; and was then deſcribed as 870 feet in length, 35 wide, and containing 100 warehouſes. A new Victualling houſe was built on the ſpot in 1745: this new building was alſo conſumed by fire in 1749, with great quantities of ſtores and proviſions. The immenſe pile which now forms the Victualling Office has been erected at different times ſince that period, and conſiſts of many ranges of building appropriated to the various eſtabliſhments neceſſary in the important concern of victualling the navy. Beſides ſtore-houſes of various kinds, and dwelling-houſes for the principal and inferior officers, it contains a wind-mill for grinding corn, with granaries, and bake-houſes for making biſcuit, an extenſive cooperage and brewhouſe, ſpacious ſlaughtering-houſes, and houſes for curing beef, pork, &c.

Beſides the King's Yard, here are two large private docks for ſhip-building, called Dudman's and Barnard's, where men of war of 74 guns are ſometimes built. Deptford contains two churches; the oldeſt dedicated from time immemorial to St. Nicholas, the patron of ſea-faring men; the other to St. Paul. St. Nicholas' church conſiſts of a nave, chancel, and aiſles, with an embattled tower of flint and ſtone, of a date long prior to the body of the fabric, which was rebuilt in 1697. The monuments and ſepulchral inſcriptions are numerous, and many of them record the memory of perſons of celebrity. In the chancel is the monument of Capt. Edward Fenton, who accompanied ſir Martin Frobiſher in his ſecond and third voyages, and had himſelf the command of an expedition for the diſcovery of a north-weſt paſſage. St. Paul's church is a handſome ſtone fabric, erected about the year 1730, under the proviſions of certain acts paſſed in the ninth and tenth years of queen Anne, for the building of fifty new churches in and near London. It conſiſts of a nave, chancel, and aiſles, with a well proportioned ſpire at the weſt end: the roof is ſupported by columns of the Corinthian order. On the north ſide of the altar is an elegant mural monument, by Nollekins, in memory of James Sayer, eſq. vice-admiral of the white. When the act for the ſeparation of the two pariſhes was paſſed in 1730, 3,500*l.* out of the duty on coals was allotted to purchaſe lands for the maintenance of the rector of the new church; and it was alſo enacted that the churchwardens ſhould pay him 70*l.* in addition, annually, in lieu of burial fees, except when the corpſe is admitted into the church. In Deptford are ſeveral places of worſhip for congregations of various claſſes of diſſenters.

The Corporation, or Society of the Trinity Houſe, the meetings of which are now held in a handſome building on Tower Hill, was originally eſtabliſhed at Deptford in the reign of Henry VIII., and incorporated by the name of "The Maſter, Warden, and Aſſiſtants of the Guild or Fraternity of the moſt glorious and undivided Trinity, and of St. Clement, in the pariſh of Deptford Strond." The ancient hall, in which the members continued to aſſemble at this

place, was pulled down about the year 1787, on the erection of the Trinity Houſe in London; but here are ſtill two hoſpitals belonging to the corporation. The penſioners conſiſt of decayed pilots and maſters of veſſels and their widows: the annual allowance to the widows and ſingle men is about 18*l.*; to the married men about 28*l.* The charitable benefactions of this town are numerous and of conſiderable value; in all thoſe given prior to the year 1730 both pariſhes have a joint intereſt.

Various improvements have been made at Deptford ſince the twenty-ſeventh of George II., when an act was paſſed for paving and cleanſing the ſtreets, and for the better relief and employment of the poor. The bridge over the Ravenſbourne, which was formerly of wood, was rebuilt of ſtone at the ſole coſt of Charles I. in 1628, and hasbeen rendered more commodious of late years, at the expence of the pariſhioners. Here, previous to the battle of Blackheath, in the reign of Henry VII., was a ſkirmiſh between lord Dawbeney's army, and "certayne arches of the rebelles, whoſe arrowes," as is reported, ſays Hall, "were in length a full yerde." Theinhabitants of Deptford are chiefly thoſe employed in the dock-yards, or engaged in maritime purſuits of different kinds: the number in both pariſhes, as returned under the act of 1801, was 17,548; the number of houſes 3,139: but they have been ſomewhat increaſed ſince that time. An extenſive manufacture of earthen ware, called Deptford ware, is carried on in this town. The manor houſe of Deptford, with its ſurrounding eſtate, which had obtained the name of Sayes court from its being long in the poſſeſſion of the Sayes, became in 1651 the reſidence of John Evelyn, eſq. the celebrated author of the "Sylva," whoſe gardens at this place are ſaid to have been the wonder and admiration of the moſt judicious men of his time. Mr. Evelyn died in 1706. The houſe and gardens were afterwards entirely neglected, and there is not now the leaſt trace of either. The preſent workhouſe was built on the ſite in the year 1729. Lyſons' Environs of London. Halſted's Hiſtory of Kent: and the Beauties of Englaud and Wales, vol. vii.

Deptford, a town of America, in Glouceſter county, New Jerſey.

DEPTH, in *Geometry*, &c. See Altitude, Elevation, &c.

Depth *of a Sail*, denotes the extent of any ſquare or oblong ſail from the head-rope to the foot-rope; or the length of the after-leech of any boom-ſail or ſtay-ſail.

Depth *of a Squadron*, or *Battalion*, is the number of men in a file, or the number of ranks. Infantry is now generally drawn up three deep, and in the defence of a breaſt-work only two deep. The cavalry is commonly drawn up three deep, and ſometimes only two deep. See Rank.

DEPURANTIA, in the *Materia Medica*, medicines ſuppoſed to correct or evacuate the impurities which, upon any occaſion, prevail in the body; but as no ſuch ſpecific power is known in any particular medicine, except, perhaps, in mercury, in the cure of ſyphilis, the general term is groundleſs and improper, and is now exploded by medical writers.

DEPURATION, from *deburgo*, *I purify*, in *Pharmacy*, the ſame as clarification, or purification; *viz.* the purging a body of all the lees, fæces, and other craſs, coarſe, and excrementitious parts contained therein.

Fermentation ſerves to depurate liquors: ſyrups, juices, &c. are depurated by paſſing them through the manica Hippocratis, or ſtraining-bag. See Clarification.

DEPURATORIA Febris, in *Medicine*, a fever thus called by the illuſtrious Sydenham, which prevailed much in the years 1661, 2, 3, 4. This, ſays he, ſeems to be the only one, as far as I could hitherto obſerve, in which nature regulated all the ſymptoms in ſuch a manner, as to fit the febrile matter, prepared by proper concoction, for expulſion in a certain time, either by a copious ſweat, or a freer perſpiration, and upon this account I call it the depuratory fever: and in reality, continues he, I am inclined to believe, that this is the capital and primary fever of nature, as well with reſpect to the regular method which nature uſes in promoting and accompliſhing the digeſtion of the morbific matter at the appointed time, as alſo becauſe it occurs more frequently than other fevers. It ſeems alſo reaſonable to think, that the neceſſary and excellent rules left us by Hippocrates and other ancient phyſicians, are adapted to this primary fever; by means of which it is to be regulated in ſuch a manner, that the febrile matter may be prepared to make a proper criſis by ſweat.

DEPUTATION, from *deputare*, *to depute*, a miſſion of certain ſelect perſons out of a company, or body, to a prince, or aſſembly, to treat of matters in their name, or to proſecute ſome affair therein.

Deputations are more or leſs ſolemn, according to the quality of thoſe who ſend them, and the buſineſs they are ſent upon.

Deputation is not properly applied where a ſingle perſon ſends another with ſuch commiſſion; but only where a body are concerned. The parliament deputed the ſpeaker, and ſix members to preſent their addreſs to his majeſty. The chapter deputed two canons to ſolicit their affair in council.

DEPUTATUS, among the *Ancients*, was applied, firſt, to armourers, or workmen employed in the making of armour in the forges, &c. And ſecondly, to a ſort of active people, who followed the army, and in engagements were truſted to bring off, and take care of the wounded.

Deputatus, Δεπουτατος, was alſo an inferior officer in the church of Conſtantinople, whoſe buſineſs was to call perſons of condition the patriarch had a mind to ſpeak with, and to keep off the crowd where that prelate walked.

This deputy appears to have been a ſort of uſher, or tipſtaff; but he had likewiſe the care of the ſacred veſtments, in which he approached the office of a ſacriſtan.

DEPUTY, a perſon ſent, or deputed, by ſome community in their name and behalf.

Deputy is alſo frequently uſed among us for an office, or employ, not a dignity; and ſtands indifferently for a vice, or lieutenant.

Deputy, in *Law*, is one who exerciſes an office in another's right: and the forfeiture or miſdemeanor of ſuch deputy ſhall cauſe the perſon whom he repreſents to loſe his office. A principal officer may not appoint a deputy in all caſes, unleſs the grant of the office will juſtify him in ſo doing; but when an office deſcends to an infant, ideot, &c. he may make a deputy of courſe (9 Rep. 47.). A ſuperior officer muſt anſwer for his deputy in civil actions, but not in criminal caſes (2 Inſt. 191. 466.) Judges have no power to hold their courts by deputy (2 Hawk. P. C. c. 1. § 9.): recorders, however, may do it (1 Lev. 76.). Coroners cannot appoint deputies, becauſe theirs is a judicial office of truſt, annexed to their perſons (1 Lil. 446.). Sheriffs, ſtewards of a court, bailiffs of a liberty, and conſtables, are allowed to appoint deputies (Cro. Eliz. 534. 2 Danv. 482.).

Deputy *Rock*, in *Geography*, a ſhoal in the ſound of Copland, near the north-eaſt coaſt of Ireland, nearly half way between the ſouth end of Copland iſland, and Donaghadee, on which the leaſt water is eight feet. Latitude 54° 38′. Long. 5° 24′ W. from Greenwich.

DE QUIBUS *ſur diſſeiſin*, in *Law*, a writ of entry. See Fitzherb. Nat. Brev. fol. 191.

DER, a ſyllable frequently prefixed to the names of places in England. It is ſaid to ſignify that ſuch were formerly places, where wild beaſts herded together, ſo called from the Saxon *deor*, *fera*, unleſs the ſituation was near ſome river.

Der, in *Geography*, a town of Egypt; 11 miles S. of Siut.

DERA, in *Ancient Geography*, a country of Iberia, watered by the river Sicanus. Steph. Byz.—Alſo, a town of Aſia, in the interior of Suſiana.

DERAIGN. See Dereyn.

DERANOBILA, in *Ancient Geography*, a town of Carmania.

DERASNIA, in *Geography*, a town of Poland, in the palatinate of Bracklaw; 68 miles N. W. of Bracklaw.

DERAZINA, a town of Poland, in the palatinate of Lucko; 28 miles N. E. of Lucko.

DERBE, in *Ancient Geography*, a city of Aſia Minor, in Lycaonia, near Iſauria. M. d'Anville places it near a ſmall chain of mountains, detached from Taurus in the country of Iſauria called Antiochiana. It is mentioned in the New Teſtament, Acts xiv. 6. It was the ſeat of Antipater Derbæus, and the country of Timothy.

Derbe, in *Geography*, a town of Piedmont, in the duchy of Aoſta; 10 miles W. of Aoſta.

DERBENT, or Derbend, a city of Perſia, in Dagheſtan, ſituated on the weſt coaſt of the Caſpian ſea, and having a harbour; though the worſt on this ſea, becauſe veſſels can ſeldom approach the ſhore, on account of ſands and ſhoals, but are obliged to anchor at the diſtance of $\frac{3}{4}$ of a mile; the commerce is therefore inconſiderable, and the port is little frequented. It is ſaid to have been built by Alexander the Great, and called Iſkander. Czar Peter became maſter of it during the civil wars of Perſia, and the empreſs Catherine II. took it in 1780. This city forms an oblong ſquare on the declivity of an eminence, and is ſurrounded with a wall built of hewn ſtone, five fathoms high, in many places 10 feet thick, and fortified with a number of round and ſquare towers. On the higheſt point lies the fort, which nature and art have contributed to render impregnable; but it lies too high to defend the city, and too remote to cover the harbour. Derbent is the reſidence of a khan, and its inhabitants are chiefly Perſians, Tartars, and a few Armenians. Two or three Ruſſian ſhips are annually bound for Derbent; they are uſually laden with oats and rye, and carry iron, ſteel, and lead for the Leſgues and other Tartar nations, who inhabit the eaſtern chain of the Caucaſus. The neighbourhood produces ſome corn, but not ſufficient for the conſumption of the place. Shamakee, in the province of Schirvan, ſupplies this port with ſalt, and ſilk, both raw and wrought for exportation; but Baku is a more convenient harbour. Derbent was anciently denominated the Caſpian or Albanian gates, as it occupies a ſhort declivity between the mountains and the ſea. The city, if we give credit to local tradition, had been founded by the Greeks; and this dangerous entrance was fortified by the kings of Perſia with a mole, double walls, and doors of iron. The adjoining territory of Derbent is very inconſiderabte in extent, being only four German miles in length on the ſea-coaſt, and extending from one and a half to two miles inland. The northern and ſouthern boundaries are formed by the rivers Darbach and Rubas, between which lies a broad and partly marſhy level interſected by many ſmall brooks, and here and there interſperſed with beautiful and well cultivated corn-fields. N. lat. 41° 52′. E. long. 54° 30′. The variation of the magnetic needle in June 16, 1796, was 11° 41′ 20″ E.

Derbent, a town of European Turkey, in the province of Romania, 20 miles N. of Adrianople.

Derbent, a town of Perſia, in the province of Choraſan; 110 miles N E. of Herat —Alſo, a town of Perſia, in the province of Choraſan; 90 miles S. of Abiverd.

DERBICES, in *Ancient Geography*, a people of Aſia, who occupied the banks of the Oxus, and who furniſhed Darius in his conteſt againſt Alexander with 2000 horſemen.—Alſo a people of Africa, in the interior of Libya.

DERBINSKOI, in *Geography*, a Tartarian village of Siberia, in the government of Irkutſk, on the Lena, N. lat. 60° 20′. E. long. 116° 14′.

DERBY, the county and principal town in Derbyſhire, England, occupies a flat tract of land on the banks of the river Derwent, the waters of which prove eminently ſerviceable to the manufactures of this place. Derby was a place of repeated conflicts in the early periods of Engliſh hiſtory. In the year 874, it was occupied by the forces of Halfden, a Daniſh chief, whoſe head quarters were then at Rependune, now Repton. In 918, the Danes were ſtill its maſters; but the ſame year they were attacked by ſurprize, and completely routed by the heroic Ethelfleda, daughter of king Alfred, and princeſs of the Mercians. In a few years the Danes regained poſſeſſion; but were again expelled in 942 by king Edmund, and about the ſame time diſpoſſeſſed of all the principal towns in the neighbouring counties of Lincoln, Stafford, Nottingham, and Leiceſter. That Derby about this period was a place of great importance, is evident from its being mentioned in Domeſday-book as a royal borough of Edward the Confeſſor, containing fourteen mills for grinding corn, and 243 burgeſſes, forty-one of whom held twenty-four plough-gates of taxed land. The annual rent then paid was 24*l*. When William the Conqueror obtained the crown, he gave Derby, with a great rent-roll, to his illegitimate ſon, William Peverell. It was afterwards granted by Henry I. to the earl of Cheſter, and made a corporate town; but its charter has been altered at various periods. It obtained additional privileges from Henry I. and II. Richard I. and John; in whoſe time the burgeſſes were indebted to the exchequer 56 marks, for the confirmation of their liberties. In the ſame reign, they were likewiſe returned debtors in ſixty marks, and two palfreys, for holding the town of Derby at the uſual fee-farm; and 10*l*. increaſe for all ſervices, and having ſuch a charter as the burgeſſes of Nottingham. A grant was obtained from Richard I., by which Jews were prohibited from reſiding in the town. In the reign of Edward III. the corporation was deprived of its liberties, and ſummoned into one of the king's courts, to anſwer "By what authority they demanded toll, yet paid none? Why they claimed the excluſive privilege of dyeing cloth, and prohibiting cloths to be dyed in every other place within ten leagues, except Nottingham? They were alſo to declare by what right they choſe a bailiff yearly; and why they kept a fair on Thurſday and Friday in Whitſun-week, and another of ſeventeen days at the time of the feſtival of St James: to explain by what authority they had a coroner; why the burgeſſes ſhould not be ſued out of their own borough; and wherefore they held weekly markets on Sunday, Monday, Wedneſday, and Friday?" Some mutilated charters were produced in anſwer to theſe requiſitions; but the liberties of the town were not reſtored till the inhabitants had paid a fine of 40 marks, and conſented to pay an increaſe of rent. In the year 1611, James I. granted a new charter, confirming the privileges beſtowed in former reigns, and inveſting the corporation with additional

additional liberties. By this charter the bailiffs, recorder, and town-clerk, or any three of them, were privileged to hold a court of record on every ſecond Tueſday; to have the ſole return of writs, keep a quarterly ſeſſion, two courts-leet, and ſix annual fairs; to be toll-free throughout the kingdom; and receive toll from all, except the duchy of Lancaſter, which was to pay only half the ſums charged on the inhabitants of other places. In 1638, it was determined, that the authority of the two bailiffs ſhould be veſted in one perſon, to be choſen annually, and to be called mayor. The then bailiffs, Henry Millor, and John Hope, were the firſt that held that title. In 1680, the ancient charter was ſurrendered to Charles II., and a new one (the preſent) obtained at the expence of nearly 400*l.* The corporation now conſiſts of a mayor, nine aldermen, fourteen brethren, (out of whom the aldermen are elected) fourteen common-council men, a recorder, a high-ſteward, and a town-clerk. The privilege of returning members to parliament is poſſeſſed by the freemen and ſworn burgeſſes; about 700 in number. In the reign of queen Mary, a woman was burnt in this town for maintaining that the ſacrament was only a memorial or repreſentation of the body and blood of Chriſt, and that the elements were merely bread and wine. In 1592, the plague ravaged this town: and in 1665, when London was nearly depopulated by that dreadful calamity, it again broke out at Derby, and proved ſo fatal, that the country people refuſed to bring their commodities to the market-place. The inhabitants, to prevent a famine, raiſed a pile of ſtones, which received the name of Headleſs-Croſs, in an open ſpace without the town. Here the market people placed their proviſions, and retired, till the buyer, who was not permitted to touch any article, till purchaſed, had concluded his bargain, and depoſited his money in a veſſel filled with vinegar. In the rebellion of 1745, Derby was diſtinguiſhed as the fartheſt place in England to which the pretender's army reached. Their coming being expected, proper meaſures had been taken for the ſafety of the town; and nearly 600 men raiſed by ſubſcription, beſides 150 levied and maintained at the ſole expence of the duke of Devonſhire.

The ſituation of Derby, on the banks of the Derwent, renders it, as before obſerved, extremely favourable for the inſtitution, and proceſs, of manufactures which require the aid of water; and various works have been eſtabliſhed in the town, or its immediate vicinity. Their ſucceſs, however, has been greatly promoted by the judicious application of machinery; and mills on the moſt improved conſtruction have been erected for various purpoſes. Thoſe belonging to Meſſrs. Strutts, for the manufacture of cotton, are particularly ingenious; and the facility attained by them in working ſtockings, figured waiſtcoat-pieces, and many other articles, has eminently contributed to the extenſion of this branch of buſineſs. One of theſe mills is remarkable for its floors being all conſtructed on brick arches, and paved with brick, whereby it is rendered abſolutely indeſtructible by fire. This building is ſix ſtories high, 115 feet long, and 30 feet wide; it was erected in 1793, and was the firſt fire-proof mill ever built.

Beſides the cotton factories, the manufactures moſt celebrated in Derby, are thoſe of ſilk, porcelain, and ornaments, &c. of Derbyſhire ſpar and marble. The manufacture of ſilk is carried on to a great extent, and the number of men, women, and children employed in it is upwards of 1000. The work is chiefly performed by means of machines, or mills, of various ſize, and different conſtruction. The original mill, called the ſilk-mill, by way of pre-eminence, being the firſt and largeſt of its kind ever erected in England, ſtands on an iſland on the river Derwent. Its hiſtory is remarkable, as it exemplifies the power of genius, and the vaſt influence which the enterpriſes of an individual has on the commerce of a country.

The extenſive fabric which contains the machinery, ſtands upon huge piles of oak, doubly planked, and covered with ſtone-work, on which are turned thirteen ſtone arches, that ſuſtain the walls. Its whole length is 110 feet, its breadth 39, and its height 55½. It contains five ſtories, beſide the under works, and is lighted by 468 windows. In the three upper ſtories, are the Italian winding engines, which are placed regularly acroſs the apartments, and furniſhed with many thouſand ſwifts and ſpindles, and engines for working them. In the two lower rooms are the ſpinning and twiſt mills, which are all of a circular form, and are turned by upright ſhafts paſſing through their centres, and communicating with ſhafts from the water-wheel. Their diameter is between twelve and thirteen feet, and their height nineteen feet eight inches. The ſpinning mills are eight in number, and give motion to upwards of 25,000 reel bobbins, and nearly 3000 ſtar-wheels belonging to the reels. Each of the four twiſt mills contains four rounds of ſpindles, 389 of which are connected with each mill, as well as numerous reels, bobbins, ſtar-wheels, &c. The whole of this elaborate machine, for *one* only it is, though diſtributed through five large apartments, is put in motion by a ſingle water-wheel, twenty-three feet in diameter, ſituated on the weſt ſide of the building. The whole number of wheels is about 14,000. All the operations are performed here, from winding the raw ſilk, to organizing or preparing it for the weavers. The raw-ſilk is chiefly brought in ſkains or hanks from China and Piedmont; that produced in the former country is perfectly white, but the produce of the latter is of a light yellow. The ſkain is firſt placed on an hexagonal wheel, or *ſwift*, and the filaments which compoſe it are regularly wound off upon a ſmall cylindrical block of wood, or *bobbin*. To wind a ſingle ſkain is the work of five or ſix days, though the machine is kept in motion ten hours daily; ſo aſtoniſhingly fine are the filaments of which it is formed. In this part of the proceſs, many children are employed, whoſe nimble fingers are kept in continual exerciſe by tying the threads that break, and removing the burs and uneven part, ſome of which are the caſes which the ſilk-worm fabricates for its own grave, or rather for its dormitory, while nature prepares it for a new mode of exiſtence. The ſilk thus wound upon the bobbins, is afterwards twiſted by other parts of the machinery, and is then ſent to the *doublers*, who are chiefly women, ſtationed in a detached building, which ſtands on the ſame iſland, on piles like the ſilk-mill; and though not half ſo broad, is nearly thirty feet longer. Here four, ſeven, or ten of the threads are united into one, according to the uſes for which they are deſigned; the fine kind going to the ſtocking weaver; the others to the manufacturers of waiſtcoat-pieces, &c.

The manufacture of porcelain was originally eſtabliſhed at Derby about the year 1750, by the late ingenious Mr. Dueſbury; but the moſt conſiderable improvements have been effected ſince his deceaſe, through the judicious methods employed in preparing the paſte, and increaſing the beauty of the decorations. The ware itſelf is not of equal fineneſs with the French and Saxon; though its workmanſhip and ornaments are far ſuperior. The paintings are, in general, rich and well executed, and the gilding and burniſhing exceedingly beautiful. The body of the ſemi-vitreous ware, called porcelain, is fine white clay, combined with different proportions of fluxing matter. The beſt kind is abſolutely infuſible, and takes for its glaze a vitreous ſubſtance,

ſtance, without a particle of lead. When the paſte is duly prepared, by grinding and other operations, it is conſigned to the workman, whoſe dexterity produces a variety of beautiful forms from the ſhapeleſs maſs delivered to him. Round veſſels are uſually made by a man called a *thrower*, who works them on a circular block, which moves horizontally on a vertical ſpindle. From him they paſs to the lathe, and are reduced to their proper thickneſs and form at the end of an horizontal ſpindle. Afterwards they are *finiſhed*, and *handled* if neceſſary by other perſons, and are then conveyed to a ſtove where they remain till the moiſture is entirely evaporated, when they become fit for baking. Oval veſſels, ſuch as tureens, tea-pots, &c. aſſume their form by being *preſſed* into moulds of plaſter, or gypſum, by hand. The *ſaggars*, or caſes, in which the articles are burnt, are various in ſize and dimenſions. Theſe are ſet in the kiln or oven, one upon the other, and when piled up nearly to the top, have ſome appearance of piles of cheeſe. When the kiln is full, it is carefully cloſed, and the ware baked by the admiſſion of heat through horizontal and vertical flues; this is the firſt baking, and the porcelain in this ſtate is vulgarly called biſcuit. It is then dipped in glaze of about the conſiſtence of cream, and carried to the glaze kiln, where it is again baked, but in a leſs degree of heat than before. The ware is now delivered to the painters, who, with colour prepared from mineral bodies, ornament it with landſcapes or figures, according to the required patterns. After this proceſs, it is again conveyed to the kiln, and the colours vitrified, in order to fix and give them a proper degree of luſtre. Every coat, or layer of colour, requires a freſh burning; once or twice is ſufficient for the ornaments of the common porcelain, but the more elaborate decorations render it neceſſary for the colours to be laid on, and undergo the action of fire ſeveral times, before they obtain their full effect. This completes the proceſs of thoſe articles that have no gold in their pattern; but where this addition is wanted, they are pencilled with a mixture of oil and gold diſſolved, or thrown down by quickſilver aided by heat, and once more committed to the kiln; here the gold reaſſumes ſolidity, but comes out with a dull ſurface, which is quickly rendered brilliant by rubbing with blood-ſtones, and other poliſhing ſubſtances. The porcelain is now ready for uſe, but the latter part of the proceſs requires conſiderable care, as the gold, when not ſufficiently burnt, will ſeparate in thin flakes, and when over-fired, will not receive a proper poliſh. The higheſt finiſhed ware in this manufactory is frequently returned to the enamel kiln, where the colours are fluxed ſix or ſeven times; the beſt only are here finiſhed for ſale. The making of biſcuit figures, or white ware, is peculiar to this manufactory; and the pieces are ſuppoſed to be equal in beauty and delicacy to any of a ſimilar kind made in Europe. Here the lathe is of no uſe, the figures being all caſt in moulds of plaſter or gypſum, into which the materials are poured, having previouſly been reduced to a liquid of the conſiſtence and appearance of thick cream. The water contained in the mixture is quickly abſorbed by the plaſter, and the paſte becomes ſufficiently hard and tenacious to part freely from the mould. The various parts of the figures, as the head, arms, legs, &c. are caſt in ſeparate moulds, and when dried and repaired, are joined by a paſte of the ſame kind, but thinner than the former. The articles are then ſent to the kiln, and after undergoing a regular and continued heat, come out extremely white and delicate.

The original ſilk-mill, erected by Mr. Crochet, and now called the old ſhop, was afterwards converted into a cotton factory, but is at preſent in the occupation of Meſſrs. Brown and ſon, who employ it for cutting and poliſhing marble, and manufacturing the Derbyſhire fluor ſpar, or blue John, and gypſum, into a variety of beautiful ornaments, as urns, vaſes, columns, obeliſks, &c. The machinery applied to execute theſe purpoſes is of very ingenious conſtruction; and the lathes are ſo contrived, by the aſſiſtance of a reverſe motion, that they can readily be made to revolve either ſlower or faſter, as the deſign or quality of the ſubſtance under manufacture may require. They may likewiſe be ſtopped at pleaſure, without impeding the motion of any other part of the works. When the blue John is to be made into a vaſe, or any other ornamental form that renders the uſe of the lathe neceſſary, it is carved with a mallet and chiſſel, into a rude reſemblance of the object intended to be produced, and being afterwards ſtrongly cemented to a plug or chock, is ſcrewed upon the lathe. A ſlow motion is then given to the work, and a bar of ſteel about two feet long, and half an inch ſquare, properly tempered, and pointed at each end, is applied to the fluor, on which water is continually dropping to keep the tool cold, preſerve it from friction, and enable it more readily to reduce the ſubſtance upon which it acts. As the ſurface becomes ſmoother, the tool is applied with more freedom, and the motion of the lathe accelerated, till the fluor has aſſumed its deſtined form. When the turning is completed, pieces of grit-ſtone, of different degrees of fineneſs, are applied with water to bring the article to a proper ground for poliſhing with fine emery, tripoli, and putty, or calx of tin. Theſe means are continued till the fluor is incapable of receiving a higher degree of poliſh; which is known when water thrown on it will no longer increaſe its luſtre. The advantage of the lathe ſet in motion by water over thoſe worked by the foot, is ſaid to be particularly conſpicuous in forming hollow vaſes, or articles of equal delicacy. By the uſe of the foot-lathe the fluor was frequently broken, and without extreme care, its laminated texture always diſturbed; but the greater ſteadineſs given to the machinery by the water-wheel, operates as an effectual preſervation from theſe inconveniences. The great eaſe with which a ſlow or quick motion can be produced by the uſe of the water lathe, is alſo an additional advantage, and tends conſiderably to increaſe the elegance of the ornaments. The ſame wheel which gives motion to the lathes for manufacturing the fluor-ſpar, &c. is likewiſe applied to work the machinery for ſawing and poliſhing marble. On the vibrating poles to which the cranks are fixed are ſliding boxes, containing ſets of ſaws, which are nothing more than thin plates of ſoft iron, that drop as they cut the marble. Theſe are ſupplied with ſand and water; and being moveable with ſcrews, may be arranged at different diſtances, ſo that the ſlabs may be cut of any thickneſs. A ſet of ſaws conſiſts of a different number of plates, ſo that the block to which they are applied may be ſeparated at one proceſs into as many ſlabs as may be thought neceſſary. The ſlabs thus ſawn, are taken to the poliſhing bed, which has four wheels that move on a gangway with a very ſlow motion given to it by a worm and a crank. One of the ſlabs being fixed on this bed, another is faſtened above it to an arm attached to a vibrating pole, that works with a quick motion in a tranſverſe direction. The ſlabs thus moving in contact with each other, and being ſupplied with ſand and water, ſoon acquire a level ſurface, when finer materials are employed to increaſe their ſmoothneſs, and give them a higher poliſh.

Derby is divided into five pariſhes, each of which has a church. The principal ornament of the town is All-Saints church: yet, reſpectable as it is, it diſplays a remarkable inſtance of architectural incongruity. The tower was

erected:

erected in the reign of Henry VIII., and its upper part is richly ornamented with tracery, crockets, high pinnacles, and battlements; but the body is Grecian, and the interior is particularly light and ſpacious. The roof is ſupported by five columns on each ſide. The deſign of the body of the church was executed by Gibbs, the ingenious architect of St. Martin's in the Fields, London. The money for building it was chiefly procured through the indefatigable exertions of the then miniſter, Dr. Michael Hutchinſon, whoſe zeal and ſucceſs in this work are recorded on a tablet to his memory, placed againſt the ſouth wall within the church. On the ſouth ſide of the chancel is the monument-room of the Cavendiſhes; and many of that illuſtrious family are buried in the vault beneath. In this repoſitory is a ſplendid mural monument to the memory of the celebrated counteſs of Shrewſbury; it was conſtructed in her life-time, and under her inſpection. Among other monuments deſerving of notice, is one to the memory of William, earl of Devonſhire, who died in 1628, and Chriſtian, his counteſs. Another neat monument, by Nollekins, diſplays the medallion and arms of William, earl of Beſborough, who died in 1793: and on a mural monument, by Ryſbrach, to the memory of Caroline, counteſs of Beſborough, who died in 1760, is a well executed figure of that lady. Againſt the wall, on the north ſide of the church, is a curious memorial of Richard Croſhaw, who was the ſon of a poor nailor in this town, and went to London in a leathern doublet to ſeek his fortune: poſſeſſing induſtry and perſeverance, his endeavours proved ſucceſsful; and having attained conſiderable affluence, he bequeathed upwards of 4000*l.* to the corporation of Derby, for the maintenance of lecturers, the relief of the poor, and other benevolent purpoſes. He died in 1631. The other four churches of this town are reſpectively dedicated to St. Alkmund, St. Peter, St. Werburgh, and St. Michael. The firſt of theſe is ſuppoſed to have been founded at the beginning of the ninth century, in honour of Alkmund (ſon of Alured, the depoſed king of Northumberland) who was ſlain in battle while endeavouring to reinſtate his father.

The principal public buildings in Derby are a county hall, a town hall, a county gaol, an elegant aſſembly room, and a theatre. The county hall, which is a large but heavy building of free ſtone, was finiſhed in the year 1660. The town hall, built by the corporation in 1730, is a handſome ſtructure. The county gaol was erected about 1756, at the expence of the county, aided by a donation of 400*l.* from the duke of Devonſhire: it is ſituated on the eaſt ſide of the town, near the upper end of Friar gate, and is a very reſpectable building, well adapted for the purpoſe of its deſtination: the front is from an excellent deſign, diſplaying ſolidity and ſtrength, without that affectation of incongruous ornament ſo frequently exhibited in modern buildings of ſimilar character. The aſſembly room is of ſtone, and is ſituated on the north-eaſt ſide of the market place: the foundation was laid in 1763; but the edifice was not completed till 1774. The theatre ſtands in Bold lane, is built of brick, and was erected in 1773.

Derby is a very improving and populous place; and though the buildings have been continually increaſing for the laſt twenty years, they are yet inſufficient for the convenience of the inhabitants. Freſh ground is frequently broken up for new houſes, which are moſtly let before they are completed: the number of houſes, as aſcertained by the late act, was 2,144. that of the inhabitants 10,832; but both are increaſing, and there is reaſon to believe, will keep pace with the progreſſive improvements of the town, and the augmentation of its trade. Various branches of buſineſs, beſides the manufactures already mentioned, are carried on to a conſiderable extent, and ſeveral new works of magnitude have lately been eſtabliſhed. On Nun's green a bleaching-ground has been opened, in which the proceſſes are performed according to the improved methods introduced by the advancement of chemiſtry: to aid the operation, a ſmall ſteam-engine has been erected. A mill for ſlitting and rolling iron for a variety of purpoſes; a large furnace for ſmelting copper ore, with a machine for battering and rolling the copper into ſheets; a red lead manufactory; a mill for making tinned-plates, &c. are alſo exiſting in this town or its immediate vicinity. Among the modern improvements of Derby, may be included the lighting and paving of the ſtreets, and the removing of thoſe obſtructions that prevented a free paſſage. Theſe purpoſes were effected by an act paſſed in 1792, which appointed commiſſioners with full power to levy a ſmall rate on the inhabitants, and likewiſe to ſell all the common land belonging to Nun's green; the ſums thus produced to be applied in defraying the neceſſary charges. Since the above year, ſeveral of the bridges that were built acroſs the Markeaton Brook have been removed, and three new ones, of ſtone, erected by ſubſcription. An elegant bridge of three arches has likewiſe been built over the Derwent; and, together with the ſilk-mill, the weirs, and the broad expanſe of the river, forms a very pleaſing proſpect on entering the town from the Nottingham road.

Numerous bequeſts for the relief of the poor have been made at different times by benevolent perſons. One of the moſt conſiderable charities is the Devonſhire alms-houſe, founded by the counteſs of Shrewſbury in queen Elizabeth's reign, for the ſupport of eight men and four women: the old houſe was taken down about twenty years ago, and the preſent erected by the duke of Devonſhire. Science and literature meet with great encouragement at Derby: this may, in ſome degree, be aſcribed to the Philoſophical Society eſtabliſhed here about the year 1772, through the foſtering patronage of the late Richard French, eſq. and Dr. Darwin, the latter of whom for many years made this town his reſidence. Several book-ſocieties have alſo been inſtituted; and to the credit of the individuals compoſing them, the works purchaſed are chiefly of a ſcientific and philoſophical tendency.

Derby, previous to the diſſolution of religious houſes, contained a monaſtery dedicated to St. Helen, founded by Robert de Ferrariis, ſecond earl of Derby, about the middle of the twelfth century; a ſmall Benedictine nunnery, founded ſoon after the former by an abbot of Derby, and dedicated to St. Mary de Pratis; a priory of Dominicans, or Black Friars, founded towards the cloſe of the thirteenth century; and a cell of Cluniac monks, founded by Walthеof, a Saxon nobleman, dedicated to St. James, and given early in the twelfth century to the abbey of Bermondſey, in Southwark. Here were alſo an hoſpital dedicated to St. Leonard, and a maiſon-dieu, both inſtituted for the reception of lepers.

Derby is ſituated 126 miles N.W. from London; it has a weekly market on Friday, and ſeven annual fairs.

The celebrated aſtronomer John Flamſtead, is conſidered by ſome authors as a native of this town; an opinion which, though controverted, is favoured by the circumſtance of his father reſiding here.

The vicinity of Derby furniſhes a variety of agreeable walks, where the inhabitants may enjoy a ſalutary exerciſe, and a ſucceſſion of proſpects diſtinguiſhed by the ſofter features that attend cultivation. On Windmill-hill, at a ſhort diſtance from the town, a neat proſpect-houſe has lately been erected by —— Robinſon, eſq. from which the views over the adjacent country are very extenſive. Hutton's Hiſtory

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of Derby, 8vo. Pilkington's Hiſtory of Derbyſhire, 2 vols. 8vo. Beauties of England and Wales, vol. iv.

DERBY, a townſhip of America, in Orleans county, Vermont, on the N. line of the ſtate, on the E. ſhore of lake Memphremagog.—Alſo, a poſt-town in New Haven county, Connecticut, on the point of land formed by the confluence of Naugatuck and Houſatonick rivers. This town was ſettled in 1665, and is now divided into two pariſhes, and has an academy. It has a conſiderable trade with the Weſt Indies, and in its vicinity are mills on the falls of Naugatuck, and iron as well as other works on Eight-mile river, that falls into the Houſatonick, which is navigable for 12 miles to this town. It has 1878 inhabitants.

DERBY, or DARBY, *Upper* and *Lower*, are ſituated in Delaware county, Pennſylvania; the former containing 862, the latter 980 inhabitants; ſeven miles S.W. of Philadelphia.

DERBY *neck*. See BRONCHOCELE.

DERBY *Canal* is the parliamentary name of a navigable canal in the county of Derby, which was completed in the year 1794, between the Trent river at Swarkſtone, and Little Eaton, with a rail-way extenſion thence to the collieries at Smithey-Houſes, near Denby, and a branch from the ſame to Horſley and Smalley Mills collieries. There is alſo a branch from the town of Derby to the Erewaſh canal, near Sandyacre. See CANAL.

DERBYSHIRE is a county ſituated nearly in the middle of England, at an equal diſtance from the eaſtern and weſtern ſeas. It is encompaſſed by Yorkſhire and Cheſhire to the north, and Staffordſhire, Leiceſterſhire, and Nottinghamſhire to the eaſt, weſt, and ſouth. The area is ſuppoſed to meaſure about 55 miles from north to ſouth, and 38 in an oppoſite direction, and compriſes nearly 720,640 acres of land. Of theſe above 500,000 are cultivated arable and paſture, whilſt the remainder conſiſts chiefly of bleak mountainous regions, and open commons. The whole county is divided into ſix hundreds, and contains 11 market towns, and 136 pariſhes. Theſe comprehend 33,191 houſes, and about 161,142 inhabitants.

The northern and ſouthern parts of this county exhibit a ſtriking difference and contraſt in geographical features: as the former abounds with hill and vale, and the latter preſents a flat-ſurface. The higher region is denominated the High Peak, and the latter the wapentake, or Low Peak. Among the chief eminences in this diſtrict are the mountains of Ax-edge, and Kinder-ſcout. The former is ſituated near Buxton, and was calculated by Mr. Whitehurſt to be about 2100 feet higher than the town of Derby, and 1000 feet above the valley in which Buxton-hall ſtands: the elevation of Kinder-ſcout, though not preciſely aſcertained, is ſuppoſed to be greater. The High Peak is a region of bleak barren heights, and long extended moors, interſperſed with deep vallies, through which the ſmall ſtreams take their courſe. Here the ſcenery is in many parts romantic and ſublime; though, on the whole, inferior in picturеſque effect to that of other mountainous countries. Beauty, indeed, is only reſident in the vallies; the high ground appearing dreary and deſtitute of entertainment; and in many ſituations not a ſingle houſe or tree is to be ſeen, to divert the eye of the traveller, or relieve the wearineſs that ariſes from the contemplation of ſterility and nakedneſs. The Low Peak abounds with eminences of various height and extent. Braſſington-Moor, Alport, near Wirkſworth, and Crich-Cliff, are the moſt elevated, and command very extenſive proſpects: from Alport, on a clear day, the Wrekin in Shropſhire may be diſtinguiſhed. On the eaſt ſide of the county there is alſo a high ridge of conſiderable extent, beginning to the ſouth of Hardwick, and continuing in another direction to the extremity of the county, where it enters Yorkſhire. The ſouthern part of Derbyſhire is in general pleaſant and well cultivated, but preſents no particular variety of ſcenery. The mountainous part of this county is diſtinguiſhed from the reſt, by the greater quantity of rain which falls in it. At Chatſworth, which is by no means the higheſt tract, about 33 inches of rain have been found to fall annually at a medium. The High Peak is peculiarly liable to violent ſtorms, in which the rain deſcends in torrents, ſo as frequently to occaſion great ravages in the lands; it is alſo ſubject to very high winds. Theſe cauſes, together with the elevation of the country, render it cold, ſo that vegetation is backward and unkindly. Some kinds of grain will not grow in the Peak, and others ſeldom ripen till very late in the year. The atmoſphere is, however, pure and healthful, and the higher ſituations are generally free from epidemic diſeaſes, though agues and fevers ſometimes prevail in the vallies. One diſeaſe is, however, endemic in theſe parts, and even as far ſouth as Derby; this is the Bronchocele or Derby-neck: it is an enlargement of the glands of the throat; and is a degree of the ſame diſeaſe that is known in the Alps, and other mountainous tracts. It is alſo prevalent in ſome parts of Sumatra and the Eaſt Indies.

The moſt common ſoil of Derbyſhire is a reddiſh clay, or marl; the ſouthern diſtrict is in general compoſed of it, having little or no ſtone near the ſurface: but ſome parts of this tract are interſperſed with ſmall beds of ſand or gravel; and in moiſt ſituations, land of a blackiſh colour, and looſe texture, is ſometimes met with, continuing through an extent of from 50 to 200 acres. This kind of ſoil is likewiſe found throughout the ſouthern and middle part of the extenſive tract of limeſtone, which lies on the north-weſt ſide of the county. Its colouring principle is iron; but its quality is very various in different ſituations: in ſome it contains much calcareous earth; in others it does not effervеſce with acids. The large tract on the eaſtern ſide of the county, which extends from Stanton, Dale, and Morley, to the borders of Yorkſhire, and abounds with coal, is covered with a clay of various colours, black, grey, brown, and yellow, but principally the laſt; and is in ſome places mixed with a large proportion of ſand. Similar ſoil is alſo met with in the northern extremity of the county; and in ſome parts where gritſtone is found; but in the latter ſituations, the land is more frequently of a black colour, and bituminous quality. In the vallies, near the banks of the larger rivers, the ſoil is very different from that of the adjacent parts, and has been evidently altered by the depoſitions from the inundations. Peat bogs exiſt in the north parts of the county, even on the higheſt mountains; and in ſome of them, trees have been found nearly perfect. Barley is much cultivated in many parts, but particularly in the pariſhes of Greſley and Repton, where the farmers are induced to grow it, by the conſumption of malt in the neighbouring town of Burton, whoſe famous ale has acquired ſuch extenſive celebrity. The whole produce has been calculated at about 5000 quarters annually. On the eaſtern ſide of the county the land is chiefly under tillage; but the midland tracts have a mixture of paſture and arable, according to ſituation: the moors in this diſtrict are in a courſe of progreſſive improvement. In the High Peak the grounds are chiefly appropriated to the grazing and breeding of cattle; very little corn, beſides black oats, being grown: on the more elevated parts, ſheep of the ſmaller horned kind are fed: the mutton is excellent. Little attention has been paid to the cultivation of artificial graſſes; but an uncommon ſpecies of culture, as a field crop, here practiſed is that of chamomile: about 200 acres are devoted to its

growth. A loamy ſoil is choſen for its cultivation, and, after the ground is well prepared by thorough cleanings, about the end of March, the roots of an old plantation are taken up, and divided into ſmall ſlips, which are planted in rows about eighteen inches aſunder, and at about the ſame diſtance in the rows. The plants are kept clean by frequent hoeing and weeding with the hand. In September the flowers are fit to gather: their perfection depends upon their being fully blown, without their having ſtood ſo long as to loſe their whiteneſs; the flowering continues till ſtopped by the froſts. The gatherings are repeated as often as ſucceſſions of flowers appear; but this depends very much on the ſeaſon, dry open weather furniſhing more ſucceſſions than wet or dull weather. When the flowers are gathered, they are carefully dried, either in kilns very moderately heated, or on the floors of boarded rooms, heated by ſlow fires: the object is to keep the flowers white and whole, and this is beſt effected by drying them as ſlowly as poſſible. The produce varies from two hundred weight, or even leſs, to four, five, and in ſome few inſtances, ſix hundred weight *per* acre. The price has alſo varied from 2*l.* to 7*l.* *per* cwt. The plants uſually ſtand three years, of which the firſt affords the ſmalleſt produce; and the ſecond the greateſt and beſt. When the ſame plants are continued beyond three years, the ground becomes foul, and the flowers weak. When dried, the flowers are packed in bags; and afterwards ſold to perſons in the neighbourhood, who tranſmit them to the druggiſts in London.

For the botanical character and medicinal properties of chamomile, ſee ANTHEMIS.

The incloſures of Derbyſhire are very numerous, and are annually extending. Within the laſt twenty or twenty-five years, more than one-fourth of the county has been incloſed, and the rent in many inſtances nearly doubled. The ſouthern part, and the wapentake, are almoſt wholly in this ſtate; but the grounds in the High Peak are chiefly open. The former diſtricts are tolerably well provided with timber, but in this reſpect the plantations of Kidleſton park are unrivalled by any in the county.

The manufactures which are carried on in Derbyſhire are various and extenſive. With Nottinghamſhire and Leiceſterſhire, it partakes in the manufacture of ſtockings; with Yorkſhire, in that of iron, and of woollen-cloth; and with Lancaſhire, in that of cotton. To theſe may be added the manufactures of ſilk and of Derbyſhire ſpar, the latter of which may be conſidered as peculiar to this county. The buſineſs of hoſiery is chiefly confined to the parts that border on Nottinghamſhire, and to Litton, near Tideſwell. The number of frames employed, including thoſe on which ſilk and cotton ſtockings are wrought, has been calculated at about 1350. Wool is moſtly manufactured in the High Peak, adjacent to Yorkſhire. Cotton is manufactured in different modes, and in various parts of the county; but the principal factories are at Cromford, Belpar, and Derby: in the former the cotton is prepared by the machine invented by the late ſir Richard Arkwright; from ſixteen to twenty machines, on the ſame model, are alſo employed in other parts of the county. The ſilk and ſpar manufactures are nearly confined to the town of Derby.

Beſides the ſources of labour derived from the branches of commerce above enumerated, the mines of lead, iron, calamine, and coal, afford employment to many inhabitants of this county. The lead mines conſtitute a conſiderable part of the natural riches of Derbyſhire, and ſome of them have probably been worked through a long ſucceſſion of ages: their produce was formerly of greater value than at preſent; as the veins become poorer, the deeper the mines are excavated. Camden imagined that Derbyſhire was alluded to by Pliny, where he ſays, "In Britain lead is found near the ſurface of the earth in ſuch abundance, that a law is made to limit the quantity that ſhall be gotten." However this may be, we have deciſive evidence that the Romans had lead works in this county, as ſeveral pigs of lead have been found with Roman inſcriptions. The firſt of theſe was diſcovered on Cromford Moor, in the year 1777, on which the following ſentence was legible: IMP. CAES. HADRIANI. AVG. MEI. LVI. That the lead mines of Derbyſhire were known to the Saxons, is apparent from the mine near Caſtleton, called *Odin*, from the name of one of their deities: the ſame circumſtance implies that it was opened previous to the introduction of Chriſtianity into Britain. It appears alſo, that there were lead mines in the wapentake of Wirkſworth, in the year 835; for at that period Kenewara, abbeſs of Repton, granted her eſtate at Wirceſworth to Humbert the alderman, on condition that he annually gave lead of the value of 300 ſhillings to archbiſhop Ceolnoth, for the uſe of Chriſt-Church, Canterbury. At the time of the Norman ſurvey, the buſineſs of the lead mines was undoubtedly carried on to a conſiderable extent, as no leſs than ſeven mines in this county are mentioned in the Domeſday book.

Veins of lead ore are diſtinguiſhed on account of their various poſitions in the earth, by the different names of pipe, rake, and flat works. Pipe-works lie between two rocks or ſtrata, yet ſeldom follow any regular inclination, but fill up fiſſures, the lines or branches running parallel to each other, and more or leſs horizontally. The veins are ſometimes twenty or thirty yards wide, and ſometimes not more than two inches: they moſt commonly have toad-ſtone in the vicinity, either above or below. Rake, or perpendicular veins, are found in the clefts and chaſms of the lime-ſtone; and conſequently, inſtead of extending uniformly between the ſame ſtrata, they follow the directions of the cavities, and ſometimes penetrate 150 or 200 yards into the earth. The flat-works bear a great reſemblance to the pipe; yet diſagree in ſome circumſtances. The principal leader or ſtem in the pipe is accompanied with many branches, but the flat has none; the latter ſpreads wider, yet ſeldom extends more than 100 yards. It is alſo found near the ſurface, and in the ſolid rock. The miners are divided in opinion whether the pipe or rake veins are moſt prevalent.

The greateſt impediments to working the mines are foul air, and water. To relieve them from the firſt, a pipe or tube is generally introduced down the ſhaft, and extended along the roof of the gallery, to the place where the work is carried on. To remove the water many adits, or, as they are here termed, ſoughs, have been driven from the bottom of ſome neighbouring valley, and made to communicate with various works by different channels or galleries. The longeſt adit in Derbyſhire is at Youlgrave, running from the Derwent to Alport, and called the Hilcar ſough. This coſt upwards of 50,000*l.* It relieves a conſiderable number of mines, and is nearly four miles in length. Another, and one of the moſt conſiderable at Wirkſworth, is called Cromford ſough. This is full two miles in length, and was driven at an expence of 30,000*l.*

The annual produce of lead from the Derbyſhire mines cannot be exactly aſcertained, but may be eſtimated at an average of between 5000 and 6000 tons. The trade has been generally conſidered to be on the decline, as the increaſe of depth renders the mines more difficult to be worked, as well as more expenſive; yet, from the improvements that have been made in the art of ſmelting, and the more effectual mode employed to relieve the mines from water, by the driving of

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new levels, and the erection of ſome improved fire-engines, advantages have been obtained, which, to a certain extent, counterbalance the augmented expences.

Iron-ſtone, or oxyd of iron, is found in this county in great abundance; it occurs throughout the whole diſtrict in which coal has been diſcovered, the Chinley hills excepted. The depth at which it lies from the ſurface is various, but frequently, from the great dipping of the ſtrata, it *baſſets* out *to-day*, as they here term it. In this caſe a hole is made like the ſhaft of a coal-pit, which is gradually enlarged as it is carried deeper, till the cavity aſſumes the ſhape of a bell. Theſe are ſeldom ſunk lower than eighteen or twenty yards; when at that depth freſh ground is broken, and new openings made, of ſimilar depth and form. From this practice the land receives greater injury by working iron mines, than thoſe of coal; and it is, therefore, not judged expedient to dig for iron ore, unleſs the beds are very rich. Their thickneſs varies from two to twelve inches. The quantity of iron annually produced in this county amounts to between fifteen and ſixteen thouſand tons. See IRON.

The chief places at which calamine is obtained, are Caſtleton, Cromford, Bonſall, and Wirkſworth. It occurs at various depths, but is generally found near a vein of lead ore: ſometimes the two minerals are mixed, or run a conſiderable way by the ſide of each other; but more frequently, one ceaſes where the other begins, and a good vein of both is never found in the ſame place. The quantity prepared annually in this county is about 500 tons. In the crude ſtate, its value is from three to four pounds a ton; but when refined, it is ſold at nine or ten pounds. By the various proceſſes it undergoes before it becomes ſaleable, it loſes about eight parts in twenty. See CALAMINE.

Coal was obtained in Derbyſhire ſo early as the reign of Edward II., both in the liberties of Norton and Alfreton. This is evinced by the grant made to the monks of Beauchief abbey by the lord of Alfreton, Thomas de Chaworth, who gave them licence to ſupply themſelves with this ſubſtance in any quantity they thought proper, from either of the above places. It is found at different depths, and in ſome ſituations ſeveral beds are perforated by one ſhaft; but the upper ones are of inferior quality, and ſeldom worked. Here, as in Cumberland, the vein of coal is frequently ſeparated, or broken, by ſome intervening ſubſtance, moſtly clay; and the coal on one ſide is ſometimes found lifted up or caſt down ten or twenty yards from its level, on the other. Beſides the home conſumption of coal, which is very great, large quantities are annually ſent to Sheffield; and by the different canals more is conveyed into Leiceſterſhire, Nottinghamſhire, Lincolnſhire, and Northamptonſhire.

Derbyſhire alſo abounds with metallic ores, foſſils, and various mineral ſubſtances; but it would exceed our limits to particularize all. Thoſe who wiſh for ſuch information are referred to Mawe's Mineralogy of Derbyſhire, and the Beauties of England and Wales, vol. iii.

The mineral and medicinal waters of Derbyſhire are, as might be expected in a country abounding with foſſils, numerous. All thoſe of a chalybeate and ſulphureous nature ariſe in beds of ſhale, and probably derive their impregnation from this ſubſtance; the warm ſprings alſo are obſerved to appear near theſe beds, though they break out in the ſtratum of lime-ſtone almoſt excluſively. The moſt celebrated warm ſprings are thoſe at Matlock and Buxton; they occur likewiſe at Stony Middleton; and Middleton, near Wirkſworth, had formerly a ſpring of this deſcription, which was cut off ſome years ſince by driving a ſough to remove the water from ſome lead mines in the vicinity. Thoſe of Matlock and Buxton have obtained much celebrity for their medicinal properties, and are annually viſited by a conſiderable afflux of company, who reſort to them as well for pleaſure as for health. The natural hiſtory of the Matlock and Buxton waters occupied much of the attention of the late Dr. Darwin, whoſe death has deprived ſociety of one of its moſt valuable members, and ſcience of one of her moſt diſtinguiſhed ſons. His principal obſervations on this ſubject were contained in a letter written to the Rev. Mr. Pilkington, and publiſhed in the "View of Derbyſhire." Among the arguments which have been adduced reſpecting the origin of warm ſprings, the doctor favours the following: "That the water of theſe ſprings is raiſed in vapour by ſubterraneous fires deep in the earth, and that this vapour is condenſed under the ſurface of the mountains in the vicinity of ſprings."

Amongſt the ſulphureous waters of Derbyſhire, that which is higheſt in repute riſes in the park of lord Scarſdale, at Kidleſton. In a glaſs it looks very clear and tranſparent; but in the well it appears of a blackiſh blue colour, tinged with purple, and any ſubſtance thrown into it aſſumes the ſame appearance. It is principally valued for its antiſcorbutic qualities. When taken inwardly it acts as a diuretic, and has given relief to perſons afflicted with the gravel. It has alſo been found efficacious, from external application, in various cutaneous diſeaſes, but more eſpecially in ulcerous complaints. The temperature of the ſpring is about forty-ſeven degrees. Several other ſulphureous ſprings riſe in different parts of the county, but have hitherto undergone very little examination.

The chalybeate waters are numerous, but the moſt celebrated ſpring of this nature is at Quarndon, about three miles from Derby. Perſons of a weak and relaxed habit have been much benefited by its uſe: when taken in ſufficient quantity, it generally operates as a cathartic; yet to produce this effect, exerciſe is ſometimes neceſſary. Its temperature is nearly forty-nine and an half. Within 200 yards of the warm ſpring at Buxton, there is a chalybeate water of properties nearly ſimilar to that at Quarndon. Other chalybeate waters are found at Morley, Cheſterfield, Tibſhelf, Duffield, and Bradley.

In the liberty of Heage, about midway between Crich and Belpar, is a martial vitriolic ſpring, the only one that has yet been found in this county. It is ſituated in a black boggy ſoil, and was accidentally diſcovered about thirty-ſix years ago.

The principal rivers of this county are the Trent, the Derwent, the Dove, the Wye, the Errewaſh, and the Rother.

Derbyſhire is ſituated in the dioceſe of Lichfield and Coventry, and ſends four members to parliament, *viz.* two for the county, and two for the county-town. Pilkington's View of Derbyſhire, 2 vols. 8vo. Mawe's Mineralogy of Derbyſhire, 2 vols. 8vo. Beauties of England and Wales, vol. iii.

DERBYSHIRE *Spar*. See FLUOR-SPAR.

DERCETO, or ATERGATIS, in *Mythology*, a Syrian goddeſs, ſuppoſed, by many learned perſons, to be the ſame with *Aſtarte*. See ASTARTE, and ATERGATIS.

DERDER, in the *Materia Medica of the Ancients*, a name uſed by Avicenna and Serapion, to expreſs the common elm, whoſe bark they uſed on many occaſions.

DERE, or DIRE, in *Ancient Geography*, a maritime town of Ethiopia, ſituated on a promontory of the ſame name, at the entrance of the Arabic gulf, now cape *Bab-el-Mandeb*.

DEREA, a town of the Peloponneſus, in Arcadia. Steph. Byz.

DEREFELD, in our *Old Writers*, is uſed for a park, *q. d.* a field of deer.

DEREGE, in *Geography*, an iſland of the Red ſea: low and covered with graſs; but round like a ſhield, whence its name. It lies between the ports of Sibt and Djezan.

DEREHAM, East, or *Market-Dereham*, is a market town and pariſh in the hundred of Midford in the county of Norfolk. It is 16 miles from Norwich, and 101 north-eaſt from London. In the year 1801, it contained 518 houſes, and 2505 inhabitants. This place has ſuſtained conſiderable injury by fires; firſt in the year 1581, when nearly the whole town was deſtroyed; and again in 1679, when about 20,000 *l.* worth of property was conſumed. The houſes ſince built have been rendered more commodious, and the town by paving, &c. more pleaſant. A nunnery is ſaid to have been founded here in 700, and deſtroyed by the Danes in 974. The manor is called Dereham-Reginæ, and is inveſted in the crown. Here are a weekly market on Friday, and two annual fairs. The pariſh-church is an ancient building: and contains ſome curious relics. William Cowper, the poet, was buried here in 1800. In the town are three modern meeting houſes. Blomefield's Hiſtory of Norfolk.

DEREIGNMENT, or Deraignment, in *Law*. The ſubſtantive dereinment is ſometimes uſed in the ſame ſenſe with the French defrayer or defranger; that is, to diſplace or ſet out of order. Thus we find deraignment or departure out of religion, ann. 31 Hen. VIII. c. 6. and 5 and 6 Edw. 6. c. 13. Thus alſo we meet with dereinment or diſcharge of their profeſſion, 35 Henry VIII. cap. 29. which is ſaid of thoſe religious men who forſook their orders or profeſſion. See Kitchin, fol. 152. The leſſee enters into religion, and afterwards is deraigned. And Briton, c. 21. uſes ſemonenſe defrenable, for a ſummons that may be challenged as defective, or not lawfully made. Skene, De Verb. Signific. verbo diſrationare, makes it ſignify what we call waging and making of law.

DERELICTS, from *de*, and *relinquo*, I leave, in the *Civil Law*, are ſuch goods as are wilfully thrown away, or relinquiſhed by the owner.

Derelict is alſo applied to ſuch lands, as the ſea receding from, leaves dry, and fit for cultivation.

If they are left by a gradual receſs of the ſea, they are adjudged to belong to the owner of the adjoining lands: but when an iſland is formed in the ſea, or a large quantity of new land appears, ſuch derelict lands belong to the king. See on this ſubject the article Alluvion.

DERELSIDE, in *Botany*, a name by which ſome authors have called the tamarind-tree. Alpin Egypt. p. 328.

DEREMISTÆ, in *Ancient Geography*, the name of a people who inhabited the interior of Illyria.

DEREMMA, a town of Aſia, in Meſopotamia.

DERENBURG, in *Geography*. See Dernbourg.

DERENPERG, a town of Germany, in the archduchy of Auſtria; three miles S. of Ebenfurth.

DEREON, in *Ancient Geography*, a ſmall place of Thrace, upon the Euxine ſea, at the extremity of Macron-Tychos.

DERETINI, a people of Illyria, placed by Ptolemy in Dalmatia.

DEREVIANNOE, in *Geography*, a town of Ruſſia, in the province of Uſting, on the Vitchegda; 76 miles E. of Uſt Siſolſk.—Alſo, a town of Ruſſia, in the government of Olonetz, on the W. coaſt of lake Olonetz; 12 miles S. of Petrovadſk.

DE REVOCATIONE Parliamenti, the name of a writ for recalling a parliament. Thus in 5 Edw. III. the parliament being ſummoned, was recalled by ſuch a writ before it met. Vide Pryn's Animad. on the 4 Inſt. f. 44.

DEREWNEA, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 42 miles E. N. E. of Novogrodek.

DEREYN, or Deraign, diſrationare vel dirationare, in our *Old Laws*, is generally uſed for the act of proving: thus we find dirationabit jus ſuum hæres propinquior. Glanv. lib. ii. c. 6. And, dirationavit terram illam in curia mea. Id. lib ii. c. 20. Bracton uſes it in the ſame ſenſe. Habeo ſufficientem diſratiocinationem et probationem, lib. iv. tract 6. c. 16. And ſo he makes uſe of diſrationare, lib. iv. c. 22. And we find to dereyn the warranty in Old Nat. Br. fol. 146. To deraign that right, 3 Edw. I. c. 4, and. Weſtmin. tom. ii. c. 5. When the parſon of any church is diſturbed to demand tithes in the next pariſh, by a writ of indicavit, the patron ſhall have a writ to demand the advowſon of the tithes, being in demand; and when it is deraigned, then ſhall the plea paſs in the court Chriſtian, as far forth as it is deraigned in the king's court.

DERG, in *Geography*, a river of Ireland, which riſes in the county of Donegal, and having paſſed through a lake of the ſame name, enters the ſouth-weſtern angle of Tyrone, and after a courſe of a few miles, unites its waters to thoſe of the Mourne.

Derg, *Lough*, a lake of Ireland, in the ſouthern part of the county of Donegal, which contains ſeveral iſlands, one of which is remarkable for St. Patrick's purgatory. This iſland is but 126 yards long by 44 broad, and the cave, which is called the purgatory, is 16 feet and a half by two wide, and ſo low that a tall man cannot ſtand erect in it. It holds exactly nine perſons; and a tenth could not remain in it without great inconvenience. The floor is the natural rock, and the whole is covered with large ſtones and ſods. It was imagined in the dark ages, that "whoever repented and was armed with true faith, and entering that pit continued there a night and a day, ſhould be purged from all his ſins, and alſo during his abode there, ſhould not only ſee the pains of the damned, but the joys of the bleſſed." There were alſo in the iſland a monaſtery for regular canons of St. Auſtin, ſeven chapels, and ſix churches dedicated to St. Patrick and other ſaints. The cell was demoliſhed in 1497, by order of pope Alexander VI., and in 1630, the lords juſtices ordered it to be broken open; the monks were driven away; and it was left in ruins. The place, however, ſtill continues to be frequented in the month of May, June, and July. This iſland, the lake, and river, are all ſuppoſed by ſome antiquaries to have derived their name from *dearg* or *dirg*, a cave, and the cave to be ſpoken of in the Puranas of the Indian Bramins. Mr. Wilford conſiders Ireland as the Suvarneya of the Puranas. Suvarneya was from the earlieſt periods conſidered as the abode of the Pitris (*i. e.* fathers or manes). A place where the pitris could be ſeen, is poſitively declared to be a narrow cave in a ſmall iſland in a lake, the waters of which were bitter. In it was the entrance of the Dirghe, or long paſſage into the infernal regions, which is often mentioned in the Puranas. The name Dirghe, and the deſcription of the cave, certainly much reſemble that in Ireland, whilſt the change of Pitris to Patricius is leſs difficult than many changes which have occurred in proper names. Still it ſeems incredible that Ireland ſhould have been known to the Indians, and connected in any way with their fables. Ware and other antiquarians maintain the Pagan origin of the ceremony, and Dr. Ledwich, who denies that ſuch a perſon as St. Patrick ever exiſted, ſuppoſes the ſtory of the cave to be "a pagan tale of purgatory trumped up with every circumſtance that could work on the hopes and fears" of the Iriſh, ſo as to render them more obedient to papal authority. Here then the learned doctor

and his reſpectable antagoniſt (general Vallancey) are not much at variance, could the former admit the oriental origin of what both conſider as a relict of paganiſm. The moſt diſcouraging circumſtance attending diſcuſſions of this kind, is, that as on one hand, after much labour employed in inveſtigation, certainty cannot be attained, ſo on the other, if it could, it would be attended with no practical benefit. For, of what conſequence is it, whether the purgatory were an eaſtern or weſtern fable; whether it originated with a real St. Patrick, or was a fiction of a later age. Ledwiche's Antiquities of Ireland, Vallancey's Proſpectus of a Dictionary of the Iriſh Language.

DERGHAS, a town of Perſia, in the province of Segeſtan; 120 miles E S.E. of Zareng.

DERGUY, Le, a town of France, in the department of the Aveiron, and diſtrict of Rodez; 5 leagues S. of Rodez.

DERHAM, William, in *Biography*, a celebrated divine of the church of England, was born at Stowton, near Worceſter, in the year 1657. The elementary parts of his education he had at Blockley, but he purſued the ſtudies preparatory to his profeſſion at Trinity college, Oxford. Here he diſtinguiſhed himſelf by his induſtry and talents. In 1681, as ſoon as he had taken orders, he was appointed chaplain to lady dowager Grey Warke, and in the following year he was preſented to the vicarage of Wargrave, in Berkſhire, and in 1689 to the more valuable living of Upminſter in Eſſex. In this place he applied himſelf, with great ardour, to the purſuit of natural ſcience, in which he afterwards greatly excelled. He was ſoon noticed by the ſcholars of the age, and introduced to the Royal Society, of which he proved one of the moſt uſeful members. Among his earlieſt publications was "The Artificial Clock-Maker, a Treatiſe on Watch and Clock-Work, &c." which has gone through many editions. In the years 1711 and 1712, he was appointed preacher at Mr. Boyle's lecture, and in the following year he publiſhed, in a new form, the ſermons he had delivered, under the title of "Phyſico-Theology, or Demonſtration of the Being and Attributes of God from his works of Creation." This was followed by a work, having the ſame deſign in view, entitled "Aſtro-Theology, or a Demonſtration of the Being and Attributes of God, from a Survey of the Heavens." Theſe volumes are too well known to require from us any particular account of their contents. Few books can be put into the hands of young perſons with greater advantage. Upon the acceſſion of George I., Mr. Derham was made chaplain to his majeſty, and ſoon after appointed one of the canons of Windſor. In the year 1730, the degree of doctor of divinity was conferred on him by the univerſity of Oxford. The other works of Dr. Derham were entitled to the applauſe of every friend to virtue and religion. He lived highly reſpected and eſteemed by his contemporaries, and has obtained for himſelf an unfading reputation. He died in the year 1735, and was buried at Upminſter. As a preacher, he is ſaid not to have excelled; his perſon was rather deformed, and his manner and delivery ungraceful, but his life and labours were rendered highly ſubſervient to the intereſt of religion and unfeigned piety. Biog. Brit.

DERIBIA, in *Ancient Geography*, a town of Aſia Minor, in Lycaonia, which had been epiſcopal under the metropolis of Iconium.

DERIVATIO, in *Rhetoric*, is a figure in which words that are derived from the ſame root come together in the ſame ſentence. The figure is repeated in the following example: "He wiſhed rather to die a preſent death, than to live a miſerable life."

DERIVATION, from *de*, and *rivus*, *a ſtream*, in *Grammar*, the affinity one word has with another, by having been originally formed from it.

Derivation, in *Phyſiology*, the drawing of a humour from one part of the body to another. It was ſuppoſed by the ancients that diſeaſes aroſe from humours flowing into and variouſly affecting the diſeaſed parts; and, conſequently, that the mode of cure conſiſted in removing ſuch humours. This they attempted, in various inſtances, by indirect means, as the application of bliſters to neighbouring parts, &c. The operation of ſuch curative methods was referred to the principle of derivation: humours in the head were ſaid to be drawn out by bliſters in the neck; and the diſcharges by the kidnies, inteſtines, and ſkin, were all conſidered as ſo many outlets by which noxious humours could be expelled. The more correct views of the animal economy entertained by modern phyſiologiſts have baniſhed all thoſe viſionary notions, which are to be regarded as mere flights of fancy, and totally unſupported by either facts or reaſoning. The humoral pathology has been entirely overthrown, and the ideas of derivation, founded on that ſyſtem, have, of courſe, fallen with it. Yet the vaſcular ſyſtem ſeems to be ſubject to an influence, which may be denominated that of derivation. Where the blood-veſſels of different parts communicate together, the removal of blood from one ſet has a powerful operation in emptying the others; and ſeveral experiments ſeem to prove that this influence is much more active than we ſhould have ſuppoſed. (See the article Circulation.) This is an important point in practice, as the utility of local blood letting depends on it. This is ſtrictly local only in affections of the ſkin; in all other inſtances the blood is drawn from veſſels connected with thoſe of the diſeaſed organ; and the latter can only be influenced by the way of derivation. Thus it is, that opening the temporal artery acts in affections of the eye and brain; cupping the head or neck in diſeaſes of the brain, &c.

Derivation. See Angle.

DERIVATIVE, in *Grammar*, a word which takes its origin from another word, called its *primitive*.

Such is the word derivative itſelf, which takes its origin from the primitive *rivus*, a rivulet, or channel, out of which leſſer ſtreams are drawn; and thus *manhood*, *deity*, *lawyer*, &c. are derived from *man*, *deus*, *law*, &c.

Derivative, or *Secondary Conveyances*, in *Law*, are thoſe which preſuppoſe ſome other conveyance precedent, and only ſerve to enlarge, confirm, alter, reſtrain, reſtore, or transfer the intereſt granted by ſuch original conveyance. Theſe are *releaſe*, *confirmation*, *ſurrender*, *aſſignment*, and *defeazance*.

Derivative *Mountains*, or *ſtrata*, in *Geology*, according to Mr. Kirwan (Geol. Eſſ. 226.) are ſuch as, being formed ſubſequently to the production of organic ſubſtances, originated from diſintegration, and the principal character by which ſuch are diſtinguiſhed, conſiſts in their exhibiting vegetable ſubſtances, or petrifactions, or land-ſhells, as thoſe of ſnails, or fluviatile ſhells, with either none, or ſcarce any, marine remains: the futility of theſe diſtinctions a writer in the article Colliery has endeavoured to ſhew.

DERKUL, in *Geography*, a river of Ruſſia, which runs into the Donetz; 36 miles S. of Bielovodſk.

DERMA, in *Anatomy*, a name given to the cutis, or true ſkin. It is derived from δερω, *I excoriate*. See Integuments.

DERMATO-LOGIA, a diſcourſe on the ſubject of the ſkin; from δερμα, *the ſkin*, and λογος, *a diſcourſe*.

DERMATODEA, in *Botany*, Ventenat Tabl. v. 2. 34. A genus formed by Ventenat of the *Lichen caninus*, and

and its near allies (Dill. Muſc. t. 27, 28. f. 102—109.) called by Acharius *Peltidea*. The former erroneouſly comprehends *L. pulmonarius* under this genus, which is otherwiſe tolerably natural, and will probably be retained under its Acharian name.

DERMBACH, or THERMBACH, in *Geography*, a ſmall and anciently fortified town of Germany, in the biſhopric of Fulda, and circle of the Upper Rhine, which now belongs to the new kingdom of Weſtphalia.

DERMESTES, in *Entomology*, a genus of coleoptera. Theſe have the antennæ clavate, the club perfoliated, and three of the joints thicker than the others: the thorax convex and ſlightly margined: head inflected and concealed under the thorax. Linn. Gmelin divides the dermeſtes genus into two families; the firſt including thoſe with the jaw biſid, the other ſuch as have the jaw armed, with a ſingle tooth. In the Entomologia Britannica of Marſham they conſtitute three families, one of which is diſtinguiſhed by having the body oblong; the two other have the body ovate, but one has the extreme joint of the antennæ obtuſe, and the other rather pointed. The Linnæan genus dermeſtes contains a number of inſects, deſcribed by Thunberg under the title of Anobium, and of the Ips of Olivier, and Ligniperda of Pallas. Fabricius forms ſeveral genera of the Linnæan dermeſtes.

The greater number of the dermeſtes tribe ſubſiſt in the larva ſtate on the dried ſkins of animals, and indeed on almoſt any kind of animal ſubſtances; they are exceedingly deſtructive to leather, and alſo to timber, and ſome of the ſpecies are too well known from the havoc they occaſion among books and furniture. A few kinds are found on flowers.

Species.

LARDARIUS. Black; anterior part of the wing-caſes cinereous, with a black dot on each. Linn., &c.

It is this inſect chiefly that infeſts the dried ſkins, and other preparations of animals, birds, &c. preſerved in muſeums; and it is alſo found in old bacon, and other animal ſubſtances. The larva is oval and hairy, and it is in this ſtate the inſect does miſchief.

ELONGATUS. Black; wing caſes at the baſe and poſterior band livid; antennæ and legs ferruginous. Linn. Fn. Suec. Native of Europe.

UNDATUS. Oblong and black; wing-caſes with a double white waved band. Linn. Oliv. Found chiefly in rotten animal ſubſtances in Europe.

PELLIO. Black; a white ſpot on each wing-caſe. Linn. Donov. Brit. Inſ. *Dermeſtes bipunctatus*, Degeer.

The larva of this kind is oblong, and hairy, with the tail briſtly; its manners of life are ſimilar to thoſe of dermeſtes lardarius; and it likewiſe inhabits Europe.

MACELLARIUS. Black, ſmooth; legs pitchy. Fabr. Reſembles D. lardarius, and is found in Germany.

CADAVERINUS. Black; mouth ferruginous. Fabr. Found in St. Helens; the antennæ are brown with the club ferruginous, and the abdomen cinereous beneath.

CARNIVORUS. Black; anterior part of the wing-caſes teſtaceous; abdomen white. Fabr.

Inhabits New Holland and New Zealand. The antennæ are brown, with the club ferruginous; head and thorax black, at the ſides grey; legs black.

TRIFASCIATUS. Ovate and black; wing-caſes with three waved cinereous bands. Fabr. *Byrrhus fuſcus*, &c. Geoffr.

Inhabits Europe. The margin of the thorax in this ſpecies is cinereous at the baſe, and the wing-caſes marked with a cinereous dot at the tip.

20. GUTTATUS. Oblong, and black with twenty white dots. Fabr.

Found in Saxony. Nine of the white dots are diſpoſed on each of the wing caſes, and one on each ſide of the thorax.

BICOLOR. Oblong and black, beneath teſtaceous; wing-caſes ſtriated. Fabr. Inhabits Germany.

DOMESTICUS. Black; wing-caſes greyiſh with black margin; thorax villous. Linn. Fn. Suec. Native of Europe.

VIOLACEUS. Blueiſh-black; thorax downy; Linn. Fn. Suec. *Clerus nigrocæruleus*. Geoff.

Frequent in decayed animal ſubſtances, and ſometimes found on flowers. A native of Europe.

RUFIPES. Blueiſh-black; thorax downy; legs rufous. Fabr. *Anobium rufipes*, Thunb.

Found in Africa, and ſeems to be a variety of dermeſtes violaceus.

RUFICOLLIS. Violaceous; thorax and wing-caſes rufous at the baſe. Fabr. Native of Africa and India.

CÆRULEUS. Blue, hairy, and linear. Fabr. *Anobium cæruleum*, Thunb. Found in the Cape of Good Hope.

HIRTUS. Deep black, and hairy. Gmel. *Lagria atra*, Fabr. Native of Europe.

FENESTRALIS. Cheſnut; head blackiſh; thorax fuſcous. Linn. *Byrrhus feneſtralis*, Müll.

Commonly found crawling on the frames of windows in the northern parts of Europe.

VULPINUS. Oblong, ſmooth, and black; ſides of the thorax cinereous downy; beneath whitiſh. Fabr. Native of the Cape of Good Hope.

FELINUS. Oblong, cinereous, downy and immaculate. Fabr.

Found in Van Diemen's land, and is nearly allied to the ſpecies Vulpinus.

MURINUS. Oblong, downy, black and white clouded; abdomen ſnowy. Fabr.

The larva is brown with the mouth deep black; and is frequent in rotten animal ſubſtances.

TESSELLATUS. Oblong and downy, fuſcous and cinereous clouded; abdomen fuſcous. Fabr.

NAVALIS. Elongated; ferruginous brown, with the eyes black. Fabr. Native of New Zealand.

SCABER. Greyiſh; thorax and wing-caſes ſcabrous. Fabr. Inhabits the ſame country as the former.

TESTACEUS. Oblong, teſtaceous; eyes and abdomen at the baſe black. Fabr. Native of Holland.

FUMATUS. Oblong teſtaceous; eyes black. Linn. Fn. Suec. *Dermeſtes roſæ*, Scop. Found on flowers in Europe.

PICIPES. Oblong blackiſh; legs pitchy. Fabr. Inhabits Saxony.

CHINENSIS. Oblong ferruginous; wing-caſes ſtriated. Fabr. Found in ſeeds brought from China.

PANICEUS. Oblong ferruginous; eyes rufous. Linn. Fn. Suec. Larva ovate, white and gloſſy. Inhabits Sweden.

FERRUGINEUS. Oblong ferruginous, and nearly cylindrical; wing-caſes abbreviated. Linn. Fn. Suec.

EUSTATIUS. Deep black, gloſſy, and very obtuſe; leſs ferruginous. Gmel. Found on fungi in the iſle of St. Euſtatius.

PEDICULARIUS. Oblong teſtaceous; wing-caſes abbreviated. Linn. Fn. Suec. Frequent on flowers in Europe.

FUSCUS. Oblong, villous, fuſcous and immaculate. Fabr. Inhabits Saxony.

TOMENTOSUS. Oblong, villous and grey; head with two brown dots. Fabr. Found in England and other parts of Europe.

SANGUI-

SANGUINICOLLIS. Elongated, hairy and violaceous; thorax and abdomen rufous. Fabr. Native of Saxony.

LIMBATUS. Fuſcous; wing-caſes dotted; border cinereous. Fabr. A ſmall ſpecies found in New Zealand.

SCANICUS. Deep black; thorax and two dots on the wing-caſes teſtaceous. Fabr. Inhabits Germany and Sweden.

COLON. Thorax at the ſides yellow; wing-caſes grey, with a black dot. Found in Europe.

SURINAMENSIS. Teſtaceous; wing-caſes ſtriated; thorax with three elevated ſtriæ, and margin denticulated. Gmel. Rolander, &c.

This is of a very ſmall ſize and oblong form, and inhabits Siberia and Surinam.

HEMIPTERUS. Wing-caſes abbreviated; exterior baſe, with the tip teſtaceous. Roland.

About the ſame ſize, and inhabits the ſame country as the preceding.

BIFASCIATUS. Black; wing-caſes with two waved yellow ſtreaks; thorax teſſellated with cinereous. Thunb. Native of the Cape of Good Hope.

INTERRUPTUS. Black; band at the baſe of the wing-caſes red and interrupted. Thunb.

BIPUSTULATUS. Deep black and gloſſy; head, thorax, and dot at the baſe of the wing-caſes red. Thunb.

MARGINATUS. Black; thorax at the ſides, breaſt, and inciſures of the abdomen white. Thunb.

PICEUS. Entirely ferruginous; wing-caſes ſtriated. Thunb. Native of the Cape of Good Hope.

CAPENSIS. Deep black and hairy; wing-caſes flexile and violet, with two white bands. *Anobium capenſe*, Thunb. A ſmall ſpecies found in the ſame country as the former.

CAFER. Black and glabrous; wing-caſes with two yellowiſh bands. Gmel. *Anobium bifaſciatum*, Thunb. Native of the Cape of Good Hope.

VIRIDIS. Green and hairy; legs red. Thunb. Native of India and Africa.

FIMETARIUS. Yellowiſh brown; thorax margined; antennæ and legs bay. Herbſt. Found on dung and flowers near Berlin.

CELLARIS. Browniſh; antennæ long; wing-caſes ſtriated. Scop. Found in Germany.

LONGICORNIS. Fuſcous; antennæ long; thorax excavated in the middle; wing-caſes dotted. Herbſt. Inhabits near Berlin, and is nearly allied to the latter.

FLAVESCENS. Ferruginous, beneath yellowiſh; head duſky; eyes black; thorax rounded. Schranck. Inhabits near Bavaria.

FULVIPES. Deep black, oblong; wing-caſes dotted; legs fulvous. Schranck. Gmel. &c.

SULCATUS. Fuſcous red; eyes black; wing-caſes ſulcated and dotted. Thunb. Native of Sweden.

FENESTRATUS. Fuſcous; wing-caſes with ſixteen pale ſpots; all the ſhanks ſpinous. Thunb. Found near Upſal.

RUBER. Red, thorax gloſſy, ferruginous black, with the ſides rufous. Thunb. A very ſmall ſpecies. Inhabits Upſal.

LINEARIS. Body and wing-caſes linear and ferruginous; head and thorax fuſcous. Thunb.

ATER. Black and ſhining; wing-caſes finely punctated; Thunb. Size of a ſmall coccinella. Found near Upſal.

BIPUSTULATUS. Black; head and thorax red; wing-caſes black with a red ſpot at the baſe. Thunb.

FASCIATUS. Black; wing-caſes with two yellowiſh waved bands of yellow. Thunb.

MURICATUS. Wing-caſes reticulated, behind retuſe and denticulated; thorax muricated and gibbous. Gmel. *Ligniperda terebrans*, Pallas. Found on the ſugar-cane in South America.

HAMATUS. Wing-caſes before the tip armed with a ſingle ſpine; anterior edge of the thorax furniſhed with two hooks, and dentated. Lives in decayed wood in Saxony.

MONACHUS. Wing-caſes obtuſe; thorax gibbous and truncated. Fabr.. *Ligniperda cornuta*, Pallas. Found on wood in South America.

JESUITA. Wing-caſes entire, and variolous; thorax truncated in front. Fabr. Native of New Holland.

INDICUS. Wing-caſes entire, and black; anterior part of the thorax ſcabrous. A ſmall ſpecies found in Coromandel.

MINUTUS. Black; wing-caſes entire, and pitchy; anterior part of the thorax ſcabrous. Fabr. Native of New Zealand.

EXILIS. Wing-caſes entire and pale, the whole margin black. Fabr. Found in Germany,

VILLOSUS. Thorax villous; wing-caſes entire and fuſcous. Fabr. Native of Saxony.

PALLIPES. Oblong, flat, deep black and gloſſy; antennæ and legs teſtaceous. Fabr.

LUNATUS. Oblong, and black; a cinereous lunule on the back of the wing-caſes. Fabr. A ſmall ſpecies found under the bark of trees in Sweden.

RUFICORNIS. Fuſcous; head retracted; antennæ and legs rufous. Linn. Native of Europe.

RUFIPES. Black; wing-caſes ſtriated; ſhanks and feet rufous. Marſh. Ent. Brit.

FLAVESCENS. Teſtaceous and downy; eyes black. Marſh. Ent. Brit.

4-MACULATUS. Black; wing-caſes with two black ſpots on each. Marſh. Ent. Brit.

SORDIDUS. Dull pitchy; head black; wing-caſes ſtriated. Marſh. Ent. Brit.

ATRICAPILLUS. Teſtaceous rufous; head deep black; wing-caſes teſtaceous and ſtriated. Marſh. Ent. Brit.

CONVEXUS. Black; head and thorax convex. Marſh. Ent. Brit.

CONCINNUS. Deep black and ſhining; thorax and margin of the wing-caſes teſtaceous. Marſh. Ent. Brit.

HYPOMELANUS. Rufous; abdomen black. Marſh. Ent. Brit.

CASTANEUS. Deep black; wing-caſes cheſnut. Marſh. Ent. Brit.

PALLIDUS. Teſtaceous and pubeſcent; wing-caſes punctured. Marſh. Ent. Brit.

DERMONES, in *Ancient Geography*, a people of Interior Libya.

DERNBACH, in *Geography*, a ſmall town of the grand duchy of Heſſe Darmſtadt, in Germany, in the circle of the Upper Rhine, nine miles of Marpurg.

DERNBURG, or DERENBURG, a ſmall town of Germany, in the principality of Halberſtadt, on the river Holtzemme; ſix miles S.W. of Halberſtadt. It now belongs to the new kingdom of Weſtphalia.

DERNE, probably *Derrhis extrema*, according to Strabo and Ptolemy, a town of Africa, and capital of a diſtrict of the ſame name, in the country of Tripoly, near the coaſt of the Mediterranean: the reſidence of a Sangiac. This place was formerly much more conſiderable than it is now, and it was built by the Moors, after they were driven out of Andaluſia. It ſtands about half a mile from the ſea, and is ſurrounded by ſome ſprings of ſweet water; ſo that it is a territory capable of bearing ſome corn and garden-ſtuff, nevertheleſs it is poorly inhabited. The diſtrict extends from cape Bomb eaſt, to the gulf of Benguſi weſt, above 100

leagues and ſtill farther inland. It is chiefly inhabited by wandering Arabs, to the amount of 30,000 families, who pay a ſmall tribute to the bey of Tripoly. It is almoſt every where covered with a kind of plant or ſhrub, which bears a downy leaf, and a yellow flower that blows the greateſt part of the year. The bees chiefly feed upon this flower, which gives an excellent taſte to their honey. N. lat. 32° 55′. E. long. 22° 55′.

DERNETAL. See DARNETAL.

DERNIER RESSORT, in *Law*, &c. See RESSORT.

Whatever power is committed by the king to any other, the dernier reſſort is ſtill remaining in himſelf; ſo that he may ſit in court and take cognizance of all cauſes: except in treaſons, and other caſes, where he himſelf is a party.

DERNIS, or DERNISCH, in *Geography*, a town and fortreſs of Dalmatia, ſituated on a mountain near the river Kerka, taken from the Turks by the Venetians in the year 1684.

DEROGATION, from *derogo*, an act contrary to the preceding one, and that annuls, deſtroys, and revokes it, either in whole, or part.

Derogations, in general terms, are not regarded in judicature; they muſt be in ſpecific, and in formal terms.

A new law imports a derogation of a former one: a ſecond teſtament is a derogation of a firſt.

DEROGATORY, a clauſe importing derogation.

By the French law, if a perſon own himſelf indebted in a certain ſum; notwithſtanding any quittance he has obtained for the ſame, the act is derogatory.

DEROTE, in *Geography*, a town of Egypt, ſituated in an iſland formed by the canal between Cairo and Roſetta. N. lat. 30° 40′. E. long. 31° 44′.

DERPT. See DORPAT.

DERRA, a town of Arabia, in the country of Yemen; 46 miles S.E. of Loheia.

DERRHA, or DERRHINI, in *Ancient Geography*, a place of the Peloponneſus, in Laconia, which gave name to the temple of Diana Derrheatis. Steph. Byz. It was ſituated on mount Taygates, in the vicinity of the town of Lapithæa, according to Pauſanias. It had a ſtatue of Diana.—Alſo, a town of Macedonia, on the Thermæan gulf. Pliny.

DERRHÆ, a people of Arabia Felix. Ptolemy.

DERRHIMA, a town of Aſia, in Syria.

DERRHIS, a promontory of Africa, in Marmarica. See DERNE.

DERRICK, in *Ship Rigging*, a tackle uſed at the outer quarters of a mizen-yard, conſiſting of a double and ſingle block, connected by a fall: alſo, a diagonal ſhore, as a ſupport to ſheers; alſo, a ſingle ſpar, top-maſt, or boom, raiſed upright and ſupported by guys at the head, from whence hangs a tackle over the hatchway, the heel working in a ſocket of wood, faſtened on the deck.

DERRIK, in *Geography*, a town of Perſia, in the province of Ghilan, 150 miles N.W. of Reſhd.

DERRIS, in *Botany*, (δερρις, a ſkin, from the membranous legume,) Loureiro Cochinch. 432. Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth tubular, coloured, its border erect with five notches. *Cor.* papilionaceous; petals four, nearly equal in length; ſtandard ovate; wings oblong; keel lunate; all falcate at the baſe, and ſtanding on ſlender claws. *Stam.* Filaments 10, all connected into a ſheath, equal, ſhort; anthers of two round lobes. *Piſt.* Germen oblong, compreſſed; ſtyle equal to the ſtamens; ſtigma ſimple. *Peric.* Legume oblong, obtuſe, remarkably compreſſed, membranous, ſmooth. *Seed* one, oblong, flat.

Eſſ. Ch. Cal. with five notches, coloured. Petals with thread-ſhaped claws. Legume oblong, membranous.

1. D. *pinnata*. "Climbing. Leaves pinnate. Stalks many-flowered, lateral." Lour. A climbing ſhrub found in the woods of Cochinchina. Stem long, much branched, without thorns. Leaves alternately pinnate, of numerous ſmall leaflets, which are ovate-oblong, ſquare at the baſe, ſmooth, and entire. Flowers white. The root is red and fleſhy, and ſerves to ſupply the place of the betle nut, *areca*, being chewed by the natives of the country along with the aromatic leaf of the *piper betle*, in order to render the breath ſweet, and the lips red. Lour. 2. D. *trifoliata*. "Climbing. Leaves ternate. Cluſters long, axillary." Lour. Found in woods in the province of Canton, China, where it is called *Sān leâo táu*. Stem ſhrubby, climbing, branched, without thorns, ſpringing from a long, ſubdivided, fleſhy root. Leaves ternate, ovato-lanceolate, entire, ſmooth. Flowers in long axillary cluſters, with white calyx, as well as petals. Germen with the rudiments of two or three ſeeds. Lour.

DERRY. See LONDONDERRY.

DERRY. The name of an Iriſh biſhopric in the province of Armagh, which was conſtituted in the year 1158, and was firſt called Darrich. Its greateſt length is 47, and its greateſt breadth 43 Iriſh miles, including the greateſt part of Londonderry, with a part of Donegal and Tyrone. The biſhop's patronage is conſiderable, and his revenue is the greateſt, except the primacy, being ſaid to exceed 7000*l*. *per ann.* Amongſt thoſe who have filled the ſee was Dr. Nicholſon, the author of the hiſtorical libraries of England, Scotland, and Ireland, a prelate of great erudition. The ſee of Derry contains 659 000 acres, which are divided into 48 pariſhes. By unions theſe are reduced to 43 benefices, but it is to the honour of the dioceſe that there are 51 pariſh churches and 33 glebe houſes, whilſt there is only *one* entirely without glebe. Beaufort.

DERRY, a townſhip of America, in Pennſylvania, in the county of Dauphin, on the E. ſide of Swetara creek, two miles above its confluence with the Suſquehanna, famous for its cave; containing 1666 inhabitants.—Alſo, a townſhip of Pennſylvania, in the county of Mifflin, containing 1135 inhabitants.—Alſo, a townſhip in the county of Northumberland, containing 1570 inhabitants.—Alſo, a townſhip in the county of Weſtmoreland, containing 2093 inhabitants.

DERRY, *Dery*, or *Defry*, a river of North Wales, which runs into the ocean near Dolgelly, in Merionethſhire.

DERRYFIELD, a townſhip of America, in New Hampſhire, on the E. bank of Merrimack river, incorporated in 1751, and containing 557 inhabitants; 42 miles W. of Portſmouth.

DERSÆI, in *Ancient Geography*, a people of Thrace, N. of Abdera.

DERSENA, in *Geography*, a town of Perſia, in the province of Segeſtan; 228 miles S. W. of Zareng.

DERTHA, a town of Perſia, in the province of Segeſtan; 120 miles E. N. E. of Zareng.

DERTONA, or ZORTONA, in *Ancient Geography*, a town of Italy, taken poſſeſſion of by Alboin, king of the Lombards, in the year 370.

DERTOSA, or TORTOSA, a town of Hither Spain, ſituated at a ſmall diſtance from the mouth of the Iberus. It was a colony, and made municipal by Scipio. It was under the protection of Pan.

DERVAL, in *Geography*, a ſmall town of France, in the department of the Lower Loire, near Chateaubriant, 24 miles

miles S. of Rennes. t reckons 1553 inhabitants, and is the chief place of a canton, which upon a territorial extent of 235 kiliometres, compriſes ſix communes, and a population of 7078 individuals.

DERVENTIO, Derwent, a fortified town of the iſland of Albion, belonging to the Brigantes.

DERVERAGH Lough, or *Derrivarach*, a lake of Ireland, in the county of Weſtmeath, which is ſaid to be remarkable for its bream, and other fiſh. It receives the river Inny, and ſome ſmaller ſtreams, and its ſuperfluous water is diſcharged by the Inny which falls into the Shannon. On its banks was Fahatty, to which Mortimer, earl of March, who was the intended ſucceſſor of Richard II., retired on the depoſition of that prince. On a ſmall river, near this lake, was the celebrated abby of Multifernan, at which ſeveral meetings were held previous to the inſurrection of 1641.

DERVIS, or Dervich, a name given to a ſort of monks among the Turks, who lead a very auſtere life, and profeſs extreme poverty; though they are allowed to marry. The word is originally Perſian, דרוישׁ, ſignifying a beggar, or perſon who has nothing: and becauſe the religious, and particularly the followers of Mevelava, profeſs not to poſſeſs any thing, they call both the religious in general, and the Mevelavites in particular, Derviſes, or Derviches.

The Derviſes, called alſo Mevelavites, are a Mahometan order of religious; the chief, or founder whereof, was one Mevelava. They are now very numerous. Their chief monaſtery is that near Cogna in Natolia, where the general makes his reſidence, and where all the aſſemblies of the order are held; the other houſes being all dependent on this, by a privilege granted to this monaſtery under Ottoman I. Theſe Mevelavites or Mevlevis are cloiſtered, and live together in *Tekas*, or convents, though they have liberty to go out during their hours of recreation.

The Derviſes affect a great deal of modeſty, patience, humility, and charity. They always go bare legged, and open-breaſted, and frequently burn themſelves with hot irons, to inure themſelves to patience. They always faſt on Wedneſdays, eating nothing on thoſe days till after ſun-ſet. Tueſdays and Fridays they hold meetings, at which the ſuperior of the houſe preſides. One of them plays all the while on the flute, and the reſt dance, turning their bodies round and round with the greateſt ſwiftneſs imaginable. Long cuſtom to this exerciſe from their youth has brought them to ſuch a habitude, that it does not diſcompoſe them at all. This practice they obſerve with great ſtrictneſs, in memory of Mevelava their patriarch's turning miraculouſly round, as they pretend, for the ſpace of four days without any food or refreſhment, his companion Hamſa playing all the while on the flute: after which he fell into an extaſy, and therein received wonderful revelations for the eſtabliſhment of his order. They believe the flute an inſtrument conſecrated by Jacob, and the ſhepherds of the Old Teſtament, becauſe they ſang the praiſes of God upon them. They profeſs poverty, chaſtity, and obedience, and really obſerve them while they remain Derviſes; but if they chooſe to go out, and marry, they are always allowed.

Baron De Tott ſays, (Memoirs, vol. i.) that there are two kinds of theſe monks in Turkey, very diſtinct from each other, and equally remarkable. The difference betweeu them ariſes from the difference of the rules impoſed upon them by their reſpective founders. That of the "Mewliach or Mevlevi derviſes" is to turn round, as we have already obſerved, like whirligigs, to the ſound of ſoft muſic, and ſeek a holy intoxication in the giddineſs which muſt naturally reſult from this abſurd exerciſe, if the habit of thus turning round did not preſerve them from dizzineſs and drunkenneſs, which they have recourſe to the tavern to accompliſh The rule of the other monks, named "Tacta-Tepen (beaters of boards, which perhaps at firſt were their only inſtruments) is more melancholy, and has more barbarity. It conſiſts in walking, ſolemnly in a row, one after the other, round their chapel, and pronouncing the name of God, with a loud voice and much exertion, at each ſtroke on a drum, beaten for that purpoſe; the ſtrokes on which, growing gradually quicker, become at laſt ſo rapid, that theſe wretches are forced to undergo a violent labour of the lungs, and the moſt devout never cloſe the proceſſion without ſpitting blood. Their appearance is always ſad and ſurly; and theſe monks are ſo perſuaded of the ſanctity of their practice, and ſo certain of pleaſing heaven by their howling, that they never look on the reſt of mankind but with the moſt profound contempt. All the Turkiſh monks, ſays M. Peyſſonnel, in his ſtrictures on Tott's Memoirs (Mem. vol. ii. p. 192.) are divided into two orders: *viz.* the *Mevlevis* above deſcribed, and the *Bektachis*. The latter have no convents nor fixed habitations, but wander about through the country. They often attach themſelves to the great, and accompany the pachas in their travels: being kept by them in their houſes, and obtaining great confidence and influence. Many of theſe bektachis follow the army, when it takes the field; when the Janiſſaries make any change in their motion, one of theſe begins the march. On ſuch occaſions they have commonly their feet, legs, and a part of the body naked; over their ſhoulders they throw the ſkin of a tiger, lion, or ſome wild beaſt; and carry in their hand a pike, halbert, or battle-ax; and as they march, ſing verſes in praiſe of the *orta*, or regiment of Janiſſaries, and offer up prayers for the glory of religion, and the proſperity of the empire.

The generality of Derviſes are mountebanks: ſome apply themſelves to legerdemain, poſtures, &c. to amuſe the people, others give into ſorcery and magic: but all of them, contrary to Mahomet's precept, are ſaid to drink wine, brandy, and other ſtrong liquors, to give them the degree of gaiety their order requires.

Thoſe Derviſes who have aſſurance ſufficient to avail themſelves of the general ignorance of the Turks ſet up for prophets; and if the event juſtify the prediction which they hazard, they are held in great eſteem as ſaints; and even thoſe who, for want of ſucceſs, can only paſs for fools, find, nevertheleſs, admiſſion every where. Nothing can reſiſt their effrontery, nor exceed the impoſition they practiſe on the ſuperſtitious multitude. The fanaticiſm of the public obliges the moſt enlightened perſons to ſubmit: and the moſt eminent Turks can only get rid of this rabble by giving them money, which ſerves to make them more troubleſome and more inſolent.

Beſides their great ſaint Mevelava, there are other ſaints honoured in ſome particular monaſteries; as Kiderle, greatly revered in the monaſteries of Egypt, and held by ſome to be St. George; and by others, with more probability, the prophet Elias.

The Derviſes are great travellers; and, under pretence of preaching and propagating their faith, are continually paſſing from one place to another; on which account they have been frequently uſed as ſpies.

There are alſo Derviſes in Perſia, called in that country *Abdals*, *q. d. ſervants of God*. They lead a very penurious, auſtere life, and preach the Alcoran in the ſtreets, coffee-houſes, and wherever they can meet with auditors. The Perſian Derviſes retail little but fables to the people, and are in the utmoſt contempt among the men of ſenſe and letters.

There are in Egypt two or three kinds: thoſe that are

in convents, are in a manner of the religious order, and live retired; though there are of theſe ſome who travel and return again to their convents. Some take this character, and yet live with their families, and exerciſe their trades: of this kind are the dancing Derviſes at Damaſcus, who go once or twice a-week to a little uninhabited convent, and perform their extraordinary exerciſes; theſe alſo ſeem to be a good people: but there is a third ſort of them who travel about the country, and beg, or rather oblige people to give, for whenever they ſound their horn ſomething muſt be given them. The people of theſe orders, in Egypt, wear an octagonal badge, of a greeniſh white alabaſter, at their girdles, and a high ſtiff cap without any thing round it. Pococke's Egypt, p. 178.

DERUSIÆI, in *Ancient Geography*, a people of Aſia in the Perſide, according to Herodotus. Their ſituation is not preciſely aſcertained. Some geographers place them to the north of the Perſian gulf, between the river Tigris to the weſt, and the Choaſpes to the eaſt.

DERUYTER, in *Geography*, a poſt-town of America, in Chenango county, and ſtate of New York, S. of Cazenovia adjoining. It has 310 inhabitants.

DERWENT, a river in Cumberland, England, has its origin among the monſtrous craggs at the head of Borrowdale, and after pouring its foaming ſtream over various precipices, its current is enlarged by ſeveral ſiſter branches at the bottom of that romantic chaſm through which it is daſhed from rock to rock, till it flows into the Derwent lake. At the foot of this beautiful expanſe of water, it unites with the Greata, and afterwards meanders through an extenſive tract of meadow-land, till it reaches Baſſenthwaite water, through which it purſues its ſilent courſe, and at length emerges at Ouſebridge. Again confined in a rocky channel, it aſſumes a weſterly direction, and flows through a narrow vale to Cockermouth, whence, being joined by the waters of the Cocker, it paſſes through a more open country to the ſea, at Workington. The whole extent of this river affords varied and intereſting ſcenery. This river is navigable from its mouth in the Iriſh ſea for a ſhort diſtance, and veſſels are loaded in it with coals, brought down by ſeveral rail-ways from the mines in the neighbourhood of Workington.

DERWENT, a river in Derbyſhire, England, derives its ſource in the mountainous diſtrict of the High Peak, and is increaſed by various torrents which flow from the dreary waſte that ſurrounds its ſpring. Theſe unite near Hatherſage in one ſtream, which taking a ſouthern courſe, rather inclining eaſtward, emerges from its native wilds, and paſſing through Chatſworth park, has its current enlarged by the waters of the Wye. Theſe united rivers then animate the pleaſant vale of Darley, till their channel is ſuddenly ingulphed between thoſe lofty rocks, which in their winding receſſes incloſe the romantic ſcenery of Matlock Dale.

> ——————"Here the High Tor
> Rears its mighty head, along whoſe broad bold baſe
> Impatient Derwent foams, among the craggs
> Roaring impetuous, till his force all loſt,
> Gentle and ſtill, a deep and ſilent ſtream,
> He ſcarcely ſeems to move: o'er him the boughs
> Bend their green foliage, ſhivering with the wind,
> And dip into his ſurface."

Emerging through a high portal of rocks at Cromford, the ſtream then flows through ſeveral deep vallies, till entering the cultivated vale which extends to Derby, it turns to the eaſt, and flows into the Trent on the Leiceſterſhire border near Wilne. The temperature of the water of the Derwent is obſerved to be higher than that of moſt rivers, a circumſtance which is aſcribed to the numerous warm ſprings that mix with the current.

This river was navigable from the Trent at Wilden Ferry to the town of Derby; but on the completion of the Derby canal, which opens two other water communications with the Trent river, the property in this concern was purchaſed by the canal company, and the river navigation diſcontinued. (See CANAL.) A weir of ſtone, 100 yards long, is erected acroſs this river, about $\frac{1}{3}$ of a mile below Derby bridge, (which is an elegant ſtructure of ſtone with three large flat elliptical arches.) A ſough is laid under this weir and the wharfs, for $\frac{1}{4}$ of a mile in length, with a wooden trunk over Moorledge brook, for feeding the ſouthern part of the Derby canal, independent of the Derwent river, although the canal interſects the ſame, and barges can proceed up the courſe of the river to Darley.

DERWENT *River*, in Yorkſhire: this river is navigable from its efflux into the York Ouſe river, at Barnby, to the town of New Malton, a diſtance of about 37 miles: by this navigation, about 40,500 tons of coals are annually carried up to New Malton, of which more than 20,000 tons are for burning lime from the lower beds of the chalk ſtrata of Hurlock; earl Fitzwilliam's extenſive brick-kilns near this town alſo conſume conſiderable quantities of coal. See CANAL.

DERWENT, a river of *Van* DIEMEN'S *land*; which ſee.

DERWENT *Fells*, a mountain of England, in the county of Cumberland, celebrated for its mines of black lead, a little to the ſouth of Keſwick.

DERWENT *Water*, a lake of England, in the county of Cumberland, formed by the river Derwent, about four miles long, and rather more than one wide, including ſeveral ſmall iſlands, one of which is called Derwent; the northern part of the lake is very near Keſwick.

DERXENA, in *Ancient Geography*, a country of Aſia, in Armenia, towards the ſources of the Euphrates: it is called Xerxena by Strabo and Steph. Byz.

DERY. See DERRY.

DERYCK, or DERICK, PETER CORNELIUS, in *Biography*, a painter of portraits, landſcapes, and cattle, was born at Delft in 1568, and was a diſciple of Hubert Jacobs. In Italy, whither he went for farther improvement, he ſtudied the ſtyles of the moſt eminent maſters, and at laſt fixed on Baſſan as his model. In copying and deſigning he ſpent 15 years at Rome, Venice, and other cities of Italy, where he painted a great number of pictures of different ſizes. His portraits were much admired; but thoſe pictures, which were executed in the manner of Baſſan, were peculiarly commended for good deſign, firm and fine touch, and the ſpirit of thoſe animals, which he introduced in his compoſitions. His diſtinguiſhing excellence conſiſted in his imitation of the ſtyle, manner, and tint of colouring of Baſſan; which was ſo perfect that even good judges are often deceived by ſome of the pictures of Deryck. He died in 1630. Pilkington.

DESAGUADERO, in *Geography*, a river of Peru, in the province of Chucuito, formed by the termination of a kind of bay towards the S. part of the lake Titi-caca; over which is ſtill remaining the bridge of ruſhes invented by Capac Yupanqui, the fifth Inca, for tranſporting his army to the other ſide, in order to conquer the provinces of Collaſayo. The Deſaguadero is here between 80 and 100 yards in breadth, flowing with a very impetuous current, under a ſmooth and tranquil ſurface. The Inca ordered four large cables to be made of a kind of graſs, which covers the lofty heaths and mountains of that country; which cable was the foundation of the whole ſtructure. Two of theſe cables being laid acroſs the river, faſcines of ruſhes were faſtened together and laid acroſs them. On theſe

theſe two other cables were laid, and covered with other faſcines, ſecurely faſtened, and ſo arranged as to form a level ſurface; and by this means he procured a ſafe paſſage to his army. This bridge, which is about five yards in breadth, and $1\frac{1}{2}$ above the ſurface of the water, is carefully repaired, or rebuilt every ſix months, by the neighbouring provinces, in conformity to a law made by that Inea, and ſince often confirmed by the kings of Spain, on account of its great uſe; as it is the channel of intercourſe between the provinces ſeparated by the Deſaguadero.

DESAGULIERS, John Theophilus, in *Biography*, a divine and experimental philoſopher, was born at Rochelle in France, in the year 1683, but on account of the revocation of the edict of Nantz in 1685, he was at that early period of his life brought to England. He was initiated into the learned languages under his father, who afterwards ſent him to Chriſt-church, Oxford, where he took his degrees, and entered into deacon's orders in 1710; about the ſame time he ſucceeded Dr. Keil as lecturer in experimental philoſophy. In 1712, he removed to London, where he introduced the practice of delivering lectures in the ſciences, in which he continued, with much reputation and ſucceſs, until his death. He was, ſhortly after his removal to the metropolis, elected a fellow of the Royal Society, and in the year 1716, he was made chaplain to the duke of Chandos, who preſented him to the living of Edgware, and in the following year he had the honour of delivering a courſe of lectures before the king at Hampton Court. In this buſineſs he conducted himſelf ſo very ably, and ſo much to the ſatisfaction of his majeſty, that he promiſed him ſome preferment in the church by way of remuneration for his trouble. The moſt, however, that he obtained was a ſmall living in Norfolk, worth about 70*l. per annum*. From this period till his death, which happened in 1749, he was indefatigable in his experiments in natural philoſophy; many he exhibited before the Royal Society, and communicated to that learned body various valuable papers on mechanical and philoſophical ſubjects. He had taken his degree of doctor of laws at Oxford in the year 1718, and 1734 he publiſhed, in two volumes quarto, "A Courſe of Experimental Philoſophy." After this he edited Dr. Gregory's Elements of Catoptrics and Dioptrics. He next was called on to deliver his lectures, and exhibit his experiments before king George II. and the other branches of the royal family; for this he was rewarded with a living in Eſſex. He was likewiſe appointed chaplain to Frederic, prince of Wales. In the year 1742, he publiſhed a diſſertation on Electricity, which contained every thing that was known on the ſubject at that time, for which he gained a prize given by the academy of Bourdeaux. Dr. Deſaguliers tranſlated into the Engliſh from the Latin "Graveſande's Mathematical Elements of Natural Philoſophy," which were publiſhed in two volumes 4to. Notwithſtanding the diligence of this gentleman, and the notice taken of him by the learned and the great, he died in poverty, though, perhaps, this was exaggerated by the poet Cawthorne, who, ſpeaking of the neglected Deſaguliers, ſays,

> "How he, who taught two gracious kings to view
> All Boyle ennobled, and all Bacon knew,
> Died in a cell, without a friend to ſave,
> Without a guinea, and without a grave."
>
> Biog. Brit.

DESAIGNE, in *Geography*, a town of France, in the department of the Ardeche; $5\frac{1}{2}$ leagues N. of Privas.

DESANA, a town of Italy, in the lordſhip of Vercelli; 5 miles S.W. of Vercelli.

DESARENA, in *Ancient Geography*, a country of India, on this ſide of the Ganges, according to Arrian.

DESART, in *Geography*. See Desert.

Desart, in *Cookery*. See Dessert.

DESAULT, Peter, in *Biography*, a native of Bourdeaux, where he was admitted doctor in medicine, and where he acquired reputation as a practitioner in that art, the beginning of the laſt century, was author of ſeveral uſeful practical works, which are ſtill ſought for: "Nouvelles decouvertes concernant la ſeinte, et les maladies les plus frequentes," Paris, 1727, 12mo., a ſort of family medicine; he alſo wrote treatiſes on the gout, and on the venereal diſeaſe, which latter he profeſſes to cure without ſalivating the patients. "Diſſertation ſur la pierre des reins et de la veſſie," 1736, in 3 vols. 12mo. In this he defends his practice in the venereal diſeaſe, which had been cenſured. He is averſe to cutting for the ſtone in the bladder; which, he ſays, may be diſſolved, by giving the patients the water of Bareges to drink, and by injecting it into their bladders. We know theſe waters acquired great reputation as lithontriptics, and were ſuppoſed to be as powerful in relieving the pain to which perſons ſuffering a fit of the ſtone are ſubjected, and in diſſolving ſtones lodged in the kidnies, or in the bladder, as Mrs. Stephens' medicine, lime water, and Caſtile ſoap, which began alſo to be in vogue about this time. Though it is now known the waters do not diſſolve the ſtone, they are ſtill uſed for their power in appeaſing pain. In the ſecond volume the author treats of the management of perſons bitten by rabid animals. He thinks the hydrophobia may be cured by mercurial frictions, but repeated trials have ſhewn its total inefficiency in that dreadful diſeaſe. He oppoſes, with propriety, opinions once very prevalent, that perſons in hydrophobia attempt biting their attendants, and that they make a noiſe reſembling the barking of a dog, which certainly never occur. Haller Bib. Chirurg.

Desault, Peter, Joseph, ſurgeon in chief to the Hotel Dieu at Paris, publiſhed, in conjunction with M. Chopart, "A Treatiſe on Chirurgical Diſeaſes, and on the Operations required in their Cure," in 2 vols. 8vo. in 1794. An indifferent tranſlation into Engliſh of the work, by Mr. Turnbull, was publiſhed in 1797. The work is allowed to have conſiderable merit. Deſault attended the young king of France, Lewis XVII., in the Temple. He died ſuddenly, Feb. 1795, a very few days before his patient, not without ſtrong ſuſpicions of his having been deſtroyed, to prevent his diſcloſing the horrid ſcenes it is ſuppoſed he muſt have witneſſed. The ſuppoſition is ſtrengthened by learning that Chopart and Doublet, who had alſo viſited the unfortunate prince, both of them died about four days after the death of Deſault. Gent. Magazine for the year 1795.

DESCEBESADO, in *Geography*, one of the higheſt mountains of the Chileſe Andes. See Chili.

DESCANT, from *de*, and *cantus*, *ſong*, in *Muſic*, originally ſignified an extemporaneous ſong, which was no ſooner uttered than loſt; but it was afterwards applied to the art of compoſing in ſeveral parts.

Deſcant is threefold; *viz. plain*, *figurative*, and *double*.

Descant, *Plain*, is the ground-work, or foundation, of muſical compoſition, and conſiſts altogether in the orderly placing of many concords; anſwering to ſimple counterpoint.

Descant, *Figurative*, or *florid*, is that wherein diſcords are concerned as well, though not ſo much, as concords. This may be well termed the ornamental, or rhetorical part of muſic; becauſe, that in this are introduced all the varieties

rieties of points, figures, ſyncopes, diverſities of meaſures, and whatſoever elſe is capable of adorning the compoſition.

DESCANT, *Double*, is when the parts are ſo contrived, that the treble may be made the baſs; and on the contrary, the baſs the treble. See DISCANT.

DESCENDANT, in *Genealogy*, a term relative to *aſcendant*, and applied to a perſon who is born or iſſued from ſome other referred to. Thus, mankind are ſaid to be deſcendants of Adam. The deſcendants from the brothers of the Maid of Orleans are confirmed in their exemption from all taxes and impoſts, by a regulation of the year 1634. See DESCENT.

DESCENDENS, OBLIQUUS, in *Anatomy*, a name given by Fabricius, and others, to the muſcle, called by Albinus *obliquus externus abdominis*. See OBLIQUI, &c.

DESCENDER, *Writ of formedon in*. See FORMEDON.

DESCENDING, ſomething that falls or moves from above, downwards.

There are aſcending and deſcending ſtars; and aſcending and deſcending degrees.

There are alſo aſcending and deſcending veins ſpringing out of the cava (ſee VEIN); and aſcending and deſcending arteries riſing out of the aorta. See ARTERY.

DESCENDING *Latitude*, in *Aſtronomy*, is the latitude of a planet in its return from the nodes to the equator.

DESCENSION, is either *right* or *oblique*.

DESCENSION, *Right, of a ſtar*, or *ſign*, is a point, or arc, of the equator, which deſcends with the ſtar, or ſign, below the horizon, in a right ſphere.

DESCENSION, *Oblique*, is a point, or arch of the equator, which deſcends at the ſame time with a ſtar, or ſign, below the horizon, in an oblique ſphere.

Deſcenſions, both right and oblique, are accounted from the firſt point of Aries, or the vernal interſection, according to the order of the ſigns; that is, from weſt to eaſt. And, as they are unequal, when it happens that they anſwer to equal arcs of the ecliptic, as, *e. gr.* to the twelve ſigns of the zodiac, it follows, that ſometimes a greater part of the equator riſes, or deſcends, with a ſign, in which caſe the ſign is ſaid to aſcend, or deſcend rightly: and ſometimes, again, a leſs part of the equator riſes, or ſets, with the ſame ſign; in which caſe, it is ſaid to aſcend and deſcend obliquely. See ASCENSION.

DESCENSION, *Refraction of the*. See REFRACTION.

DESCENSIONAL DIFFERENCE, is the difference between the right and oblique deſcenſion of the ſame ſtar, or point of the heavens, &c.

DESCENT, *diſtillation by*, in *Chemiſtry*, is a mode of diſtillation adopted in ſome inſtances, where the ſubſtance to be diſtilled is placed in a veſſel above the receiver, and heat being applied at top, the liquor drops into the receiver below, which is kept cool for that purpoſe.

DESCENT *into a ditch*, in *Fortification*, is a deep trench, or ſap, cut through the eſplanade, and under the covert-way; covered above with planks and hurdles, and loaded with earth againſt artificial fires. See MOAT.

In wet ditches the deſcent is made even to the ſurface of the water: in dry ditches, it is carried to the bottom of the moat, where traverſes are made to lodge and ſecure the miners.

DESCENT, in *Genealogy* and *Heraldry*, the order, or ſucceſſion, of deſcendants in a line, or family.

We ſay, one deſcent, two deſcents, &c. A gentleman is of perfect blood who has four deſcents of gentility, both by his father's and mother's ſide, *i. e.* whoſe great grandfather, grandfather, and father, on both ſides, were all gentlemen.

DESCENT is alſo uſed, in *Heraldry*, to expreſs the coming down of any thing from above.

Thus, a lion en deſcent is a lion with his head towards one of the baſe points, and his heels towards one of the corners of the chief; as if he were leaping from ſome high place.

DESCENT, DISCENT, or *Hereditary Succeſſion*, in *Law*, denotes the title whereby a man on the death of his anceſtor acquires his eſtate by right of repreſentation, as his heir at law; or it is the order, or manner, wherein lands and tenements are derived to any man from his anceſtors: and this is by cuſtom, ſtatute, or common law. By cuſtom, as in gavelkind or borough Engliſh; by ſtatute, as in fee-tail; and by common law, when a perſon has lands of inheritance in fee-ſimple, and dies without diſpoſing them: in which caſe the land deſcends in courſe to the eldeſt ſon and heir. The heir is, therefore, he upon whom the law caſts the eſtate immediately on the death of the anceſtor; and an eſtate, ſo deſcending to the heir, is in law called the inheritance. See HEIR and INHERITANCE.

Thus, to make his deſcent from his anceſtors, is to ſhew how, and by what particular degrees, the land in queſtion came to a perſon from his anceſtors. See CONSANGUINITY.

Deſcent, in common law, is either lineal, or collateral.

DESCENT, *Lineal*, is that conveyed down, in a right line, from the grandfather to the father, and from the father to the ſon, from the ſon to the grandſon, &c.

DESCENT, *Collateral*, is that ſpringing out of the ſide of the line, or blood; as from a man to his brother, nephew, or the like.

Judge Blackſtone has collected and illuſtrated the following rules or canons of inheritance, according to which eſtates are tranſmitted from the anceſtor to the heir. "Inheritances ſhall lineally deſcend to the iſſue of the perſon who laſt died actually ſeiſed *in infinitum;* but ſhall never lineally aſcend." The affirmative part of this rule has been almoſt univerſally adopted by all nations: but the negative part, whereby parents and all lineal anceſtors are excluded from ſucceeding to the inheritance of their offſpring, is peculiar to our laws, and thoſe of the ſame original: for, by the Jewiſh law, on failure of iſſue the father ſucceeded to the ſon, in excluſion of brethren, unleſs one of them married the widow, and raiſed up ſeed to his brother. And, by the laws of Rome, the children or lineal deſcendants were firſt preferred; and, on failure of theſe, the father and mother, or lineal aſcendants, ſucceeded together with the brethren and ſiſters; though by the law of the Twelve Tables, the mother was originally excluded, on account of her ſex. This rule was introduced into our law at the ſame time with, and in conſequence of, the feodal tenures: and though the right of ſucceſſion in the aſcending line was reſtored by Henry I. it was ſoon diſuſed; for it was laid down as an eſtabliſhed law in Glanvil's time, under Henry II. that *hereditas nunquam aſcendit;* and this maxim has been invariable ever ſince. Another rule of inheritance is, "that the male iſſue ſhall be admitted before the female." This preference of males to females is entirely agreeable to the law of ſucceſſion among the Jews, and alſo among the ſtates of Greece, or at leaſt among the Athenians; but was totally unknown to the laws of Rome, now extant, which allow brethren and ſiſters to ſucceed to equal portions of the inheritance. It was derived to us from the feodal law, and admitted on the principle, that no female could ſucceed to a proper feud, becauſe they were incapable of military ſervice. However, according to our law, though daughters are excluded by ſons, they ſucceed before any collateral re-

lations. A third rule of deſcent is, "that where there are two or more males in equal degree, the eldeſt only ſhall inherit; but the females all together." The right of primogeniture in males ſeems anciently only to have obtained among the Jews, in whoſe conſtitution the eldeſt ſon had a double portion of the inheritance. The Greeks, Romans, Britons, Saxons, and even originally the feudiſts, divided the lands equally: but when the emperors began to create honorary feuds, or titles of nobility, it was found neceſſary to make them impartible, or *feuda individua*, and deſcendible to the eldeſt ſon alone: in conſequence of which, the eldeſt male began univerſally to ſucceed to the whole of the lands in all military tenures; and in this condition the feodal conſtitution was eſtabliſhed in England by William the Conqueror. The fourth rule of deſcent is, "that the lineal deſcendants, *in infinitum*, of any perſon deceaſed, ſhall repreſent their anceſtor, or ſtand in the ſame place as the perſon himſelf would have done, had he been living." Thus the child, grand-child, or great-grand-child, male or female, of the eldeſt ſon ſucceeds before the younger ſon, and ſo *in infinitum*; and theſe repreſentatives ſhall take neither more nor leſs, but juſt ſo much as their principals would have done. As, if there be two ſiſters, Margaret and Charlotte, and Margaret dies leaving ſix daughters; and then John Stiles the father of the two ſiſters dies, without other iſſue: theſe ſix daughters ſhall take among them exactly the ſame as their mother Margaret would have done, had ſhe been living; that is, a moiety of the lands of John Stiles in coparcenary; ſo that, upon partition made, if the land be divided into 12 parts, thereof Charlotte the ſurviving ſiſter ſhall have ſix, and her ſix nieces, the daughters of Margaret, one a-piece. This is called ſucceſſion *in ſtirpes*, according to the roots; ſince all the branches inherit the ſame ſhare that their root, whom they repreſent, would have done. The Jewiſh ſucceſſion was directed in the ſame manner; but the Roman ſomewhat differed from it. This rule was indiſputably ſettled in the time of king Henry III. and has continued ever ſince. A fifth rule is, "that, on failure of lineal deſcendants, or iſſue, of the perſon laſt ſeiſed, the inheritance ſhall deſcend to his collateral relations, being of the blood of the firſt purchaſer; ſubject to the preceding rules." This rule was entirely unknown among the Jews, Greeks, and Romans; but the law of Normandy is the ſame with our's in this reſpect; both being derived from the ſame feodal origin.

Accordingly, when an eſtate hath really deſcended in a courſe of inheritance to the perſon laſt ſeiſed, the ſtrict rule of the feodal law is obſerved; and none are admitted, but the heirs of thoſe through whom the inheritance hath paſſed; for all others have demonſtrably none of the blood of the firſt purchaſer in them, and therefore ſhall never ſucceed. As, if lands come to John Stiles by deſcent from his mother Lucy Baker, no relation of his father (as ſuch) ſhall ever be his heir of theſe lands; and, *vice verſâ*, if they deſcended from his father Geoffrey Stiles, no relation of his mother (as ſuch) ſhall ever be admitted thereto; for his father's kindred have none of his mother's blood, nor have his mother's relations any ſhare of his father's blood. And ſo, if the eſtate deſcended from his father's father, George Stiles, the relations of his father's mother, Cecilia Kempe, ſhall for the ſame reaſon never be admitted, but only thoſe of his father's father. This is alſo the rule of the French law, which is derived from the ſame feodal fountain. So far, it is obſerved, as the feud is really antiquum, the law traces it back, and will not ſuffer any to inherit but the blood of thoſe anceſtors, from whom the feud was conveyed to the late proprietor. But when, through length of time, it can trace it no further; or if it be not known whether his grandfather, George Stiles, inherited it from his father, Walter Stiles, or his mother, Chriſtian Smith, or if it appear that his grandfather was the firſt grantee, and ſo took it (by the general law) as a feud of indefinite antiquity; in either of theſe caſes the law admits the deſcendants of any anceſtor of George Stiles, either paternal or maternal, to be in their due order the heirs to John Stiles of this eſtate; becauſe in the firſt caſe it is really uncertain, and in the ſecond caſe it is ſuppoſed to be uncertain, whether the grandfather derived his title from the part of his father or his mother. This then is the great and general principle, upon which the law of collateral inheritances depends; that, upon failure of iſſue in the laſt proprietor, the eſtate ſhall deſcend to the blood of the firſt purchaſer; or, that it ſhall reſult back to the heirs of the body of that anceſtor, from whom it either really has, or is ſuppoſed by fiction of law to have originally deſcended: according to the rule laid down in the Year-books, Fitzherbert, Brook and Hale, "that he who would have been heir to the father of the deceaſed" (and, of courſe, to the mother, or any other real or ſuppoſed purchaſing anceſtor) "ſhall alſo be heir to the ſon;" a maxim, that will hold univerſally, except in the caſe of a brother or ſiſter of the half-blood, which exception depends upon very ſpecial grounds.

The ſixth rule is, "that the collateral heir of the perſon laſt ſeiſed muſt be his next collateral kinſman, of the whole blood." The proximity of the collateral kinſman is reckoned according to the canonical degrees of *conſanguinity*, which ſee. Conſequently, the brother being in the firſt degree, he and his deſcendants ſhall exclude the uncle and his iſſue, who is only in the ſecond. And herein conſiſts the true reaſon of the different methods of computing the degrees of conſanguinity, in the civil law on the one hand, and in the canon and common laws on the other. The civil law regards conſanguinity principally with reſpect to ſucceſſion, and therein very naturally conſiders only the perſon deceaſed, to whom the relation is claimed: it therefore counts the degrees of kindred according to the number of perſons through whom the claim muſt be derived from him; and makes not only his great nephew but alſo his firſt couſin to be both related to him in the fourth degree; becauſe there are three perſons between him and each of them. The canon law regards conſanguinity principally with a view to prevent inceſtuous marriages, between thoſe who have a large portion of the ſame blood running in their reſpective veins; and therefore looks up to the author of that blood, or the common anceſtor, reckoning the degrees from him; ſo that the great nephew is related in the third canonical degree to the perſon propoſed, and the firſt couſin in the ſecond; the former being diſtant three degrees from the common anceſtor (the father of the *propoſitus*) and therefore deriving only one-fourth of his blood from the ſame fountain; the latter, and alſo the *propoſitus* himſelf, being each of them diſtant only two degrees from the common anceſtor (the grandfather of each) and therefore having one-half of each of theſe bloods the ſame. The common law regards conſanguinity principally with reſpect to deſcents; and having therein the ſame object in view as the civil, it may ſeem as if it ought to proceed according to the civil computation. But as it alſo reſpects the purchaſing anceſtor, from whom the eſtate was derived, it therein reſembles the canon law, and therefore counts its degrees in the ſame manner. Indeed the deſignation of perſon, in ſeeking for the next of kin, will come to exactly the ſame end (though the degrees will be differently numbered) whichever method of computation we ſuppoſe the law

law of England to uſe; ſince the right of repreſentation, of the parent by the iſſue, is allowed to prevail *in infinitum*. The iſſue or deſcendants, therefore, of John Stiles's brother are all of them in the firſt degree of kindred with reſpect to inheritances, thoſe of his uncle in the ſecond, and thoſe of his great uncle in the third; as their reſpective anceſtors, if living, would have been; and are ſeverally called to the ſucceſſion in right of ſuch their repreſentative proximity.

The former part of the preſent rule, therefore, amounts to this; that on failure of iſſue of the perſon laſt ſeiſed, the inheritance ſhall deſcend to the other ſubſiſting iſſue of his next immediate anceſtor. Thus, if John Stiles dies without iſſue, his eſtate ſhall deſcend to Francis his brother, or his repreſentatives; he being lineally deſcended from Geoffrey Stiles, John's next immediate anceſtor, or father. On failure of brethren, or ſiſters, and their iſſue, it ſhall deſcend to the uncle of John Stiles, the lineal deſcendant of his grandfather, George, and ſo on *in infinitum*. In the Jewiſh law, which in this reſpect entirely correſponds with ours, (Numb. c. 27.) the father, or other lineal anceſtor is himſelf ſaid to be the heir, though long ſince dead, as being repreſented by the perſons of his iſſue, who are held to ſucceed not in their own rights, as brethren, uncles, &c. but in right of repreſentation, as the offspring of the father, grandfather, &c. of the deceaſed. But though the common anceſtor be thus the root of the inheritance, yet with us it is not neceſſary to *name* him in making out the pedigree or deſcent. For the deſcent between two brothers is held to be an *immediate* deſcent; and therefore title may be made by one brother or his repreſentatives *to* or *through* another, without mentioning their common father. But, ſecondly, the heir need not be the neareſt kinſman abſolutely, but only *ſub modo*: that is, he muſt be the neareſt kinſman of the *whole* blood; for, if there be a much nearer kinſman of the *half* blood, a diſtant kinſman of the whole blood ſhall be admitted, and the other entirely excluded; nay, the eſtate ſhall eſcheat to the lord, ſooner than the half blood ſhall inherit. See BLOOD, *whole and half*.

The rule, together with its illuſtration, amounts to this: that in order to keep the eſtate of John Stiles as nearly as poſſible in the line of his purchaſing anceſtor, it muſt deſcend to the iſſue of the neareſt couple of anceſtors that have left deſcendants behind them; becauſe the deſcendants of one anceſtor only are not ſo likely to be in the line of that purchaſing anceſtor, as thoſe who are deſcended from both. But, as in the 2d, 3d, 4th, and every ſuperior degree every man has many couples of anceſtors, increaſing according to the diſtances in a geometrical progreſſion upwards, the deſcendants of all which reſpective couples are (repreſentatively) related to him in the ſame degree, a difficulty occurs in determining to which of theſe anceſtors we muſt firſt reſort, in order to find out deſcendants to be preferably called to the inheritance. Another qualification, therefore, is requiſite, beſides the *proximity*, and *entirety*, which is that of *dignity* or *worthineſs*, of blood. Accordingly, the ſeventh and laſt rule of deſcent is, "that in collateral inheritances the male ſtocks ſhall be preferred to the female; that is, kindred derived from the blood of the male anceſtors, however remote, ſhall be admitted before thoſe from the blood of the female, however near; unleſs where the lands have, in fact, deſcended from a female." This is warranted by the examples of the Hebrew, Athenian, and Roman laws; and alſo of the cuſtomary law of Normandy. See farther on this ſubject Blackſt. Com. vol. ii. chap. 14, paſſim.

If one dies ſeiſed of land, wherein another has a right to enter, and it deſcends to his heir; ſuch deſcent ſhall take away the other's right of entry, and put him to his action for recovery thereof. Stat. 32 Hen. VIII. c. 31. Co. Litt. 237.

DESCENT *of the Crown*. See *Right of* CROWN *and* KING.

DESCENT, *fall*, in *Mechanics*, &c. is the motion, or tendency, of a body towards the centre of the earth, either directly or obliquely: and this deſcent may be conſidered as occurring in a free or unreſiſting medium, or as impeded by ſome ſolid body, or as retarded by a denſe medium. We may therefore obſerve, 1. That if a body b deſcend freely, and in a perpendicular direction, by the force of gravity, the motive force, urging it downwards, will be equal to its whole weight, and its quantity of matter being alſo b, the accelerative force will be $\frac{b}{b}$ or 1.

2. If, whilſt the body b is deſcending, it is made to deſcend obliquely along an inclined plane, the ſine of whoſe angle of inclination to the horizon is s, the radius being 1, the motive force urging the body down the plane will be $b\,s$, and therefore the accelerative force will be $\frac{b\,s}{b}$ or s, leſs than that in the former caſe in the proportion of s to 1.

3. A body cannot deſcend in a denſe or reſiſting medium, unleſs it can divide and ſeparate the medium; which it cannot do, unleſs it be ſpecifically heavier than the medium. For ſince bodies cannot penetrate each other, one muſt give way before the other can move: and again, though a medium, *e. gr.* water, be diviſible, yet if it be ſpecifically heavier than another, *e. gr.* wood, it is only heavier as it contains more particles of matter in the ſame bulk, all which have an impulſe downwards; and, conſequently, in water there is a greater impulſe than in the ſame bulk of wood.

4. The deſcending body loſes as much of its weight as is the weight of the medium, with the force of its coheſion, and the oppoſing force of the particles againſt which it impinges, which laſt produces a greater or leſs reſiſtance, according to the velocity of the motion. And, therefore, a body ſpecifically heavier deſcends in a fluid medium ſpecifically lighter (*e. gr.* the air) with a force equal to the exceſs of the weight of the body above an equal bulk of the medium: for a body only deſcends in a medium with the force remaining, after a part has been ſpent in overcoming the reſiſtance of the medium; and this reſiſtance is equal to the weight of an equal bulk of the medium; conſequently, the body only falls with the exceſs of its weight above that of an equal bulk of the medium. In this caſe, the weight of the body being b, and that of an equal bulk of the medium being m, the motive force urging the body to deſcend will be only $b - m$.

Hence, the power that ſuſtains a body in a ſpecifically lighter medium, is equal to the exceſs of the abſolute weight of the body above an equal bulk of the medium. Thus $47\frac{1}{3}$ pounds of copper in water loſe $5\frac{1}{3}$ of their weight. A power, therefore, of 42 pounds is able to ſuſtain them.

5. If two bodies have the ſame ſpecific gravity, the leſs the bulk of the deſcending body is, the more of its gravity does it loſe, and the ſlower does it deſcend, in the ſame medium. For, though the proportion of the ſpecific gravity of the body to that of the fluid be ſtill the ſame in a greater or leſſer bulk, yet the leſs the body, the greater is the ſurface, in proportion to the maſs; and the larger the ſurface, the greater is the reſiſtance of the parts of the fluid.

6. If the ſpecific gravities of two bodies be different, that which has the greateſt ſpecific gravity will deſcend with greater velocity in the air or other reſiſting medium, than

the other. Thus a ball of lead deſcends ſwifter than wood or cork, becauſe it loſes leſs of its weight, though in vacuo they both fall with equal velocity.

The cauſe of this deſcent, or tendency downwards, has been greatly controverted. There are two oppoſite hypotheſes advanced; the one holding it to proceed from an internal, and the other from an external principle: the firſt maintained by the PERIPATETICS and EPICUREANS, and by the NEWTONIANS; and the latter by the CARTESIANS and GASSENDISTS. See ACCELERATION.

Laws of the DESCENT *of Bodies.* 1. Heavy bodies, in an unreſiſting medium, fall with an uniformly accelerated motion. See the *laws of uniformly accelerated motion*, under the articles ACCELERATION and MOTION. 2. The ſpace deſcribed by a body, urged by an uniform gravity, is ſubduple of that which it would deſcribe in the ſame time by the velocity laſt acquired and uniformly continued.

Galileo, who firſt diſcovered the *law of the deſcent* of heavy bodies by reaſoning, afterwards confirmed the ſame by experiments, the reſult of which, repeated often both by him and ſince his time, by Grimaldi, Riccioli, Huygens, Newton, and many others, was, 3. That the ſpaces of deſcent were as the ſquares of the times, or the ſquares of the velocities. See ACCELERATION.

Dr. Deſaguliers tried the effect of falling bodies by cauſing a leaden ball to fall from the inner cupola of St. Paul's church, whoſe altitude from the ground is 272 feet. Through this ſpace the ball deſcended in $4\frac{1}{2}$ ſeconds; during which time it ſhould, according to the theory, have deſcended through 325.6 feet, making a difference of about one-fifth of the actual deſcent between the experiment and the theory. This difference he ſhews to have ariſen principally from the reſiſtance of the air. To remedy the defects of theſe and ſimilar experiments, Mr. Atwood contrived his apparatus, for an account of which, ſee MOTION.

Grimaldi and Riccioli made experiments to the ſame effect, though in a different manner, by letting fall a number of balls, weighing eight ounces a-piece, from the tops of ſeveral towers, and meaſuring the times of falling by a pendulum. Riccioli. Almag. Nov. tom. i. lib. ii. cap. 21. prop. 4. Theſe experiments are exhibited in the following table.

Vibrations of the Pendulum.	Time.	Space at the end of the Time.	Space deſcended each Time.
	″ ‴	Rom. Foot.	Rom. Foot.
5	0 50	10	10
10	1 40	40	30
15	2 30	90	50
20	3 20	160	70
25	4 10	250	90
6	1 0	15	15
12	2 0	60	45
18	3 0	135	75
24	4 0	240	105

By ſuch and ſimilar experiments the ſpace deſcended by a heavy body, in a given time, has been aſcertained; and hence have been deduced theorems for eſtimating the times, velocities, and alſo the ſpaces deſcended, as far as they depend on an uniform force of gravity. From many accurate experiments made in England, it has been found that a heavy body falling freely, deſcends through $16\frac{1}{12}$ feet, in the firſt ſecond of time; and therefore the velocity gained at the end of one ſecond is $32\frac{1}{6}$ feet *per* ſecond. Hence we may infer that the velocity gained in any other time t is $32\frac{1}{6}\,t$, and that the ſpace deſcended is $16\frac{1}{12}\,t^2$.

Let v denote the velocity, and s the ſpace correſponding to the time t, and put $g = 16\frac{1}{12}$; then we ſhall have

$$v = 2gt = 2\sqrt{gs} = \frac{2s}{t}.$$

$$s = gt^2 = \frac{v^2}{4g} = \tfrac{1}{2}tv.$$

$$t = \frac{v}{2g} = \sqrt{\frac{s}{g}} = \frac{2s}{v}.$$

See ACCELERATION.

The ſpace deſcribed by a deſcending body in a ſecond of time has been alſo aſcertained by experiments with pendulums. In the latitude of London the length of a pendulum vibrating ſeconds is $39\frac{1}{8}$ inches; and ſince the circumference of a circle is to its diameter as the time of one vibration of any pendulum is to the time in which a heavy body will fall through half the length of the pendulum, we ſhall have $3.1416 : 1 :: 1 : \frac{1}{3.1416}$, which is the time of deſcending through $19\frac{9}{16}$ inches, or half the length of the pendulum; and, ſpaces being as the ſquares of the times, $\left(\frac{1}{3.1416}\right)^2 : 1^2 :: 19\frac{9}{16} : 193$ inches, or 16 feet 1 inch, which is the ſpace through which a heavy body will deſcend in one ſecond, as before. See PENDULUM.

4. The time wherein a body falls from a given height being given, to determine the ſpaces it fell in the ſeveral parts of that time.

Suppoſe the given altitude $= a$, the time $= t$, and the ſpace it fell in one part of time x: then

$$\frac{1 : x = t^2 : a}{t^2 x = a}$$

$$x = \frac{a}{t^2}.$$

Therefore the ſpace paſſed over in the firſt part of time is $\frac{a}{t^2}$: conſequently that paſſed over in the ſecond time $= \frac{3a}{t^2}$; that in the third $= \frac{5a}{t^2}$, &c. See ACCELERATION, *art.* 3.

5. The time wherein a body falls through a given ſpace being given; to determine the time wherein it will fall through any other given ſpace, in the ſame medium.

Since the ſpaces are as the ſquare of the times, to the ſpace which the body falls in the given time, the ſpace in the queſtion, and the ſquare of the given time, find a fourth proportional, which will be the ſquare of the time ſought. The ſquare root, therefore, being extracted therefrom, the problem is ſolved.

6. The ſpace a body falls in a given time being given; to determine the ſpace through which it will fall in any other given time.

To the ſquare of the time wherein the body falls through the given ſpace, the ſquare of the time wherein it ſhould fall through the ſpace required, and the given ſpace, ſeek a fourth proportional; this will be the ſpace required.

7. For any other conſtant force, inſtead of the perpendicular free deſcent by gravity, find the ſpace deſcended in one ſecond by a body urged by that force, and ſubſtitute that inſtead of $16\frac{1}{12}$ for the value of g in the preceding formulæ: or, if the proportion of this force to that of gravity be known, let the value of g be altered in the ſame proportion, and the ſame

ſame formulæ will hold good. Thus alſo, if the deſcent be on an inclined plane, making, *e. g.* an angle of 30° with the horizon; then, the force of deſcent upon the plane being always as the ſine of the angle it makes with the horizon; it will, in the preſent caſe, be as the ſine of 30°, that is, half the radius; and therefore in this caſe the value of *g* will be but half the former, $8\frac{1}{12}$, in the preceding formulæ. The ſame adaptation may be applied to any conſtant forces whatever.

8. The time of the oblique deſcent down any chord of a circle is equal to the perpendicular deſcent through the diameter of the circle.

9. The deſcents or vibrations through all arcs of the ſame cycloid, whether great or ſmall, are equal.

10. The deſcents, or vibrations, through unequal arcs of circles are unequal; the times being greater in the greater arcs, and leſs in the leſs.

For the Laws of the DESCENT *of bodies on inclined planes*, ſee *Inclined* PLANE.

For the Laws of DESCENT *in cycloids*, ſee CYCLOID, and PENDULUM.

For the Laws of DESCENT *by variable forces*, ſee FORCES.

DESCENT, *Line of ſwifteſt*, is that which a body, falling by the action of gravity, deſcribes in the ſhorteſt time from one given point to another; which is proved by geometricians to be the *cycloid*; which ſee.

DESCENT *of the Uterus*, in *Midwifery*, ſee *Bearing down of the* UTERUS. &c.

DESCHEL, in *Geography*, a town of Brabant; 13 miles S. of Herentals.

DESCHKIN, a town of Ruſſia, in the government of Orel; 24 miles N. of Orel, and 484 S.S.E. of Peterſburg.

DESCHNAY, a town of Bohemia, in the circle of Konigingratz; 21 miles E N.E. of Konigingratz.

DESCHNO, a town of Bohemia, in the circle of Boleſlaw; 4 miles W. of Aycha.

DESCRIBENT, is a term in *Geometry*, expreſſing ſome line or ſurface, which by its motion produces a plane figure, or a ſolid.

DESCRIPTON, in *Logic*, an imperfect, or inaccurate definition of a thing, giving a ſort of knowledge thereof from ſome accidents and circumſtances peculiar to it, which determine it enough to give an idea that may diſtinguiſh it from other things; but without explaining its nature or eſſence.

Grammarians content themſelves with deſcriptions: philoſophers require definitions of things. See DEFINITION. A deſcription is an enumeration of divers attributes of a thing, moſt of which are only accidental: as, when a perſon is deſcribed by his deeds, his ſayings, his writings, his honours, &c. A deſcription, as to its outward appearance, reſembles a definition, and is even convertible with the thing deſcribed; but does not explain it. For, inſtead of bringing ſeveral things eſſential to the thing deſcribed, it only brings a number of accidents belonging to it. A deſcription, therefore, is no proper anſwer to the queſtion, *quid eſt*, what is he? but to that, *quis eſt*, who is he?

Deſcriptions, in effect, are principally uſed for ſingulars, or individuals; for things of the ſame ſpecies do not differ in eſſence, but only as to *hic* and *ille*, which difference contains nothing very notable, or diſtinguiſhable. But individuals of the ſame kind differ much in accidents; *e. gr.* George is a king, and William a citizen; Charles is a male, and Anne a female; Henry is wiſe, and John a blockhead, &c. Thus, a deſcription is an accumulation of accidents, whereby things are notably diſtinguiſhed from each other, though they ſcarce differ at all in eſſence.

Some authors call a deſcription a quaſi-definition, as, body is a thing diviſible, moveable, ſolid, extended, &c., which only falls ſhort of a definition in this, that, inſtead of the form or eſſence of a thing, it gives one or more properties ariſing from the form or eſſence.

DESCRIPTION, in *Geometry*. To deſcribe a circle, ellipſis, parabola, &c., is to conſtruct or form thoſe figures, with rules, compaſſes, &c.

DESCRIPTION, in *Law*. In deeds and grants there muſt be a certain deſcription of the lands granted, of the places where they lie, and of the perſons to whom granted, &c., in order to make them good. But wills are more favoured than grants as to theſe deſcriptions; and a wrong deſcription of the perſon will not make a demiſe void, if there be likewiſe a ſufficient certainty what perſon was intended by the teſtator. (1 Nelſ. Abr. 64.)

DESCRIPTION, in *Poetry and Rhetoric*, is a figure which, by the aid of imagery and argument, exhibits ſuch a ſtrong and lively repreſentation of a ſubject, as gives a diſtinct view and ſatisfactory notion of it to the reader or hearer; and whilſt it convinces the mind, it moves and ſways the paſſions. This figure is principally uſed by poets, not only with a deſign to move the paſſions, but to pleaſe the fancy. Hiſtorians alſo deſcribe things, places, and perſons; and orators produce the greateſt effect by deſcription. In what a beautiful light has Cicero (Pro Arch. c. 7.) exhibited the polite arts and ſciences when he deſcribes their effects, and repreſents the benefit and pleaſure which they afford to the mind! "Other ſtudies neither ſuit with all times, nor all ages, nor all places, but theſe improve youth, delight old age, adorn proſperity, afford a refuge and ſolace in adverſity; pleaſe at home, are no hinderance abroad, ſleep, travel, and retire with us." Quintilian (Inſt. Orat. l. viii. c. 3.) has painted, by deſcription, the calamities of a city taken by ſtorm, in the brighteſt and ſtrongeſt colours: "Flames ſpreading themſelves over the houſes and temples, the cracking of falling buildings, and a confuſed noiſe from a variety of cries and ſhouts; ſome running they knew not where, others in the laſt embraces of their friends, the ſhrieks of children, women, and old men unhappily reſerved to ſuch diſtreſs; the plundering of all places civil and ſacred, the hurry and confuſion in carrying off the booty, captives driven before their victors, mothers endeavouring to guard their infants, and quarrels among the conquerors, where the plunder is largeſt." Juſtin alſo (lib. xxix. c. 3.) gives us a fine inſtance of deſcription, in a ſpeech of king Philip V. of Macedon, in which he repreſents the neceſſity of falling upon the Romans, who at that time were engaged in a war with Hannibal. "I behold," ſays he, "a cloud of a moſt dreadful and bloody war riſing in Italy. I ſee a ſtorm of thunder and lightning from the weſt, which will overſpread all places with a vaſt ſhower of blood, into whatever country the tempeſt of victory ſhall drive it. Greece has undergone many violent ſhocks in the Perſian, Gallic, and Macedonian wars; but theſe would all be found unworthy of regard, if the armies now engaged in Italy ſhould march out of that country. I view the terrible and cruel wars, which involve thoſe nations through the courage of their forces, and ſkill of their generals. This rage and fury cannot ceaſe by the deſtruction of one party, without the ruin of their neighbours. Indeed Macedon has leſs reaſon to dread the ſavage conquerors than Greece; becauſe more prepared, and better able to defend itſelf; but I am ſenſible thoſe who attack each other ſo impetuouſly will not confine their victories within thoſe bounds; and that it will be our lot to engage the conquerors."

A though deſcriptive poetry does not denote any one particular ſpecies or form of compoſition, and deſcription is generally introduced as an embelliſhment rather than made the ſubject of a regular

a regular work; it nevertheleſs enters into every ſpecies of poetical compoſition, paſtoral, lyric, didactic, epic and dramatic, and in each of them poſſeſſes a very conſiderable place. Deſcription, ſays Dr. Blair, (Lect. vol. iii. p. 158.) is the great teſt of a poet's imagination; and always diſtinguiſhes an original from a ſecond-rate genius. A true poet makes us imagine that we ſee the object which he deſcribes before our eyes; he catches the diſtinguiſhing features; he gives it the colours of life and reality; he places it in ſuch a light that a painter could copy after him. This happy talent is chiefly owing to a ſtrong imagination, which firſt receives a lively impreſſion of the object; and then, by employing a proper ſelection of circumſtances in deſcribing it, tranſmits that impreſſion in its full force to the imagination of others. In this ſelection of circumſtances lies the great art of pictureſque deſcription. In the firſt place they ought not to be vulgar, and common ones, ſuch as are apt to paſs by without remark; but as much as poſſible, new and original, which may catch the fancy and draw attention. In the next place, they ought to be ſuch as particularize the object deſcribed, and mark it ſtrongly. No deſcription that reſts in generals can be good; for we can conceive nothing clearly in the abſtract. In the third place, all the circumſtances employed ought to be uniform; that is, when deſcribing a great object, every circumſtance brought into view ſhould tend to aggrandize; or, when deſcribing a gay and pleaſant one, ſhould tend to beautify, that by this means, the impreſſion may reſt upon the imagination complete and entire; and laſtly, the circumſtances in deſcription ſhould be expreſſed with conciſeneſs, and with ſimplicity; for when either too much exaggerated, or too long dwelt upon and extended, they never fail to enfeeble the impreſſion that is deſigned to be made. Of all deſcriptive compoſitions, the largeſt and fulleſt, ſays Dr. Blair, with which he is acquainted, is Mr. Thomſon's Seaſons; a work that poſſeſſes very uncommon merit. Thomſon is a ſtrong and a beautiful deſcriber; for he had a feeling heart and a warm imagination. From him we might ſelect ſeveral inſtances of moſt beautiful deſcription; as, the ſhower in ſpring, the morning in ſummer, and the man periſhing in ſnow in winter. In a paſſage of another kind we perceive the power which a ſingle well-choſen circumſtance has in heightening a deſcription. In his Summer, relating the effects of heat in the torrid zone, he is led to take notice of the peſtilence that deſtroyed the Engliſh fleet at Carthagena, under admiral Vernon; when he has the following lines:

" ——————— You, gallant Vernon, ſaw
The miſerable ſcene; you pitying ſaw
To infant weakneſs ſunk the warrior's arm;
Saw the deep racking pang; the ghaſtly form;
The lip pale quiv'ring; and the beamleſs eye
No more with ardour bright; you heard the groans
Of agonizing ſhips from ſhore to ſhore:
Heard nightly plunged, amid the ſullen waves,
The frequent corſe.——" l. 1050.

Mr. Parnell's tale of the Hermit is conſpicuous throughout the whole of it, for beautiful deſcriptive narration. But of all the Engliſh poems in the deſcriptive ſtyle, the richeſt and moſt remarkable are Milton's Allegro and Penſeroſo. The collection of gay images on the one hand, and of melancholy ideas on the other, exhibited in theſe two ſmall, but inimitably fine poems, are as exquiſite as can be conceived. The following paſſage is ſelected by Dr. Blair from the Penſeroſo;

" ——— I walk unſeen
On the dry, ſmooth-ſhaven green,
To behold the wandering moon,
Riding near her higheſt noon,
Like one that had been led aſtray
Through the heaven's wide pathleſs way,
And oft, as if her head ſhe bow'd,
Stooping through a fleecy cloud,
Oft, on a plat of riſing ground,
I hear the far-off curfew ſound,
Over ſome wide watered ſhore,
Swinging ſlow with ſolemn roar:
Or, if the air will not permit,
Some ſtill removed place will fit,
Where glowing embers through the room
Teach light to counterfeit a gloom:
Far from all reſort of mirth,
Save the cricket on the hearth,
Or the bellman's drowſy charm,
To bliſs the doors from nightly harm:
Or let my lamp, at midnight hour,
Be ſeen in ſome high lonely tower,
Where I may outwatch the Bear
With thrice great Hermes, or unſphere
The ſpirit of Plato to unfold
What worlds, or what vaſt regions hold
Th' immortal mind, that hath forſook
Her manſion in this fleſhly nook:
And of thoſe dæmons that are found
In fire, air, flood, or under-ground."

Here are, as he obſerves, no unmeaning general expreſſions; all is particular, all is pictureſque; nothing forced or exaggerated; but a ſimple ſtyle, and a collection of ſtrong expreſſive images, which are all of one claſs, and recal a number of ſimilar ideas of the melancholy kind; particularly the walk by moonlight; the ſound of the curfew-bell heard diſtant; the dying embers in the chamber; the bellman's call; and the lamp ſeen at midnight, in the high lonely tower. The poet's manner is alſo admirably conciſe; and this manner, in deſcribing ſolemn or great objects, is almoſt always proper. It farther deſerves attention, that in deſcribing inanimate natural objects, the poet, in order to enliven his deſcription, ought always to mix living beings with them. It is a great beauty in Milton's Allegro, that it is all alive, and full of perſons. Every thing in deſcription ſhould be as marked and particular as poſſible, in order to imprint on the mind a diſtinct and complete image. Moſt of the ancient writers were apprized of the advantage which this circumſtance gives to deſcription. Thus, in the beautiful paſtoral compoſition, the Song of Solomon, the images are commonly particularized by the objects to which they allude. (See ch. iv. 8.) Both Homer and Virgil were remarkable for the talent of poetical deſcription. All Homer's battles, Virgil's deſcription of the burning and ſacking of Troy, in the ſecond Æneid, and Milton's account both of paradiſe, and of the infernal regions, furniſh many inſtances of poetical deſcription.

Much of the beauty of deſcriptive poetry depends on a right choice of epithets. In this caſe every epithet ſhould either add a new idea to the word which it qualifies, or at leaſt ſerve to raiſe and heighten its known ſignification. So in Milton:

" —— Who ſhall tempt with wand'ring feet
The dark, unbottom'd, infinite abyſs,
And through the palpable obſcure, find out
His uncouth way? or ſpread his airy flight,
Upborn with indefatigable wings,
Over the vaſt abrupt?" b. ii.

Sometimes it is in the power of a poet of genius, by one well-choſen epithet, to accompliſh a deſcription, and by means of a ſingle word, to paint a whole ſcene to the fancy. The following lines of Milton's Lycidas manifeſt this effect of an epithet:

" Where were ye, nymphs, when the remorſeleſs deep
Cloſ'd o'er the head of your lov'd Lycidas?
For neither were ye playing on the ſteep,
Where your old bards, the famous Druids, lie,
Nor on the ſhaggy top of Mona high,
Nor yet where Deva ſpreads her wizard ſtream."

Horace and Virgil have alſo occaſionally employed epithets with great beauty and propriety.

Upon the whole, the deſcriptive talents of an author may be reaſonably diſtruſted, when we find him laborious and turgid, amaſſing common-place epithets, and general expreſſions, to work up a high conception of ſome object, of which, after all, we can form but an indiſtinct idea. The beſt deſcribers are ſimple and conciſe; they ſet before us ſuch features of an object, as, on the firſt view, ſtrike and warm the fancy; they give us ideas which a ſtatuary or a painter could lay hold of, and work after them; which is one of the ſtrongeſt and moſt deciſive trials of the real merit of Deſcription.

The deſcription of a perſon is called a character.

For the difference between deſcription and imitation; ſee IMITATION.

DESEADA. See LA DESIRADE.

DESEADA, *Cape*, the ſouthern point of the ſtraits of Magellan in S. America, at the entrance of the South ſea. S. lat 53°. W. long. 74° 40'.

DESEADEN, a town of Perſia, in the province of Segeſtan; 30 miles S. S. E. of Kin.

DESENIK, a town of Hungary; 10 miles S. of Levens.

DESENZANO, or DISSENZANO, a town of Italy, in the Breſſan; celebrated for its wines; 15 miles E. of Breſcia.

DESERT, or DESART, a wild, uncultivated, uninhabited place or country: as the deſerts of Libya, of the Thebaid, &c. Geographers uſe the word in the general for all countries little, or not at all, inhabited. In Scripture, we find ſeveral places in the Holy Land, or places adjoining thereto, called deſerts, which were not abſolutely barren or unfruitful, but ſuch as were rarely ſown or cultivated; and though they yielded no crops of corn or fruit, they nevertheleſs afforded herbage for the graziers of cattle, with fountains or rills of water, though more ſparingly interſperſed than in other places. The wilderneſs or deſert, which was the ſcene of our Saviour's temptation, with ſeveral others mentioned in Scripture, was of this nature and quality. Many of theſe deſerts contained cities and villages, rich and well peopled; and, indeed, almoſt every city had ſome deſert according to the Scripture idiom, belonging to it for paſture: ſo that the word meant no more than a land, or tract, that bore neither corn, wine, nor oil, but was left to the ſpontaneous production of nature. Reland (Paleſt. l. i. p. 375.) hath fully ſhewn that the Hebrew word מדבר *midbar*, which the Greeks rendered ἔρημος, and the Latins *deſertum* and *ſolitudo*, bear no analogy to each other; and that the former was appropriated to the feeding of flocks, whilſt the cultivated lands were ſtyled plains and vallies, and thoſe that excelled in fertility, were diſtinguiſhed by ſome proper epithets, or even names of that import. The Scripture ſpeaks of the beauty of the deſert. Pſ. lxiv. 13. Jer. ix. 10. Joel. i. 20.

The deſert or wilderneſs, abſolutely ſo called, is that part of Arabia on the ſouth of the Holy Land, wherein the Iſraelites wandered, from the time of their evacuating Egypt to their entry into the Promiſed Land. The deſert of Beerſheba was that part of the deſert juſt mentioned, which bordered on the Holy Land, running towards the Mediterranean. The deſert of Idumæa is Idumæa itſelf, a barren mountainous country. The deſert of Shur lay north of the Red ſea; in this wilderneſs Hagar wandered; and Iſrael came hither after having paſſed the Red ſea. The deſert of Paran was ſituated in Arabia Petræa, near the city of Paran; and here was the habitation of Iſhmael (Gen. xxi. 11.) There were two deſerts of Sin; one written with a *ſamech* סין, (Exod. xvi. 1.) which lay between Elim and mount Sinai, and another written with a *tzade*, צין, (Exod. xix. 2.) near Kadeſh-Barnea. The deſert of Sinai was adjacent to mount Sinai. The deſert of Arnon was ſo called from the brook Arnon which ran through the land of Gilead, on the frontiers of Arabia Deſerta. The deſert of Ziph was the place of David's retreat from Saul (ſee ZIPH). The deſert of Maon (1 Kings, xxiii. 24.) lay in Arabia Petræa, at the extremity of Judah. The deſert of Kadeſh was ſituate above Kadeſh-Barnea, in the ſouth of Judah, and in Arabia Petræa. The deſert of Palmyra lay between the Euphrates and the rivers Orontes and Chryſorrhoas. The deſert of Egypt (Ezek. xx. 36.) ſeems to denote the deſert in which the Hebrews ſojourned after quitting Egypt. The deſert of Judæa or Judah was the ſcene of the preaching of John the Baptiſt (Matt. iii. 1.) This contained no leſs than ſix cities, beſides villages; *viz.* Bethabarah, Middin, Secanah, Nibſhan, the city of Salt, and that of Engedi. The deſerts of Tekoah, Bezer, Bozrah, or Boſor, Gibeon or Gibea, Horeb, Moab, and others of leſs note, were denominated from the cities to which they belonged; and were ſo many dry, uncultivated, and in general mountainous places like our downs, &c. where there are few or no habitations or inhabitants; whence the Hebrews call them by antiphraſis מדבר, which properly ſignifies human word, or ſpeech, becauſe there is none heard there.

One of the moſt ſtriking features of Africa is its immenſe deſerts, which pervade many parts of that continent, and may poſſibly comprize one-half of its whole extent. The chief of theſe is that called "the Deſert," *Sahara* or *Zaara*; which ſee. The ſandy deſerts of Arabia have in every period of time preſented to the view of the obſerver and to the arrangements of the geographers objects, highly worthy of attention. From Oman to Mecca, the greater part of Neged is one prodigious deſert, interrupted towards the frontiers of Hejaz and Yemen by Kerjé, containing the diſtrict of Surſa, and ſome fertile ſpots and towns, indicated by Niebuhr. The N. W. part of Neged preſents almoſt a continued deſert, a prolongation of the other, with an oaſis, and on the W. of Lachſa, including Jabrin, and ſome other places, mentioned by that author. In this deſert there are alſo the oaſis of mount Sehamer; and probably ſeveral others. Perſia is divided by its mountains and deſerts, for an account of which, ſee PERSIA.

DESERT *Iſlands*, in *Geography*, a denomination given to a number of African iſlands, that lie E. of Madagaſcar, and from the 5th to the 40th degree of latitude; which it is needleſs to enumerate, as neither their names nor ſituation are perfectly aſcertained.

DESERT *Iſland*, *Mount*, an American iſland, which lies on the coaſt of the diſtrict of Maine, Maſſachuſetts, containing about 200 families, and divided into two different ſettlements, about 15 miles apart.

DESERTER, in *Military Language*, a perſon of whatever rank, whether commiſſioned, or non-commiſſioned, who having entered into the ſervice of his country, by land or by ſea, abſents himſelf from his poſt without permiſſion, and neglects to perform the ſeveral duties of his ſituation. It is, however,

neceſſary that the party ſhould have received pay, or ſome allowance in money, raiment, accoutrements, or proviſions. The fact muſt alſo be decidedly proved by ſome overt act; ſuch as abſconding, going over to the enemy, ſecreting when duty, however trivial, required the party's preſence, with the known intention to quit the ſervice clandeſtinely. But if a ſoldier be abſent for many days, or weeks, through illneſs; or if he be intoxicated, or confined for debt, ſo that he could not attend at quarters, ſuch phyſical inabilities would exempt him from the imputation of deſertion; though in caſe of inebriety he would receive the puniſhment incurred by that treſpaſs.

Officers who deſert are, in almoſt every ſervice, executed: ſuch ſeverity is undoubtedly very proper, on account of the ill effects inſeparable from the bad example of ſuperiors. The Britiſh army and navy however can happily boaſt an exemption from this crime; which we could wiſh were equally unknown among the ſubordinate ranks, wherein it is, indeed, too commonly practiſed.

Our military code inflicts "death, or ſuch other puniſhment as may be adjudged by a general court-martial," on deſerters; whereby a proper diſcretionary power is left for the exerciſe of lenity in ſuch caſes as may appear leſs heinous, or where circumſtances may be favourable to the accuſed; although the crime might have been ſubſtantiated. Thus we certainly ſhould make a wide diſtinction between the ſoldier, who, in conſequence of bribery, or of diſcontent, either went over to the enemy, or urged others to do ſo, or who carried away his horſe, arms, &c.; and the irreſolute individual who being emaciated by ſickneſs, hunger, fatigue, or being under the influence of a large family, quitted his colours, without any adverſe intention. Repetition of the crime, and the nefarious practice of receiving bounties in ſeveral different regiments, or ſhips, aſſuredly cannot find any honeſt advocate.

Such is the deteſtation in which deſerters are held in every part of the world, that we invariably find them ſentenced to death. Even the uncivilized nations of America and Africa conform to this principle; and, probably annexing the ſtain of treachery to the treſpaſs, not unfrequently conſign all the family of the deſerter, with himſelf, to the flames!

Not only the officers, ſoldiers, &c. ſerving in regiments of the line, and other regular bodies, are ſubject to puniſhment when they abſent themſelves from their colours, but all perſons who are allowed, or are called upon by goverment, to embody, or to bear arms in the ſervice of the ſtate, are equally amenable to the military code; and, whatever their rank, or ſituation in private life, to all the penalties incurred by inattention to, or diſobedience of, martial law.

However expedient the moſt ſtrict regulations may be in time of actual war, yet in times of profound peace, a little relaxation of military rigor would not, one ſhould hope, ſays judge Blackſtone, be productive of much inconvenience. Upon this principle, though by our ſtanding laws (ſtat. 18 Hen. VI. c. 19. 2 and 3 Edw. VI. c. 2.), ſtill remaining in force, though not attended to, deſertion in time of war is made felony, without benefit of clergy, and the offence is triable by a jury and before juſtices at the common law; yet by our militia laws, a much lighter puniſhment is inflicted for deſertion in time of peace. So, by the Roman law alſo, deſertion in time of war was puniſhed with death, but more mildly in time of tranquillity. But our mutiny act makes no ſuch diſtinction; for deſertion, &c. is puniſhable with death itielf, if a court-martial ſhall think proper. See COURT MARTIAL and MUTINY ACT.

For the manner of puniſhing deſerters among the ancients, ſee TRANSFUGA.

DE'SERTINES, in *Geography*, a ſmall town of France, in the department of Mayenne; 15 miles north-weſt of the town of Mayenne.

DESESPOIR, or DESPAIR, *Cape*, a cape of America, on the northern ſide of Chaleur bay, about three leagues weſt-ſouth-weſt of Bonaventure iſland. Here is a large cod-fiſhery.

DESHABILLE, compounded of the privative *de*, and *s'habiller*, to *dreſs one's ſelf*, a French term, naturalized of late. It properly ſignifies a night-gown, and other neceſſaries, made uſe of in dreſſing or undreſſing.

DESHACHE', Fr. from *de* and *hacher*, *to cut*, in *Heraldry*, is when a beaſt has its limbs ſeparated from the body, ſo as they ſtill remain on the eſcutcheon, with only a ſmall ſeparation from their natural places.

DESICCATION, in *Chemiſtry*, is the act of reducing any ſubſtance to perfect dryneſs, and is an operation the accuracy of which is of very great importance, as the eſtimation of weights and quantities is materially affected by it. Some of the heats uſually employed by chemiſts for deſiccation may be here mentioned.

1. Very gentle heat.—Such as, for example, that of an inhabited chamber, or the open air in ſummer. Many ſubſtances are decompoſed and altered at a higher heat, and ſome of the more powerful fulminating compounds explode. The range of this heat may be taken at about from 60° to 70°.

2. Solar or moderate artificial heat.—The heat of the ſun's rays, when not concentrated by artificial means, ſeldom exceeds 120°, and is often reſorted to by chemiſts. The temperature, which would be denominated *moderate artificial heat*, may be taken at about 100° to 120°, and is often employed for drying many vegetable and decompoſable preparations. Neither fermentation nor putrefaction go on at this temperature.

3. It is often neceſſary to fix ſome maximum of deſiccation between 120° and 212° to fulfill particular purpoſes; ſuch as, for example, to avoid the coagulation of albumen, or to avoid the evaporation of any portion of the ſubſtance itſelf which is to be dried. Thus, for example, muriate of magneſia parts with a portion of its acid, as well as its water, at a heat above 180°, and the ſuccinats are partially decompoſed from the like cauſe. In ſuch caſes, therefore, the point of deſiccation ſhould be ſteadily kept up, which may often be conveniently effected by a ſlow-burning lamp, and a cloſed apparatus.

4. The heat of boiling water, or the water-bath heat, as it is uſually termed.—This temperature is, on the whole, that which is moſt frequently uſed by chemiſts, being conveniently applied, and if properly managed, is very ſteady and uniform. The heat of boiling water itſelf is 212°, but any ſubſtance contained in a veſſel only immerſed in boiling water, or its vapour, falls ſhort of this temperature a few degrees. However, by ſaturating the water with ſalt, its boiling point is ſo much raiſed, that it is able to impart a heat of full 212° to any body immerſed in it. It is generally ſuppoſed that as water is totally evaporable, the boiling point of water affords heat enough to expel this fluid from any ſubſtance with which it may be united; but this is not correct, for all the ſalts that have any affinity with this fluid will retain a portion of it after any deſiccation at 212°, however long continued, and the more obſtinately, as appears, in proportion to the force of this affinity. So that moſt ſaline bodies, and even earths and metallic oxyds, after being dried at 212°, will loſe a little more water in a higher heat. In general it requires from half an hour to an

hour to expel from even a ſmall maſs of ſubſtance all the water which it will part with at this heat.

5. The heat of an Argand lamp may be conſidered as a convenient and tolerably uniform mean between the temperature of boiling water, and a low red heat. It may be reſorted to on very many occaſions with great advantage, as there are numerous ſaline earths and metallic ſubſtances that only part with water at this temperature, and none of their other conſtituent parts. The deſiccation produced in this way is uſually very compleat and conveniently rapid, eſpecially when the ſubſtance is contained in a cup of platina or other metal.

Laſtly, we may mention the heat of low redneſs which is juſt viſible by day-light, and this is in moſt caſes the utmoſt heat employed for mere deſiccation; though there are ſome ſubſtances which will retain water till they have been expoſed to a ſtrong red-heat.

DESICCATION, in *Geology*, is a term that has been uſed by geologiſts to expreſs the drying or hardening of the ſtrata of the earth, particularly of ſuch ſtrata as preſent many veins, rifts, and caverns, *e. g.* the mountain lime-ſtone in Derbyſhire: whoſe veins of ore preſent ſtrong reaſons for ſuppoſing them to have been formed by the ſhrinking and cracking of the rock in which the mines are ſunk, at a period long prior to the violent heavings and rupture which the ſtrata there have undergone; becauſe the inſtances are numerous, of a fiſſure traverſing a vein that was previouſly quite filled with ſpar and ore, and the ſucceſſive heavings of the ſtrata, noticed under our article COLLIERY, have ground the two ſurfaces into furrows, and covered them with a poliſhed coating of galena, called *ſlickenſide*, which ſee. Fiſſures alſo frequently croſs and interſect the veins, and have introduced rolled pebbles and other extraneous and alluvial matters to great depths in the earth.

DESIDERATUM, from *deſidero, I deſire*, is uſed to ſignify deſirable improvements in any art or ſcience, as yet unattained. Thus, it is a deſideratum with the blackſmith, to render iron fuſible, by gentle heat, and yet preſerve it hard enough for ordinary uſes; with the glaſs-man and looking-glaſs-maker, to render glaſs malleable; with the clock-maker, to bring pendulums to be uſeful where there are irregular motions; with the braſier and copperſmith, to make malleable ſolder; with the ſhipwright, to build veſſels that will ſail under water; with the diver, to procure manageable inſtruments for conveying freſh air to the bottom of the ſea ſufficient for reſpiration, and the burning of lights; with the aſſay-maſter, to melt or copel ores, or metals, immediately without the uſe of bellows or furnace; and with the carvers and joiners, to faſhion wood in moulds like plaſter of Paris, or burnt alabaſter, &c. And though, as Mr. Boyle obſerves, the obtaining of theſe deſiderata may be thought chimerical, yet it is proper they ſhould be propoſed; for although perfection may not be attainable, yet approaches to it may be made, and arts thereby improved. Vide Boyle's Works abr. vol. i. p. 129, 136. In ſhort, all arts and ſciences have their defects, and it is not at firſt to be gueſſed, for how many of theſe remedies may be found, by means of chemical and philoſophical reſearches, properly directed.

If a proper number of perſons duly qualified for making experiments, and improving from them, would ſet about each his particular ſhare of the neceſſary experiments, and communicate the reſult of all their proceſſes to one another, the buſineſs of chemical and philoſophical experiments would be much better directed in regard to future ſtudents, and many of the deſiderata in the art probably ſupplied.

DESIGN, from *deſigno, I mark out*, the plan, or repreſentation, of the order, general diſtribution, and conſtruction, of a painting, poem, book, building, or the like. The painter has ſhewn the firſt deſign of his piece, in which the figures are well diſpoſed. The deſign of that poem, or book, is artfully laid. Claudian never ſees his whole deſign together; when he compoſes a part he thinks of nothing elſe, and works up every member, as if it were ſeparate from all the reſt.

In building, we uſe the term ichnography, when by deſign is only meant the plan of a building, or a flat figure drawn on paper. Orthography, when ſome face or ſide of the building is raiſed from the ground. And ſcenography, when both front and ſides are ſeen in perſpective. See each article.

DESIGN, in *Muſic*, is the plan, ſubject, *prima intentione*, of a compoſition. It is not enough to produce good paſſages in the melody, and to accompany them with good harmony; the whole muſt ariſe out of, and have ſome connexion with, the ſubject. In all Haydn's beſt productions, where his invention ſeems inexhauſtible, the hearer is never allowed to forget the text; which, amidſt all the variety and contraſt of pathos, grace, ſpirit, and playfulneſs of the principal melody, is heard, by means of double counterpoint, in one part or other throughout the compoſition. Variety is perhaps more neceſſary in muſic than in poetry or painting; but that variety ſhould never amount to wildneſs, or incoherence, nor ſhould the regularity degenerate into monotony and dullneſs. To ſteer between theſe two extremes is the criterion by which we may eſtimate the judgment, genius, and experience of the maſter. The difficulty is to aſſociate with the melody, movement, character, harmony, modulation, and an elegant *variety;* without which, the whole becomes unintereſting and tireſome. The compoſer, as well as the poet and painter, may, doubtleſs, dare every thing in favour of this captivating variety; provided, under the pretence of contraſt, he gives us not for a well deſigned work, a *Cento* of unconnected paſſages of different character, which, as a whole, render the piece a monſter.

It is, therefore, in the intelligent diſtribution and arrangement of the ſeveral parts, that a perfect *deſign* conſiſts. In the latter productions of Mozart it is, that perfection of deſign appears. The early cultivation of his talents rendered him a profound critic, at an age when others are uſually beginning their ſtudies. In his firſt compoſition he was trying experiments, and vanquiſhing difficulties; but in his maturer years he gave way to his feeling, particularly in his vocal muſic, which was little known, except at Vienna, till after his death. But in his operas, both ſerious and comic, his deſigns are ſupported with ſo much ſimplicity, grace, and elegance, and fed with ſuch a conſtant flow of ideas, as if he had truſted to chance for arrangement.

DESIGN, in *Architecture, Engraving, Painting*, and *Sculpture*, is chiefly uſed for the general idea, or plan of a work, including the invention, compoſition, and arrangement of the whole; this being commonly ſketched out, or drawn. The terms deſign and drawing have become almoſt ſynonymous; and hence, perhaps, theſe arts have acquired the name of the arts of deſign: though it may be, becauſe they are all occupied in the expreſſion of forms; in the latter ſenſe, deſign conſtitutes one of the three elements of painting, chiaroſcuro and colouring being the others: this, however, is oftener called drawing, while deſign is applied to the invention and compoſition; ſo that, technically, a picture may be well drawn, though the deſign be bad, or *vice verſâ*. This diſtinction ſeems the better founded; the term deſign being uſed for a delineated invention (as the patterns in various ornamental manufactures, &c.), while

drawing oftener refers to the imitative, or executive part employed in repreſenting the appearances of objects. See INVENTION, COMPOSITION, PAINTING, and DRAWING.

DESIGN, in the *Weaving Manufactures*, ſignifies the pattern of any ornamented piece of cloth, when the ornaments are woven in the loom along with the fabric. A ſpecies of paper is uſed to lay down theſe ornaments to a ſcale, which is called deſign paper, and which ſerves to direct the weaver in his ſubſequent operations. In every ſpecies of ornamental weaving, the whole deſign is effected by the leaves of claſped twine, which move the various threads of that part of the yarn, which is ſtretched in the loom, and which is called the warp. Theſe leaves are called heddles in Scotland, healds in Lancaſhire, and may probably be known by other names in different parts of the country. The paper upon which the deſign is to be drawn, is ruled from top to bottom with a number of parallel lines, the intervals between which repreſent certain portions of warp. Theſe, being again croſſed by other parallel lines at right angles, the latter repreſent that part of the yarn which is inſerted by the ſhuttle, and which is called the woof or weft. The deſign-paper, when ruled, has the appearance of a number of ſmall ſquares, and in theſe the deſign is inſerted with a black lead pencil, or with any kind of water colour, very frequently with vermilion, or red lake. Every interval upon the paper may be ſuppoſed to repreſent either one or more threads. When it will not occupy too much ſpace, and when the deſign requires particular delicacy of ſhape, the moſt accurate way is to make every interval repreſent only one thread. At other times it frequently repreſents two, and ſometimes more.

The five figures in *Plate* IV., *Miſcellany*, repreſent the uſual modes of drawing deſigns for the ſpecies of ornamented cloth moſt commonly made in Great Britain. Different ways of effecting ornaments in the loom are practiſed, according to the fabric of the cloth, and the purpoſe to which it is to be applied. In the lighter manufactures of the ſilk, lawn, and muſlin trades, now chiefly uſed as ornamental parts of female dreſs, the fabric is generally ſo flimſy, that, when ornamented in the loom, the figures, in order to have any ſhow, muſt be compoſed of yarn, much coarſer than that which forms the ground or fabric of the cloth, and this yarn is ſometimes dyed of different colours. Being moſt convenient in general, and the patterns more eaſily changed, the weft, or woof, is moſt frequently uſed for this purpoſe. *Figures* 1 and 2, are repreſentations of this kind of work. In *fig.* 1, every ſquare of the deſign-paper is ſuppoſed to repreſent one thread both of warp and woof. In *fig.* 2, it is ſuppoſed to repreſent two. For the application of theſe deſigns to the purpoſes of mounting looms, ſee the article DRAUGHT and *Cording*.

In the heavier branches of the manufacture of cloth, ornaments are effected without any alteration in the fineneſs of either warp or woof, and moſt frequently without any change of colour. The *figs.* 3 and 5, refer to theſe kinds of work, and the ſquares in each of theſe may be ſuppoſed to repreſent any number of threads from three to eight, according to the fineneſs of the cloth, and labour beſtowed in ornamenting it. *Fig.* 4, is alſo a kind of ornamented cloth of the dimity kind of a ſtout fabric. Each ſquare upon the deſign repreſents one thread. For the application of theſe, ſee the reſpective articles DIAPER, DIMITY, DORNOCK, and DRAW-LOOM, eſpecially the laſt.

When deſigns are drawn upon paper, the diſtance of the lines is generally ſo much more than the diameters of the threads which they repreſent, that the figure upon the cloth will often be very different both in ſize and appearance from the deſign. To calculate this accurately is an important part of the buſineſs of a ſkilful manufacturer. The rules, therefore, for this, with references to the plate, will be found in the reſpective articles to which they refer.

Some general remarks upon the principle of deſigning ornaments upon cloth, and upon the analogy which ſubſiſts between the figure of any flower or pattern, when drawn upon plain paper, when reduced to the deſign-paper, and when woven into the cloth, may, however, be uſeful to thoſe who poſſeſs an adequate knowledge of the art of manufacturing plain cloth, but who are not equally converſant with the various branches of ornamental weaving.

When an oblique or curvilineal figure is drawn or painted, either upon canvas, paper, or any other ſubſtance, no impediment exiſts to prevent the artiſt from drawing every oblique ſtraight line at whatever angle of obliquity he chuſes, nor from forming whatever curves will add to the beauty of the picture. But, when an imitation of this is to be transferred to deſign-paper, and from thence to cloth, the ſame facilities do not exiſt, and the utmoſt which the moſt ſkilful weaver can effect is only the neareſt poſſible approximation to the original from which he copies. Every perſon at all acquainted with weaving knows, that the threads of warp are ſtretched in the loom, forming ſtraight lines parallel to each other, and that theſe threads are interſected by the woof at right angles. No oblique pattern can, therefore, be formed in the loom, except by varying the point in the warp, where the interſection ſhowing the pattern appears, and every change of this point muſt be at leaſt equal to the diameter of one thread. Now, if we ſuppoſe that there are equal quantities of warp and woof in a web, and that a ſhift of one thread of warp is made, to the right or left, every time that a thread of woof is paſſed acroſs, the diagonal line produced will form invariably an angle of 45° both with warp and woof. The diagonal here, then, is produced by the reſolution of two equal forces, acting at right angles to each other. But an obliquity, confined invariably to an angle of 45°, would produce a very limited range of patterns indeed. *Figs.* 1 and 2, are ſpecimens of ſuch as may be effected by it. It becomes, therefore, neceſſary, in more extenſive deſigns, to vary the obliquity of the angles frequently, and this can only be done in two ways.

1ſt. By ſhifting the point of interſection over more than one thread of warp, which will render the angle formed by the diagonal line and warp greater, and that by the diagonal and the woof leſs than 45°, or

2d. By inſerting more than one thread of woof without ſhifting the point of interſection, the effect of which will be exactly the converſe of the former.

It is to be obſerved, that by the diagonal line is only meant the apparent line which is preſented to the eye; for as the ſhifts are at right angles, each will form either a ſquare or parallelogram, the true diagonal of which is intended to be repreſented, and the means uſed are therefore only approximations to this.

When the deſign (*fig.* 5.) is examined, as all the ſquares forming the flower are black, whilſt thoſe which repreſent the ground are vacant, every ſhift, when minutely inſpected, is evidently at right angles, although the general effect, when viewed at ſome diſtance, has the appearance of diagonal or curved lines. But, were this pattern woven upon a fine cloth, the diameters of the threads would be ſo much leſs than the meaſures of the ſquares which repreſent them upon the paper, that the angular corners which give the edges of the flower the appearance of being dented, would totally

totally diſappear, unleſs very minutely inſpected, and the flower upon the cloth would be much ſmaller than that upon the paper.

The following table of the angles, formed between the diagonals of parallelograms, whoſe ſides are in the ſame ratio to each other as thoſe upon the deſign-paper, has been calculated to aſſiſt in reducing the drawing of deſigns, as nearly as poſſible, to correct imitations of the drawings or paintings from which they are taken.

TABLE ſhewing by inſpection the angles of obliquity formed by colouring the ſquares of deſign paper for weavers, both by the warp and woof, from 1 to 9 ſquares each way; the line of woof being taken as the baſe.

Squares of Warp.	Squares of Woof.								
	1	2	3	4	5	6	7	8	9
1	45°	27°	18°	14°	11°	9°	8°	7°	6°
2	63	45	34	27	22	18	16	14	13
3	72	56	45	37	31	27	23	21	18
4	76	63	53	45	39	34	30	27	24
5	79	68	59	51	45	40	36	32	29
6	81	72	63	56	50	45	41	37	34
7	82	74	67	60	54	49	45	41	38
8	83	76	69	63	58	53	49	45	42
9	84	77	72	66	61	56	52	48	45

The angles may be continued down to 1° and up to 89°, as follows: By the warp the number of ſquares to be coloured for one ſquare of woof will be for 85°, 11 ſquares; for 86°, 14 ſquares; for 87°, 19 ſquares; for 88°, 29 ſquares; and for 89°, 53 ſquares. And reverſing the operation for the ſame numbers the angles will reſpectively be the complements of thoſe quoted, *viz.* 11 ſquares 5°; 14 ſquares 4°; 19 ſquares 3°; 29 ſquares 2°; and 53 ſquares 1°.

To underſtand this table it is neceſſary to obſerve, that the left hand column from top to bottom contains the number of ſquares, coloured upon the deſign-paper, and forming the edge of the flower by the warp, or contained between one or more ſpaces from top to bottom of the paper. The croſs columns at the top contain the ſame by the woof, or acroſs the deſign, and the figures, where the one column croſſes the other, give the angle which the diagonal of a parallelogram, whoſe ſides are in the ratios of the two numbers to each other, would form with the baſe or croſs lines. When the number of coloured ſquares each way is equal, the angle is always 45°, and in all others the angle formed by the croſs ſquares is always the complement of the ſame number from top to bottom. The minutes have been thrown away, being unneceſſary in practice, and the neareſt degree, whether a little more or leſs, taken.

When a pattern is to be reduced from a common drawing to a deſign for weaving, this table may be of conſiderable uſe; for if a croſs line be drawn upon the original, the angles of obliquity may be taken with very conſiderable accuracy by a line of cords, or any of the uſual mathematical proceſſes, and a reference to the table will ſhew the number of ſquares which, when coloured, will produce the effect moſt nearly ſimilar. Curve lines are formed merely by changing the angles of obliquity, as frequently as neceſſary. When it is deſirable to make a ſmooth uniform line, it is always beſt to ſhift only one ſquare at a time, and make the ſhifts more frequent; for when many are ſhifted, the ſquare corners will be always too apparent; but where a rough edge is wanted, theſe may be reſorted to.

The calculation of the ſize of the flower upon the cloth, compared with that upon the paper, is merely a caſe of ſimple proportion. In order to calculate correctly, the greateſt number of ſquares coloured from right to left, and from top to bottom, muſt be counted, and the ſize of the flower each way meaſured; for deſign-paper is ruled to many different ſcales. The number of the reed, or, which is the ſame thing, the number of warp-threads in a given breadth, is then to be aſcertained, and alſo how many threads are repreſented by each ſquare. Theſe points being fixed, the ratio of the one to the other will be readily found. A ſingle example, taken from the damaſk flower, (*fig.* 5.) will illuſtrate this.

The ſquares coloured from right to left, counting from either extremity, are 107, and the meaſure is $5\frac{1}{8}$ inches.

From top to bottom the ſquares are 113, and the meaſure $5\frac{3}{8}$ nearly.

Let it be ſuppoſed that this pattern is to be wrought upon what is called a five leaf damaſk, containing 2400 threads in the compaſs of 37 inches. Every ſquare will then repreſent five threads either way; and the threads contained in the warp of one flower will be 535.

Then as 2400 : 37 :: 535 : 8.2479, or nearly $8\frac{1}{4}$ inches. The flower, therefore, upon this ſcale, will be $3\frac{1}{3}$ inches broader upon the cloth than upon the paper, and the exceſs of length will be found by a ſimilar proportion.

But were the ſame flower to be wrought as a ſpot, only two threads would be repreſented by each ſquare, and the number of warp-threads would be 214 in each flower. Suppoſe then the muſlin to be figured, to contain 3200 threads in 37 inches, the proportion would be

As 3200 : 37 :: 214 : 2.474, or nearly $2\frac{1}{2}$ inches. In this caſe the ſame flower, on the cloth, would be leſs than one-half of its breadth on the paper. The great diſproportion in the ſize of the two flowers depends partly upon the difference in the number of threads repreſented by one ſquare, and partly by the fineneſs or ſet of the webs. In the firſt, the ratio of decrement is *directly* as 2 to 5; in the ſecond, *inverſely* as 12 to 16.

When looms are mounted to work fanciful patterns, if the range is not too extenſive, heddles are uſed, which are moved by levers or heddles attached to them below by cords, and which are preſſed down by the weaver's feet. When the range of pattern becomes too extenſive to render this mounting convenient, another apparatus is adopted, which will be found in the articles DIAPER, MOUNTING, and the moſt extenſive in that of DRAW-LOOM. The more common mountings belong to the article DRAUGHT and *Cording*.

DESIGNATION, the act of marking or indicating, and making a thing known. The deſignation of ſuch an eſtate is made by the tenants, butments, and boundings. Among the Romans, there were deſignations of the conſuls and other magiſtrates, ſome time before their election.

DESIGNATOR, a Roman officer, who aſſigned and marked each perſon his place and rank in public ceremonies, ſhows, proceſſions, &c.

The word is formed from the verb *deſignare*, to deſign.

The deſignator was a kind of marſhal or maſter of the ceremonies, who regulated the ſeats, march, order, &c. There were deſignators at funeral ſolemnities, and at the games, theatres, and ſhows, who not only aſſigned every one his place,

place, but alſo led him to it; as appears from the prologue to the Pœnulus of Plautus.

Much of the ſame nature were the agonothetæ of the Greeks.

DESIGNING, the art of delineating, or drawing the appearance of natural objects, by lines on a plain.

To deſign, according to the rules of mathematics, makes the object of perſpective.

To deſign by the camera obſcura, ſee CAMERA *obſcura*, and DRAWING.

DESION, in *Chronology*, the Macedonian name of the Athenian month Antheſterion. See ANTHESTERION.

DE'SIRADE, LA, in Latin *Deſiderata*, in Spaniſh *Deſeada*, in *Geography*, one of the Caribbee iſles, or, according to the Engliſh denomination, one of the Leeward iſlands in the Weſt Indies belonging to the French, in the neighbourhood of Antigua, ſituated in N. lat. 16° 40′. W. long. 61° 20′; 18 miles N. E. of Guadaloupe, and 21 N. of Mariegalante. It is about 12 miles long and ſix broad.

At what time this ſmall iſland received its firſt inhabitants is not known, but although it was diſcovered by Columbus, it is yet a very modern colony.

In the year 1788, La Deſirade contained a population of 213 white, 33 mulattoes, or free negroes, and 619 negro ſlaves. There is no regular town. The ſoil is ſandy and not very fruitful; it yields ſome coffee and cotton. The iſland is however of ſome conſequence to the French in time of war, as it gives ſhelter to a number of privateers which annoy the Engliſh Weſt India trade.

DESIRE is defined by Mr. Locke to be the uneaſineſs a man finds in himſelf upon the abſence of any thing, whoſe preſent enjoyment carries with it the idea of delight; which is greater or leſs, as that uneaſineſs is more or leſs vehement. The uneaſineſs of deſire, fixed on ſome abſent good, is that, according to this writer, which determines the will, from time to time, to every voluntary action: nor does even the greater good, though apprehended and acknowledged to be ſuch, determine the will, until our deſire, proportionably excited, makes us uneaſy in the want of it. If it be enquired, what it is that moves deſire? He replies, happineſs, and that alone. This author has very properly diſtinguiſhed between will and deſire; though many later writers have overlooked this diſtinction, and have repreſented deſire as a modification of the will. Deſire and will agree in this, that both muſt have an object, of which we have ſome conception; and, therefore, both muſt be accompanied with ſome degree of underſtanding. Nevertheleſs they differ in ſeveral things. The object of deſire may be any thing, which appetite, paſſion, or affection leads us to purſue; it may be any event which we think good for us, or for thoſe to whom we are well affected. I may deſire meat, or drink, or eaſe from pain; but to ſay that I will meat, or will drink, or will eaſe from pain, is not Engliſh. There is, therefore, a diſtinction in common language between deſire and will. And the diſtinction is, that what we will muſt be an action, and our own action; what we deſire may not be our action; it may be no action at all. With regard to our own actions, we may deſire what we do not will, and will what we do not deſire; nay, what we have a ſtrong averſion to. Deſire, therefore, even when its object is ſome action of our own, is only an incitement to will, but it is not volition. The determination of the mind may be, not to do what we deſire to do. But as deſire is often unaccompanied by will, we are apt to overlook the diſtinction between them. Reid's Eſſays on the Active Powers of Man, p. 63.

DESIRE, *Port*, in *Geography*, a harbour on the coaſt of Patagonia, S. of cape Blanco, and about 3 leagues from Penguin iſland, having a remarkable rock, riſing from the water like a ſteeple, on the ſouth ſide of its entrance; and this rock ſerves as an excellent mark to know the harbour, which it would be otherwiſe difficult to find. The mouth of the harbour is very narrow, and has many rocks and ſhoals about it, and a very rapid tide running at the rate of eight miles an hour. The adjoining country for ſeveral miles is barren and deſolate, without a ſingle tree or ſhrub. It abounds with guanicoes, reſembling our deer, but much larger, ſome of them being 13 hands high, very ſhy and very ſwift, and an iſland within the harbour is covered with ſeals, many of which are larger than a bullock. Birds are alſo very plentiful.

DESISE, a town of France, in the department of the Saone and Loire, and diſtrict of Autun; 15 miles E. of Autun.

DESMAISEAUX, PETER, in *Biography*, was born at Auvergne in the year 1666. He came at an early age into this country, and acquired a very accurate knowledge of its language and literature. He was elected a fellow of the Royal Society, and is known chiefly by his editions of the works of Bayle and St. Evremond. To theſe he prefixed memoirs of the authors, in which are given many curious particulars of literary hiſtory and anecdote. He wrote the lives of Chillingworth and John Hales; and publiſhed a collection of pieces in philoſophy, hiſtory, mathematics, &c. from the works of Leibnitz, Newton, Clarke, Locke, and other diſtinguiſhed writers. He died in London in 1745. Moreri.

DESMARETS, HENRI, one of the moſt able French muſicians in the reign of Louis XIV., who having married a young lady with her own conſent, and that of her mother, was proſecuted by her father, and condemned to death by the chatlet, and had only time to ſave himſelf from an ignominious death by flight to Bruxelles, where he was appointed maeſtro di cappella to Philip V. king of Spain; and after remaining 14 years in Spain, quitting that country on account of the heat of the climate injuring his wife's health, he obtained the place of ſuperintendant of the muſic of the duke of Lorraine. He was obliged to remain a fugitive the chief part of his life, never having been able to obtain a pardon during the remainder of his inexorable father-in-law's days. However, in the year 1722, during the regency of the duke of Orleans, his ſentence was reverſed, and his marriage declared valid. He died in 1741, at the age of 80, having compoſed ſeven or eight operas, chiefly ſerious, which were much admired in their day.

DESMARS, NICHOLAS, phyſician to the town of Boulogne, was author of ſeveral uſeful publications on botany, mineralogy, and medicine, publiſhed about the middle of the laſt century. "Obſervations d'hiſtoire naturelle faites aux environs du Beauvais," 1749, treating of the air, water, plants and minerals found in the neighbourhood of the town, and of the diſeaſes peculiar to the place, and dependent, he thinks, on the water and ſoil. The work was reprinted, conſiderably enlarged, in 1759, and in 1762, 12mo. "Lettre concernant quelques plantes qui naiſſent en Picardie;" printed with the memoirs of the academy at Amiens, of which he was a member. He wrote alſo, in 1762, on a diſeaſe, then raging among the ſheep; and in the following year, on a ſimilar epidemic among dogs. In 1767, he publiſhed a tranſlation from the Greek, of the epidemics of Hippocrates, with notes and illuſtrations, 12mo., which is much commended, and has manifeſtly a reference to his firſt work. Haller Bib. Botan.

DESMOND, in *Geography*, the name of an ancient diſtrict of Ireland, which contained part of the preſent counties of Kerry

Kerry and Cork. The name implies South Munſter; and it was formerly ſubject to the M'Carthys, one of whom, as king of Deſmond, ſwore fealty to Henry II. After the Engliſh invaſion, the Fitzgeralds eſtabliſhed themſelves there by marriage, and became powerful ſupporters of the Engliſh intereſt in the ſouth. A branch of this family (from which are alſo deſcended the dukes of Leinſter, the earl of Kerry, and ſeveral reſpectable families of commoners,) was made earl of Deſmond in 1329. Far removed from the ſeat of government, theſe earls paid very little attention to its orders, and carried on frequent wars with the Ormond family, and other chieftains. The 16th earl was in open rebellion againſt queen Elizabeth, and being taken was beheaded on the ſpot, and his forfeited eſtates were divided amongſt Engliſh undertakers. His ſon died in priſon, in 1608, and the Deſmond branch of the Fitzgerald family ſoon after became extinct. The title was given to the family of Fielding. Smith's Cork, &c.

DESMOS, in *Botany*, (δεσμος, *a chain*, alluding to the chain-like, or rather beaded, form of the ſeed-veſſels,) a genus founded by Loureiro, Fl. Cochinch. 352. Claſs and order, *Polyandria Polygynia*. Nat. Ord. *Annonæ*, Juſſ.

Eſſ. Ch. Calyx of three leaves, flat. Petals ſix, lanceolate. Berries numerous, oblong, with numerous bead-like conſtrictions, each of which contains a ſingle ſeed.

Loureiro cites ſeveral plants as ſimilar to this genus, to which it has no affinity, nor ſcarcely any reſemblance; but he rightly indicates its relationſhip to *Uvaria*, *Annona*, &c. It is unqueſtionably of the ſame genus with *Uvaria zeylanica*, Aublet Guian. v. 1. 604. t. 243, (Funis muſæius, Rumph. Amboin. v. 5. 78. t. 42; Piper æthiopicum, Matth. Valgr. 526. Lob. Ic. v. 2. 205;) but ſcarcely with Narum Panel, Hort. Malab. v. 2. 11. t. 10, which laſt ſhould ſeem to be *Uvaria zeylanica* of Linnæus. It appears probable that the above plant of Aublet, which is a tree, and the two ſpecies in Loureiro, both ſmall ſhrubs and very nearly akin to each other, may properly belong to the genus *Unona*, Linn. Suppl. 44 & 270, the character of which would in that caſe require emendation; or rather perhaps the *Unona* itſelf, along with the plants in queſtion, ought altogether to be referred to *Uvaria*. S.

DESNY, in *Geography*. See Dezny.

DESOJA, a town of Spain, in Navarre; 10 miles S. W. of Eſtella.

DESOLATION, Cape, the S. E. point of the bay of St. Barbara, near the ſtraits of Magellan or Magelhaens, ſo called by captain Cook, becauſe near it commenced the moſt deſolate and barren country he ever ſaw. It is ſituated in S. lat. 54° 55′. W. long. 72° 12′. About four leagues to the eaſt of this cape, is a deep inlet, at the entrance of which lies a pretty large iſland, and ſome others of leſs note. Nearly in this ſituation ſome charts place a channel leading into the ſtraits of Magelhaens, under the name of ſtraits of Jelouzel. The coaſt is entirely compoſed of rocky mountains, without the leaſt appearance of vegetation. The mountains terminate in horrible precipices, whoſe craggy ſummits ſpire up to a vaſt height; ſo that hardly any thing in nature can appear with a more barren and ſavage aſpect, than the whole of this country. The inland mountains were covered with ſnow; (Dec. 19, 1774) but thoſe on the ſea-coaſt were not. The former were thought to belong to the main of Terra del Fuego, and the latter to be iſlands, ſo ranged, as apparently to form a coaſt.

Desolation *Iſland*, a name given by captain Cook in his third voyage to *Kerguelen's-land*, which ſee.

DE SON TORT Demesne, in our *Law*, words of form, uſed in an action of treſpaſs by way of reply to the defendant's plea. Thus, if A. ſues B. in ſuch an action, B. anſwers for himſelf, that he did that which it calls a treſpaſs by the command of C. his maſter. A. replies that B. did it "de ſon tort demeſne, ſans ce que C. luy commande modo et forma;" that is, B. did it of his own wrong, without C.'s commanding him in ſuch manner and form.

DESPAIR, is the thought of the unattainableneſs of any good, producing in ſome minds, and on ſome occaſions, uneaſineſs or pain; on others reſt and indolence.

Despair, in *Geography*, a bay on the ſouth-weſtern ſide of the iſland of Newfoundland, adjoining to Fortune bay on the north-eaſtward.

DESPARS, or De Partibus, James, in *Biography*, a native of Tournay, where he was born, towards the end of the fourteenth century, was in high reputation both as a divine, and as a phyſician. He was one of the canons, and treaſurer to the church at Tournay. In 1414, he was ſent by the univerſity at Paris, as one of the deputies to the council at Conſtance. He preſented to the univerſity a ſilver mace, in the year 1410, and in 1455, a ſecond, to be carried before the preſident; in conſideration of which the univerſity inſtituted a maſs, to be performed annually on the 4th of January, for the repoſe of his ſoul. Returning from his embaſſy to Conſtance, he retired to Tournay, where he died, in 1465. He left many works in manuſcript, ſeveral of which were thought ſufficiently important to be printed. The principal was a tranſlation and commentary on the canons of Avicenna. "Ego, Jacobus Deſpars," he ſays, in the preface, "de Tornaco, magiſter in medicina Pariſiis, expoſui ad longum totum primum librum canonis Avicennæ, incipiens anno Domini, 1432, et finiens anno 1453;" ſo that he employed twenty-one years on the work. The art of printing was divulged ſoon after the death of Deſpars, and this work was printed in four volumes folio, in 1498. In 1504, his "Gloſſa interlinearis in practicam Alexandri" was printed in 4to. at Lyons. Many other of his works were printed in ſucceſſion. They were of value in their time; but are now little noticed. For their titles, ſee Eloy. Dict. Hiſt.

DESPORTES, John Baptist, phyſician to the king of France, and correſpondent member of the Royal Academy of Sciences at Paris, was a native of Vitre, a town in Bretagne. After practiſing ſome years at Paris, he was appointed phyſician to the iſland of Domingo, where he died, after a reſidence of about ten years, in 1748. He left an intereſting and curious work, "Hiſtoire des Maladies de Saint Domingue," which was printed in the year 1770, in 3 vols. 12mo. Beſides an account of the diſeaſes common in Domingo, it contains deſcriptions of all the plants which the author found in the iſland. In this he has corrected ſeveral errors in the accounts left by Plumier, and Barrere, and has added, where he could obtain them, the names by which they were known by the native Caribbees; alſo a pharmacopœia, giving the qualities, or virtues, of the plants. Eloy. Dict. Hiſt.

Desportes, Francis, an eminent painter, was born at the village of Champigneul, in Champagne, in the year 1661; and being a diſciple of Nicaſius Bernard, imitated his manner of painting. The ſubjects which he ſelected were flowers, inſects, animals, and repreſentations of the chace, and theſe he deſigned and coloured with much truth; his local colours being very good, and the aerial perſpective well managed. He was chiefly employed in the ſervice of Lewis XIV.; and accompanied the French embaſſador, the duke d'Aumont, to London, where he was much encouraged. He died in 1743. Pilkington.

DESPOT, a title or quality given to the princes of Walachia,

Wallachia, Servia, and ſome of the neighbouring countries.

The word, in its firſt origin, ſignified the ſame with the Latin herus, and the Engliſh maſter: but, in time, it underwent the ſame fate on medals, as, among the Latins, Cæſar did with regard to Auguſtus; ΒΑCΙΛΕΥC anſwering to Auguſtus, and ΔΕCΠΟΤΗC, *deſpotes*, to Cæſar. See CÆSAR.

Thus, Nicephorus, having ordered his ſon Stauracius to be crowned, the ſon, out of reſpect, would only take the name ΔΕCΠΟΤΗC, leaving to his father that of ΒΑCΙΛΕΥC. For it is to be noted, that it was juſt about the time that the emperors began to ceaſe to uſe Latin inſcriptions.

This delicacy, however, did not laſt long; for the following emperors preferred the quality of ΔΕCΠΟΤΗC, to that of ΒΑCΙΛΕΥC, particularly Conſtantine, Michael Ducas, Nicephorus Botoniates, Romanus Diogenes, the Comneni, and ſome others.

In imitation of the princes, the princeſſes likewiſe aſſumed the title of ΔΕCΠΟΙΝΑ.

It was the emperor Alexius, ſurnamed the Angel, that created the dignity of deſpot, and made it the firſt after that of emperor, above that of Auguſtus, or Sebaſtocrator, and Cæſar. See AUGUST.

The deſpots were uſually the emperors' ſons, or ſons in-law, and their colleagues, or copartners in the empire, as well as their preſumptive heirs. The deſpots, that were ſons of the emperors, had more privileges and authority than thoſe that were only ſons in-law. Codin. p. 38. deſcribes the habit and ornaments of the deſpot. See the notes of father Goar on that author.

Under the ſucceſſors of Conſtantine the Great, the title deſpot of Sparta was given to the emperor's ſon, or brother, who had the city of Sparta, or Lacedæmon, by way of apannage.

DESPOTISM, or DESPOTIC *Government*, a form of government wherein the prince is abſolute and arbitrary, doing whatever he liſts, without being checked by any other power. Such are moſt of the eaſtern governments; as thoſe of the mogul, grand ſeignior, ſophi of Perſia, &c.

From the nature of a deſpotic power, it follows, that the ſingle perſon inveſted with this power, commits the execution of it alſo to a ſingle perſon. The creation of a vizir, ſays Monteſquieu, is a fundamental law of this government: and, accordingly, the Eaſtern kings are never without vizirs. As virtue is neceſſary in a republic, in a monarchy honour, ſo fear is neceſſary in a deſpotic government: as to virtue, there is no occaſion for it; and honour would be extremely dangerous. Perſons ſetting a value upon themſelves would be likely to create revolutions; and, therefore, fear muſt depreſs all their ſpirits, and extinguiſh every ſpark of ambition. As a deſpotic prince can have no notion of true glory, war is carried on under ſuch a government in its full natural fury, and a leſs extent is given to the law of nations, than in other ſtates. As fear is the principle of deſpotic government, its end, beſides the pleaſures of the prince, is tranquillity; a tranquillity, however, that cannot be called a peace; it is merely the ſilence of thoſe towns which the enemy is ready to invade. As the ſtrength does not lie in the ſtate, but in the army that founded it; in order to defend the ſtate, the army muſt be preſerved, how formidable ſoever to the prince. In deſpotic ſtates, religion, or rather ſuperſtition, has greater influence than any where elſe; it is a fear added to fear; and, therefore, it is not unaptly obſerved by Gibbon, that deſpotiſm originates in ſuperſtition; or it may be truly ſaid to derive its chief ſupport from it, in connection with the military power which it commands. In Mahometan countries, it is partly from their religion that the people derive the ſurpriſing veneration which they have for their prince. Of all deſpotic governments, there is none that labours more under its own weight than that wherein the prince declares himſelf the proprietor of all the lands and heir to all his ſubjects. Hence ariſes the neglect of agriculture; and if the prince intermeddles likewiſe in trade, all manner of induſtry is ruined. Under this ſort of government nothing is repaired or improved. In deſpotic governments, where the prince's brothers are equally his ſlaves and rivals, prudence requires that their perſons be ſecured; eſpecially in Mahometan countries, where religion conſiders victory or ſucceſs as a divine deciſion in their favour; ſo that they have no ſuch thing as a monarch *de jure*, but only *de facto*. The princes of deſpotic ſtates have always prevented the uſe of marriage. They generally take many wives, eſpecially in that part of the world where abſolute power is in ſome meaſure naturalized, *viz.* Aſia. Hence, they have ſuch a multitude of children, that they can hardly have any great affection for them, nor the children for one another. The reigning family reſembles the ſtate; it is too weak in itſelf, and its head too powerful; it ſeems very numerous and powerful, and yet is ſuddenly extinct. Poverty, and uncertainty of property, in a deſpotic ſtate, render uſury natural; each perſon raiſing the value of his money in proportion to the danger he ſees in lending it. Miſery, therefore, pours in from all parts into thoſe unhappy countries: they are bereft of every thing, even of the reſource of borrowing. Hence it is, that a merchant under this government is incapable of carrying on a great trade; for, if he were to encumber himſelf with a large quantity of merchandiſe, he would looſe more by the exorbitant intereſt he muſt give for money, than he could poſſibly get by his goods. A government cannot be unjuſt, without having hands to exerciſe its injuſtice. The embezzling of the public money is, therefore, natural in deſpotic ſtates. As this is a common crime under this government confiſcations are very uſeful. In this kind of government, authority muſt ever be wavering; nor is that of the loweſt magiſtrate leſs ſteady than that of the deſpotic prince. As the prince's will is the law, it is neceſſary that thoſe who will for him ſhould follow his ſubitaneous manner of willing. In deſpotic governments, of courſe, there are no laws; the judge is himſelf his own rule; and in theſe governments the prince himſelf may be judge. The principle of deſpotic government is ſubject to a continual corruption, becauſe it is in its very nature corrupt. Other governments are deſtroyed by particular accidents which do violence to the principles of each conſtitution: this is ruined by its own intrinſic imperfection, when no accidental cauſes impede or corrupt the principles on which it is founded. It maintains itſelf, therefore, only when circumſtances drawn from the climate, religion, ſituation, or genius of the people, oblige it to follow ſome order, and to admit of ſome rule. By theſe things its nature is forced without being changed: its ferocity remains; and it is made tame and tractable only for a time. From the nature, properties, and effects of a deſpotic government, one might imagine that it would meet with a general and perpetual oppoſition. But, notwithſtanding the love of liberty, ſo natural to mankind, notwithſtanding their innate deteſtation of force and violence, moſt nations, ſays Monteſquieu, are ſubject to this very government. This, he ſays, is eaſily accounted for. In order to form a moderate government, it is neceſſary to combine the ſeveral powers, to rule, temper, and ſet them in motion, to give, as it were, ballaſt to one, in order to enable it to reſiſt another.

This is a maſter-piece of legiſlation, rarely produced by hazard, and ſeldom attained by prudence. On the contrary, a deſpotic government offers itſelf, as it were, at firſt ſight; it is uniform throughout; and as paſſions only are requiſite to eſtabliſh it, this is what every capacity may reach.

As republics provide for their ſecurity by uniting, deſpotic governments do it by ſeparating, and by keeping themſelves, as it were, ſingle. They ſacrifice part of the country, ravage and deſolate the frontiers; and by theſe means render the heart of the empire inacceſſible. It preſerves itſelf, likewiſe, by another kind of ſeparation; which is, by putting the moſt diſtant provinces into the hands of a feudatory prince. The mogul, the king of Perſia, and the emperors of China, have their feudatories; and the Turks have found their account in putting the Tartars, the Moldavians, the Wallachians, and, formerly, the Tranſylvanians, between themſelves and their enemies.

DESPOUILLE, Fr. in *Heraldry*, is the whole caſe, ſkin, or ſlough, of a beaſt, with the head, feet, tail, and all appurtenances, ſo that, being filled, or ſtuffed, it looks like the entire creature.

DESPREAUX, in *Biography*. See Boileau.

DESPUMATION, of *de*, *priv.* and *ſpuma*, *froth*, the clarification of any liquor, by throwing up its foulneſs in a froth, and taking that off.

DESQUAMATION, from *de*, and *ſquamo*, *I ſcale*, expreſſes the flaking or ſcaling of carious bones. See Exfoliation.

DESS, in *Agriculture*, a term applied to any ſquare portion of cut fodder; thus, a deſs of hay ſignifies a cut of hay, &c.

Dess-*up*, ſignifies to pile up any ſort of cattle fodder, &c. in a neat manner.

DESSAU, in Latin *Deſſavia*, in *Geography*, a conſiderable town of Germany, in the principality of Anhalt Deſſau, in the circle of Upper Saxony, and reſidence of the prince of Anhalt Deſſau, whoſe dominions, ſince the peace of Tilſit, are in the conſcription of the new kingdom of Weſtphalia. Deſſau is ſituated in a delightful plain on the river Mulde, which, at a ſmall diſtance from the town, runs into the Elbe. The palace is a fine building; the ſtreets of the new part of the town are ſpacious and elegant. There are two Calviniſt churches and one Lutheran, a grammar-ſchool, ſeveral charitable foundations, and ſome manufactures of woollen cloth, ſtockings, and hats But Deſſau has more particularly acquired ſome celebrity within the laſt 30 years, from two inſtitutions eſtabliſhed here, one for the education of boys of good family, on principles nearly allied to thoſe ſuggeſted by J. J. Rouſſeau. This inſtitution, known by the name of *Philantropinum*, owed its origin to the celebrated Baſedow, (ſee Basedow,) who, for ſeveral years, conducted it with the greateſt ſucceſs, and whoſe elementary writings opened the career in which Campe, Villaume, Saltzmann, and other German literati, have ſo eminently diſtinguiſhed themſelves. The ſecond inſtitution, equally favourable to the diffuſion of knowledge, was a printing preſs and library, for the printing and publiſhing of works on account of their authors, without the interference of a bookſeller; the beneficial conſequence of which was, that the German publiſhers offered better prices for the manuſcript writings of men of known celebrity, and that young authors might feel the pulſe of the public taſte, by publiſhing their productions on their own account. Both theſe eſtabliſhments were warmly patronized by the prince, who is ſtill at the head of the principality of Anhalt Deſſau.

Near Deſſau are two ſummer palaces, Louiſium and Wörlitz, which ſee.

DESSENIUS, Bernard, in *Biography*, born at Amſterdam in 1510, was ſent firſt to Louvain, where he ſoon diſtinguiſhed himſelf by his acquirements in claſſical literature. Declaring at length for the practice of medicine, he went to Bologna, in Italy, and, in 1538, he took his degree of doctor in that faculty. A vacancy happening ſoon after at Groningen, he accepted the office of profeſſor, in the practice of medicine, which he taught with reputation for nine years. From thence, invited by Echtius, profeſſor in medicine there, he went to Cologne, where he approved himſelf ſo well, as to be admitted member of the college of phyſicians, and to receive a conſiderable penſion from the government. This he retained to the time of his death, which happened in 1574. He was author of ſeveral uſeful works. His "De Compoſitione Medicamentorum," fol. 1555, contains many valuable obſervations, and improvements on the formulæ, uſed in his time. "De peſte, Commentarius, preſervatio, et curatio," Col. 1564, 4to. He ſpeaks of a leathern jacket, which had paſſed into the hands of 25 perſons, who had received the infection from it, and been deſtroyed, before the cauſe was diſcovered. He wrote alſo in defence of the ancient medicine, and againſt the practice introduced by Paracelſus. Haller. Bib. Med. Pract.

DESSERT, or Desart, Fr. the laſt ſervice brought on the tables of people of quality, when the meats are all taken off. The deſſert conſiſts of fruits, paſtry-works, confections, &c.

DESSICATIVE, or Desiccative, from *deſicco*, *I dry up*, in *Medicine*, a remedy that has the virtue of drying up ſuperfluous moiſture; uſed to ſkin over old ſores, &c. We ſay, a deſiccative unguent, &c.

Pimpinella is held deterſive, deſiccative, and vulnerary. Lemery.

DESSOUBRE, in *Geography*, a river of France, which runs into the Doubs, at St. Hypolite.

DESTAKTUL, De, a Tartarian village of Siberia; 48 miles S.W. of Yakutſk.

DESTILLATION, or Distillation, in *Chemiſtry*. See Distillation.

DESTINIES, in *Mythology*. See Parcæ.

DESTINY, from *deſtino*, *I order*, the order, diſpoſition, or chain of ſecond cauſes appointed by Providence; and importing, or carrying with it, a neceſſity of event.

According to many of the heathen philoſophers, deſtiny was a ſecret and inviſible power, or virtue, which, with incomprehenſible wiſdom, conducted what to us appears irregular and fortuitous. This amounts to what we call God.

The Stoics, by deſtiny, underſtood a certain concatenation of things, which from all eternity follow each other of abſolute neceſſity, there being no power able to interrupt their connexion. This anſwers, in a great degree, to the ideas entertained by ſome of Providence.

But the Stoics made even the gods themſelves ſubject to the neceſſity of this deſtiny. The truth is, the Stoics rather define what the word deſtiny ſhould ſignify, than what it did ſignify in common language; for they had no diſtinct idea of this power, to which they attributed thoſe events. They had only a vague, confuſed idea of ſome kind of chimera, or unknown cauſe, to which they referred that invariable diſpoſition, and eternal concatenation of all things. There is no real being to which the ſame deſtiny can agree. The heathen philoſophers, who had framed a notion thereof, ſuppoſed it to exiſt, without knowing preciſely what they meant by it. But men, not daring on the one ſide to impute to Providence the evils and misfortunes that befel them, as they imagined, undeſervedly; and on the other ſide, not being

ing willing to allow that it was their own fault, formed this phantom of deſtiny, to bear the weight of all the evil.

DESTOUCHES, PHILIP NERICAULT, in *Biography*, was born at Tours in the year 1680. He was ſent early to Paris to ſtudy the law, but the conſequences of a love affair in which he engaged at ſixteen made it neceſſary for him to leave that ſituation; and having no reſources, he entered as a private ſoldier into a regiment then under orders for Spain. At the ſiege of Barcelona he narrowly eſcaped with his life. Shortly after this, he entered into a provincial company of players, with whom he viſited Switzerland, became the poet of the party, and compoſed a comedy which was acted with great applauſe in that country, and afterwards in France. While he was at Soleure, he attracted the attention of the marquis de Puyſieux, the French ambaſſador, who made him his private ſecretary, and obtained for him a reſpectable rank in life. On his return to Paris, he brought out with great ſucceſs ſeveral comedies: by theſe he was raiſed to a high rank among the writers of the time. He was afterwards ſent by the regent duke of Orleans to England as aſſiſtant to the abbé Dubois, in the negociations between the two courts. At the court of London he reſided 7 years as the ſole reſident: here he married, but circumſtances obliged him for ſome time to keep the matter a perfect ſecret. His conduct in England was highly approved, and duties of the ſame kind were afterwards offered him, which he declined, preferring a literary retreat to the buſineſs and buſtle of a diplomatic ſtation. At the age of ſixty, he devoted himſelf entirely, and employed his talents in the ſervice of religion. He died at the age of 74, and his works were collected and printed in four volumes quarto, which were afterwards publiſhed in 10 volumes 12mo. As a comic writer, he is inferior to Regnard in gaiety and humour, to Moliere, in truth and nature, and in unforced pleaſantry; but by many he is thought to deſerve the place next to theſe authors; he ſurpaſſes them in the morality and decorum of his pieces, and he had the art of attaining the pathetic without loſing the *vis comica*, which is the eſſential character of this ſpecies of compoſition. In the various connections of domeſtic life, he maintained a truly reſpectable character, and in early life, he gave evidence of his filial duty, by ſending 40,000 livres out of his ſavings to his father, who was burdened with a large family.

DESTOUCHES, ANDRE' CARDINAL, a voluminous compoſer of French operas on Lulli's plan, written chiefly by La Motte: theſe have been long forgotten; but his voyage to Siam with the abbé de Choiſis, is ſtill remembered. He died at Paris in 1749, aged 75.

DESTRUCTION, paſſively taken, is the corruption or annihilation of ſomething before exiſting. See CORRUPTION.

A thing paſſes from *eſſe* to *non eſſe*, either by corruption, when nothing of the ſubſtance is loſt, but only the accidents, *viz.* the diſpoſition of parts; or, by annihilation, when both ſubſtance and accidents are loſt.

DESTRUCTION *iſland*, in *Geography*, lies off the coaſt of New Albion, in N. lat. 47° 37'. W. long. 124° 11'. It is about a league in circumference, level, and almoſt entirely barrren, producing only a few dwarf trees; although the country to the ſouthward of it exhibits an appearance of the greateſt fertility.

DESUDABÆ, in *Ancient Geography*, a town of Thrace, in the country of the Mœdi, according to Livy.

DESUDATION, from *deſudo, I ſweat much*, expreſſes a profuſe and inordinate ſweating, followed by the irruption of ſudamina, or heat-pimples.

DESULTOR, from *deſilio, I vault*, in *Antiquity*, a vaulter, or leaper, who jumped off one horſe upon another.

Among the Scythians, Indians, and Numidians, the cavaliers, or horſemen, who ſerved in the wars, were very expert deſultores; that is, they always carried with them at leaſt two horſes, and when that they were mounted on grew weary, or wanted breath, they leaped with great agility and addreſs, upon the other which they led in their hand.

The Greeks and Romans borrowed the ſame practice from thoſe barbarous nations; but they only uſed it in their games, races, and funeral ſolemnities; and never, that we read of, in war. The deſultores, therefore, were, among the people of Aſia and Africa, ſoldiers; but, among the Romans, &c. they were no more than tumblers and poſture-maſters. Euſtathius, on Homer's Iliad, lib. iv. aſſures us, that inſtead of two, they had ſometimes four or ſix horſes all a-breaſt, and would jump from the firſt to the fourth or ſixth, which was the maſter-piece of their art.

DESUNNAY, in *Geography*, a river of Wales, in the county of Merioneth, which runs into the Iriſh ſea, five miles S.E. from Surnabugh point.

DESVRES, formerly called *Déſures*, and *Déſurennes* is a ſmall town of France, chief place of a canton, in the department of the Pas de Calais, diſtrict of Boulogne, 9 miles E. of that place. It has 2109 inhabitants. The canton reckons a population of 9443 individuals, diſtributed in 23 communes, on a territorial extent of 195 kiliometres.

DESUVIATII, in *Ancient Geography*, a people of Gallia Narbonnenſis, who occupied, according to Pliny, the vicinity of the Anatilians and Cavarians, on the banks of the Rhone. D'Anville places them N. of Arelate.

DESWARTE, in *Geography*, a river of Brabant, which runs into the Demer, near Dieſt.

DETACHE', *Fr.* A term in *Muſic* equal to *ſciolto* or *ſtaccato*, Ital. and detached, ſeparated, accented, and cut, in Engliſh: when, inſtead of ſuſtaining the notes during their whole value, they are performed as if there was a reſt after each, equal to half the length of the note it follows. This ſhort and dry manner of executing the notes is uſually expreſſed by lengthened points, or accents, thus ‴

DETACHED PIECES, in *Fortification*, are demi-lunes, ravelins, horn and crown-works, and even baſtions, when ſeparated, or at a diſtance from the body of the place.

In painting, the figures are ſaid to be well detached, or looſened, when they ſtand free and diſengaged from each other, are no where confounded together, but ſtand out with a ſtrong relievo from the ground, and from each other.

DETACHMENT, as a military term, refers to the ſending away a portion of any force upon any particular ſervice. We generally conſider a detachment to be rather a ſmall portion of the whole body; viewing it as ſtill appertaining thereto, and acting under the authority by which it was detached. Thus eſcorts, foraging-parties, &c. whether from one corps, or compoſed of drafts from ſeveral, though all of different claſſes, ſuch as horſe, infantry, artillery, engineers, pioneers, &c. all come under this denomination.

It is perhaps difficult to adduce any part of the military ſcience that requires more judgment than the detachment of various parties for the neceſſary purpoſes of ſupply, communication, ſurprize, or reinforcement. When we look back into the annals of military events, there appear numberleſs inſtances of ruin occaſioned by the injudicious and incautious manner of detaching ſmall parties from the main body. Hence we cannot but coincide with the practice of the greateſt generals, ſuch as the duke of Marlborough, marſhall Turenne, prince Eugene, the great Frederick, the no leſs

admirable Washington, and many others, who seemed to avoid detachments, at least small ones; considering them, no doubt, as being easily cut off. Those generals usually kept their forces as much concentrated as the means of subsistence, lodging, &c permitted.

The general who sends out numerous small detachments in various directions, while in the vicinity of an enemy, subjects them to be cut off in detail, and to have his head-quarters attacked by any enterprizing partizan. It should ever be recollected, that detachments generally are forced to self-preservation, and leave to the care of the main body such others as may not be within sight: hence, when attacked in their rear, these small parties are ordinarily obliged to surrender. Nor is it advisable, even in a friendly country, to allow too much dispersion of a force; for when riots happen, or that orders are suddenly received for a new destination, it will be found more difficult, than common observers may suppose, to rescue from danger in the former case, or to concentrate the whole in the latter instance, so as to move off in full force, with alacrity and due order.

In short, small detachments, like centinels too far removed from their posts of relief, are open to every danger, and in the end perform very insignificant services. In many instances it is better to move a large army, to effect what may be considered comparatively trifling, rather than to subject a small portion to the danger of being cut off.

Detachment *of a fleet or squadron*, a certain number of ships chosen by an admiral or commodore from the rest of the fleet, and charged to execute some particular service.

DETAINER, in *Law*. See Forcible *entry*.

DETENT, in *Horology*, is a piece of steel that detains or arrests the motion of one wheel that would otherwise continue its motion as actuated by the maintaining power. In the striking part of a clock, where a count-wheel is used, that bar which falls in the way of the notches in the count-wheel, and stops the motion of the striking train when the last blow is made, is called the detent: but in a chronometer, that piece of metal which catches a tooth of the escapement-wheel, and holds it while the balance performs its oscillation, is the detent; and may, according to the French constructions, turn on pivots, or otherwise be made elastic without pivots, agreeably to the English practice. Many of the clock-escapements also have detents, as may be seen more particularly under our article Escapement.

DETENTION, from *detineo, I detain*, in *Law*, the possession or holding of lands, or the like, for some other claimant.

The word is chiefly used in an ill sense, for an unjust withholding, &c.

The canons condemn a person who has intruded into a benefice, to make restitution of all the fruits thereof, during the time of his unjust detention.

DETERGENTS, in *Medicine* and *Surgery*, constitute a class of remedies which have been supposed to cleanse or deterge unhealthy humours. The old theories on this subject are now wholly exploded; but the fact remains, that certain substances applied to morbid parts, and especially to sores, will render the surface more clean and healthy.

Detergents are either mechanical or chemical. Pure water is one of the best detergents for common wounds: but where an ulcer remains sordid and ill-conditioned, it is often useful to apply a solution of some irritating substance, which produces an healthy discharge of pus. See the articles Abstergent and Cicatrix.

The detergents in general use for local applications, are turpentine, nitre, verdigris, alum, vitriolated zinc and copper, red nitrated mercury, or red precipitate, lunar caustic, or nitrated silver, &c. But, for internal use, physicians prescribe what are called balsamic medicines, absorbents, and vulneraries, which have been erroneously imagined to act as healing, suppurating, and cleansing remedies, to the internal parts of the body.

DETERIORATION, an act whereby a thing is impaired or rendered worse.

When the deterioration of a commodity, seized by an officer, arises from the fault of the keeper, he is answerable for the same.

J. Frederic Mayer, professor at Leipsic, printed a treatise of deterioration, in the year 1695, under the title of "Tractatus de Deterioratione."

DETERMINATE Number. See Number.

Determinate *Problem*, is that which has but one, or at least but a certain number of solutions; in contradistinction to an indeterminate problem, which admits of infinite solutions.

Such, *e. gr.* is the problem: To describe an isosceles triangle on a given line, whose angles at the base shall be double that at the vertex: which has only one solution; as that which follows has two, *viz.* To find an isosceles triangle, whose area and perimeter are given.

A determinate problem may either be simple or linear, plane, solid, or surfolid.

Determinate *Ramosus*, *Caulis*, in *Botany*, is often applied by Linnæus, in his later works, to that kind of stem which may be called abruptly branched, each branch, after terminating in flowers throwing out a number of fresh shoots, in a circular order, just below the origin of those flowers. This term does not occur in the Philosophia Botanica, nor any other elementary work of the learned Swede. It is exemplified in many species of Heath, as well as in the genus *Azalea*. See Caulis.

DETERMINATION, in *Physics*, the disposition or tendency of a body towards one way, rather than another. Heavy bodies have a determination towards the centre of the earth.

Determination is also used for the action whereby a cause or agent is limited, or restrained, to act, or not act, in this or in that manner.

Determinations, say the schoolmen, proceed either from an efficient cause, in which case the determination is called effective; as, when an artist determines an instrument to a certain action; or from the form, as that determines the indifferency of the matter: and thus our senses are said to be determinations to have ideas upon the presence of external objects.

Or the determination is from the matter or subject that receives the action; and thus the heating of fire upon clay determines it to harden, upon wax to soften, &c.

Or it is from the object; as when we say, colour determines the visual power: or, lastly, it is from the end, as the end determines the desire.

Determinations, again, are either moral or physical. A moral determination is that proceeding from a cause which operates morally, *i. e.* by commanding, persuading, or advising, some effect. This is the only kind of influence or determination which is consistent with man's free moral agency; or indeed with any agency at all.

Physical determination is an act whereby God excites and applies a second cause to act, antecedently to all operation of the creature. Such a determination the Thomists and Dominicans maintain necessary to all the actions of every creature. The Jesuits, on the contrary, deny that God thus determines even second causes; and hold, that God exerts no influence on second causes, but only with the second cause on the action. And thus they exclude a physical determination,

termination, both from natural cauſes, as ſuppoſing them already determined by nature to act; ſo that there needs no other external determination from God to the ſeveral actions; and from free cauſes, as ſuppoſing ſuch a predetermination contrary to our natural liberty. See DESIRE, MOTIVE, VOLITION, and WILL.

A determination to be pleaſed with certain forms, or ideas, an ingenious author calls an internal ſenſe; and a determination to be pleaſed with virtuous actions, characters, manners, &c. a moral ſenſe. See SENSE.

DETERMINATION *of Will*, in *Law*. See ESTATE *at Will*.

DETERMINATIVE PROPOSITION, in *Logic*. See COMPLEX *Propoſition*.

DETERN, in *Geography*, a ſmall town of Holland, in the principality of Eaſt Frieſland, which, till the peace of Tilſit in July 1807, belonged to the king of Pruſſia. This place has lately become faſhionable on account of its mineral waters.

DETERRATION, from *de* and *terra*, is uſed to ſignify a removal of the earth, ſands, &c. from the mountains and higher grounds, down into the valleys and lower parts. This is occaſioned by rains, which waſh the earthy matter down by degrees; but this cannot be very conſiderable, or much raiſe the ſurface of the earth, as ſome have imagined, becauſe a good part of it is ſunk into the clefts and caverns of the rocks and mountains, a great quantity is borne down into rivers, and thence into the ſea, and the richer and finer parts help to compoſe the bodies of plants and vegetables. From this deterration or devolution, as the diſintegration of mountains is called by Woodward and others, the ſecondary ſtrata of the earth, according to ſome theories of geology, had their origin.

DETERSIVE, in *Surgery*, the ſame with *Detergent*, which ſee.

DETERSOR, from *detergo*, *I clear away*, in *Antiquity*, a ſervant whoſe buſineſs it was to attend at dinner, and wipe the table. Pitiſc.

DETERSORIUM, in *Antiquity*, a name given to the common waſh, which was bean-meal, called *lomentum*, or the meal of a ſort of pulſe called *lupines*: this laſt they called *ſmegma*.

The ancients, when they bathed, uſed various waſhes for cleanſing the ſkin; but *natrum*, and this thin froth, called in Greek *aphronitron*, were moſt common.

DETHARDING, GEORGE, in *Biography*, was born at Stetin, about the middle of the 17th century. His father was an apothecary, and well verſed in chemiſtry, to the knowledge of which, having initiated his ſon, he ſent him to Louvain, where he took his degree of doctor in medicine; he was thence invited to Stralſund, and having practiſed medicine there ten years, he was in the year 1680 appointed firſt phyſician to the duke of Mecklenburg. This obliged him once more to change his habitation, and to go and reſide at Guſtrow. He appears to have been living at Guſtrow as late as the year 1696, when he publiſhed his "Nomenclator Chirurgicus." Several of his communications were publiſhed in the Memoirs Academ. Nat. Cur. A ſtill greater number of his eſſays, or diſſertations, were publiſhed by his ſon after his death. The titles of a few of theſe follow; the remainder will be found in Haller's Bib. Med. and in Eloy's Dict. Hiſtor.; *viz.* "De modo ſubveniendi ſubmerſis in Aqua, per Laryngotomiam," Roſtoch, 1714, 4to. The practice has not been much followed, but in extreme caſes ſhould not be omitted; the operation neither requiring much ſkill in the performance, nor being attended with danger. "De Variolarum Inoculatione," 1723, 4to. He was one of the few writers on the continent, who at that early period recommended the practice. "De neceſſitate inſpectionis vulnerum in crimine homicidii," 1726, 4to. Eloy gives the titles of twenty different eſſays.

DETINET, in *Law*. See *Debet* and *Detinet*.

DETINUE, a writ which lies againſt a man who, having goods, or chattels, delivered to keep, refuſes to re-deliver them.

Detinue anſwers, in great meaſure, to the *actio depoſiti* of the civilians.

In this action of detinue it is neceſſary to aſcertain the thing detained, in ſuch manner as that it may be ſpecifically known and recovered. Therefore, it cannot be brought for money, corn, or the like; for that cannot be known from other money or corn; unleſs it be in a bag or ſack, for then it may be diſtinguiſhably marked. In order, therefore, to ground an action of detinue, which is only for the detaining, theſe points are neceſſary (Co. Litt. 286.); 1. That the defendant came lawfully into poſſeſſion of the goods, as either by delivery to him, or finding them; 2. That the plaintiff have a property; 3. That the goods themſelves be of ſome value; and, 4. That they be aſcertained in point of identity. Upon this the jury, if they find for the plaintiff, aſſeſs the reſpective values of the ſeveral parcels detained, and alſo damages for the detention. And the judgment is conditional, that the plaintiff recover the ſaid goods, or (if they cannot be had) their reſpective values, and alſo the damages for detaining them (Co. Entr. 170. Cro. Jac. 681.) But there is one diſadvantage which attends this action; *viz.* that the defendant is herein permitted to wage his law, that is, to exculpate himſelf by oath (Co. Litt. 295.), and thereby defeat the plaintiff of his remedy; which privilege is grounded on the confidence originally repoſed in the bailee by the bailer, in the borrower by the lender, and the like; from whence aroſe a ſtrong preſumptive evidence, that in the plaintiff's own opinion the defendant was worthy of credit. For this reaſon, the action itſelf is of late much diſuſed, and has given place to the action of *Trover*; which ſee.

DETINUE *of Charters*. A man may have detinue for deeds and charters concerning land: but if they concern the freehold, it muſt be in C. B. and no other court. Action of detinue lies for charters which make the title of lands: and the heir may have a detinue of charters, although he hath not the land. If my father be diſſeiſed, and dieth, I ſhall have detinue for the charters, notwithſtanding I have not the land: but the executors ſhall not have the action for them. New Nat. Br. 308.

DETINUE *of goods in frank marriage*, is on a divorce betwixt a man and his wife; after which the wife ſhall have this writ of detinue for the goods given with her in marriage. Mich. 35 Eliz. 1. New Nat. Br. 308.

DETMOLD, or DETHMOLD, anciently *Thietmal*, in *Geography*, an inconſiderable but very old town of Germany, in the county of Lippe, in the circle of Weſtphalia, which is now in the conſcription of the new kingdom of Weſtphalia. It is ſituated on the river Werre, three miles S. of Lemgow, 18 N. of Paderborn, and has a caſtle, which is the uſual reſidence of the counts of Lippe. The town is divided into the old and new town. It has a very excellent grammar ſchool. Cluverius and others ſuppoſe that Detmold is actually the ancient Teutenburg, in the vicinity of which the Roman general Quintilius Varus met with a ſevere defeat.

DETONATION, in *Chemiſtry*, is ſudden combuſtion, attended with a loud and inſtantaneous noiſe. It is ſynonymous with fulmination.

DETONNER, *Fr.* in *Muſic*, to ſing or play out of time, or in falſe intervals, that are equally offenſive in a ſingle part, as in harmony.

DETOUR,

DETOUR, in *Geography*, in Upper Canada, the entrance into lake Huron from Muddy lake to the S. and W. of St. Joſeph's iſland.

DETOUR alſo lies on the N. ſhore of lake Huron, a little to the E. of the iſles au Serpent.

DETOUR *Point* lies on the W. main, in the ſtrait made by St. Joſeph's iſland.

DETOUR *des Anglois*, or *Engliſh Turn*, is a circular direction of the river Miſſiſſippi, ſo conſiderable that veſſels cannot paſs it with the ſame wind that conducted them to it. The two forts and batteries at this place on both ſides of the river are more than ſufficient to ſtop the progreſs of any veſſel. Dr. Cox, of New Jerſey, aſcended the Miſſiſſippi to this place, A. D. 1698, took poſſeſſion, and called the country Carolina. It lies 18 miles below New Orleans, and 87 above the Balize. The banks of the river are ſettled and well cultivated from hence to New Orleans, and there is a good road for carriages all the way.

DETOUR, in the *Military Art*, ſignifies that circuitous route taken by a body of troops, for the purpoſe of evading obſervation, or of paſſing round the flank of an enemy, ſo as to come by ſurpriſe againſt ſome weak part: or to force a paſſage at a point on which the general ſucceſs of the day might depend.

Detours are uſually made in the night time, and require the utmoſt caution. Silence ſhould, as much as poſſible, be obſerved, and the whole equipment ought to be made in a manner ſuitable to the main intention. The men ſhould be ſelected; the ordnance, (if any be uſed,) ſhould be light and well ſupplied with horſes, &c.; and nothing ſhould be allowed to accompany, which could, in the ſmalleſt degree, retard the movement, or require time for arrangement when arrived at the place of attack.

Unhappily our allies have, in almoſt every inſtance, allowed themſelves to be taken in flank, or even to be aſſaulted in their rear, by neglecting to take poſitions which rendered the acceſs by detour difficult: hence we have commonly witneſſed, with pain, that many advantageous movements have been rendered nugatory, indeed fatal, by the neglect of guarding againſt this device: a device which we muſt ever expect an enterpriſing enemy will perpetually reſort to, when his main body may be ſtrongly poſted (if inferior,) or be capable of ſhewing a ſufficient front.

When two different columns, or diviſions, intend to attack by detour, at any given point of the enemy's flank or rear, the utmoſt precaution ought to be uſed to arrive preciſely at the appointed hour, and to diſtract the attention of the troops to be ſurpriſed. Sometimes an attack is made openly by one column, while another makes a ſecret detour with the view to cut off the retreat of the enemy, if he be overpowered; or to create a diverſion in caſe the conteſt ſhould be ſevere, and doubtful. In ſuch caſes much hazard is incurred by both columns; therefore the manœuvre muſt be very cautiouſly managed, and ought to be confided to the ſuperintendance of officers diſtinguiſhed for their courage, diſcretion, and preſence of mind.

DETRAHENS QUADRATUS, in *Anatomy*, a name given by ſome authors, particularly Spigelius, to a muſcle, called by the generality of anatomiſts the platyſma myodes; and, by Albinus, latiſſimus colli. Douglas calls it alſo quadratus genæ. See DEGLUTITION.

DETRANCHE', among the *French Heralds*, ſignifies a line bendwiſe, which does not come from the very dexter angle, but either from ſome part of the upper edge, and thence falling athwart, or diagonally; or form part of the dexter ſide. They ſay, *tranché*, *detranché*, and *retranché*; to denote that there are two diagonal lines, making two partitions in the eſcutcheon, and coming from the angles, and a third from ſome of the other parts above mentioned. See TRANCHE'.

DETRITUS, in *Geology*, is a term uſed for the ſmall fragments and matters formed by the ſuppoſed diſintegration of the primeval mountains of the globe, by the Moſaic and other deluges, which, according to the theories of ſome, have contributed to the formation of the *ſtrata*, which ſee.

DETROIT, in *Geography*, a port town, the principal and the beſt fortified in the country N. W. of the Ohio river. It is the chief town of the county or territory of Wayne, and is ſituated on the weſtern bank of the ſtrait St. Clair, or Detroit river, between lake Erie and lake St. Clair; 18 miles N. of the W. end of the former, and 9 miles below the latter. Detroit contains about 300 houſes, and 1200 inhabitants: it ſtands contiguous to the river, on the top of the banks, which are here about 20 feet high. At the bottom of them there are very extenſive wharfs for the accommodation of the ſhipping, built of wood, ſimilar to thoſe in the Atlantic ſea-ports. The town conſiſts of ſeveral ſtreets that run parallel to the river, which are interſected by others at right angles. They are all very narrow, and not being paved, extremely dirty in wet weather; but for the accommodation of paſſengers there are foot-ways in moſt of them, formed of ſquare logs, laid tranſverſely cloſe to each other. The town is ſurrounded by a ſtrong ſtockade, through which there are four gates; two of them open to the wharfs, and the two others to the N. and S. ſides of the town reſpectively. The gates are defended by ſtrong block-houſes, and on the W. ſide of the town is a ſmall fort in the form of a ſquare, with baſtions at the angles, and having one ſide which commands the river. At each of the corners of this fort is planted a ſmall field-piece: and theſe conſtitute the whole of the ordnance at preſent in the place. The Britiſh kept a conſiderable train of artillery here, but the place was never capable of holding out for any length of time againſt a regular force: the fortifications, indeed, were conſtructed chiefly as a defence againſt the Engliſh. Detroit is at preſent the head-quarters of the weſtern army of the ſtates: the garriſon conſiſts of 300 men, who are quartered in barracks. About two-thirds of the inhabitants of Detroit are of French extraction; and the greater part of the inhabitants of the ſettlements on the river, both above and below the town, are of the ſame deſcription. The former are moſtly engaged in trade, and they all appear to be much on an equality. This is a place of very conſiderable trade; there are no leſs than twelve trading veſſels belonging to it, brigs, ſloops, and ſchooners, of from 50 to 100 tons burthen each. The inland navigation in this quarter is indeed very extenſive; lake Erie, 300 miles in length, being open to veſſels belonging to the port, on the one ſide, and lakes Michigan and Huron, the firſt upwards of 200 miles in length, and 60 in breadth, and the ſecond no leſs than 1000 miles in circumference, on the oppoſite ſide; beſides lake St. Clair and Detroit river, which connect theſe former lakes together, and many large rivers which fall into them. The ſtores and ſhops in the town are well furniſhed with fine cloth, linen, &c.; and its chief trade conſiſts in a barter of coarſe European goods with the natives for furs, deer-ſkins, tallow, &c. The inhabitants are well ſupplied with proviſions of every deſcription, and particularly fiſh, of which the moſt eſteemed is a ſort of large trout, called the "Michillimakin," or white fiſh, from its being caught moſtly in the ſtraits of that name. The want of ſalt was, till of late, attended with great inconvenience: but ſalt ſprings have been diſcovered in various parts of the country, and they are now beginning to manufacture this article for

for themſelves. Some of the ſprings in the weſtern country throw up water ſufficient to yield ſeveral hundred buſhels in the courſe of one week.

There is a large Roman Catholic church in the town of Detroit, and another on the oppoſite ſide, called the Huron church, from its having been devoted to the uſe of the Huron Indians. The ſtreets of Detroit are generally crowded with Indians of one tribe or the other; and amongſt them you ſee numberleſs old ſquaws leading about their daughters, ever ready to diſpoſe of them, *pro tempore*, to the higheſt bidder. At night all the Indians, except ſuch as get admittance into private houſes, and remain there quietly, are turned out of the town, and the gates ſhut upon them. The country round Detroit is very much cleared, and ſo is that on the Britiſh ſide of the river for a conſiderable diſtance above the town. The ſettlements extend nearly as far as lake Huron; but beyond the river La Trenche, which falls into lake St. Clair, they are ſcattered very thinly along the ſhores. The banks of the river La Trenche, or Thames, as it is now called, are increaſing rapidly in population, on account of the great emigration thither of the people from the neighbourhood of Niagara, and alſo of Detroit, ſince it has been evacuated by the Britiſh. The country round Detroit is uncommonly flat, and none of the rivers have a fall ſufficient for turning even a griſt-mill: their corn therefore is ground by wind-mills. The ſoil of the country bordering upon Detroit river is rich though light, and it produces good crops both of Indian corn and wheat. For eight miles below, and about the ſame diſtance above fort Detroit, on both ſides of the river, the country is divided into regular and well cultivated plantations; and from the contiguity of the farmers' houſes to each other, they appear like two long extended villages. The climate is much more healthy than that of the country in the neighbourhood of Niagara river; although intermittent fevers are not uncommon diſorders. The ſummers are intenſely hot, Fahrenheit's thermometer often riſing above 100; and yet a winter ſeldom paſſes over without ſnow remaining on the ground for two or three months.

By the treaty of Grenville, Aug. 1795, the Indians have ceded to the United States the port of Detroit, and all the land to the N., W., and S. of it, of which the Indian title has been extinguiſhed by gifts or grants to the French or Engliſh governments; and ſo much more land is to be annexed to Detroit as ſhall be comprehended between Roſine river on the S.; lake St. Clair on the N.; and a line, the general courſe of which ſhall be ſix miles from the W. end of lake Erie and Detroit river. The fort was delivered up by the Britiſh in July, 1796, according to treaty. It lies 18 miles N. of lake Erie, 724 N.W. by W. from Philadelphia, N. lat. 42° 40'. W. long. 82° 56'. Weld's Travels through North America, vol. ii. Morſe. See MALDEN.

DETROIT *river*, or *Strait of St. Clair*, iſſues from lake St. Clair, and enters the weſt end of lake Erie forming part of the boundary between the United States and Upper Canada. In aſcending it, its entrance is more than three miles wide, but it is perceptibly diminiſhed: ſo that oppoſite to the fort, 18 miles from lake Erie, it does not exceed half a mile in width; from thence to lake St. Clair it widens to more than a mile. The channel of the ſtrait is gentle, and wide and deep enough for ſhipping of great burthen, although it is incommoded by ſeveral iſlands, one of which is more than ſeven miles in length. The ſoil of theſe iſlands is fertile, and by their ſituation preſent an agreeable appearance. The length of the river is 28 miles, and ſeveral ſtreams fall into it, chiefly from the N.W.; *viz.* Bareche, Clora, Gueriere, Detroit, and Huron rivers. On the Detroit are ſeveral windmills, and an orchard adjoins to almoſt every houſe. The ſettlers are numerous, and the improvements extenſive. When the fruit-trees are in bloſſom, the proſpect as you paſs through the ſtrait is as delightful, perhaps, as any in the world.

DETROIT, *le Petit*, lies on the Ottawa river, in Upper Canada, below the upper main forks of the Ottawa river.

DETROIT, in a *Military Acceptation*, relates to thoſe ſituations which appear to be the natural embouchures, or entrances, of areas encloſed among mountains, wilderneſſes, &c. beyond which an army cannot penetrate; ſuch areas being acceſſible from no other quarter. Many large tracts are ſo happily ſituated as to be invulnerable on every ſide, except at a detroit, or ſtraight, where a very ſhort line of defence ſuffices to keep the encloſure perfectly ſecure.

When an army retires to a *Cul-de-ſac* (*i.e.* literally the bottom of the bag,) it may be eaſily excluded from further operations in the field, by a comparatively ſmall force; provided the very entrance is occupied by the detaining power. But if the detroit expands gradually towards the open country, and that there be heights which command the funnel, or entrance, it will demand a ſuperior number to prevent thoſe who have retreated thereto, from iſſuing forth at pleaſure; becauſe the batteries (or flankings) alone, would prevent the occupancy of thoſe poſts that might keep the embouchure cloſely guarded, and prevent the ſaliant column from deploying into line as the ground might admit of enlarging the front.

Nothing can be more favourable than taking poſt in a cul-de-ſac, whoſe entrance is a detroit. When the poſition can be maintained by means of abundant ſtores, both of proviſion and of ammunition; and when the ſituation is airy and healthy; but, on the other hand, nothing can be more hazardous, indeed, more entirely fatal, than the retreat to ſuch, when either proviſion, or ammunition, is likely to fall ſhort. In ſuch caſes a ſurrender muſt take place; as, on two or three occaſions happened to the Romans, who were compelled to lay down their arms, and to paſs under the yoke. A good general, who has confidence in his troops, will, however, do his utmoſt to force the paſſage of the detroit, if it be in the hands of the enemy; if it be in his own poſſeſſion, he will ſally forth, in ſo determined and pointed a manner, as may awe his oppoſers, and, in all probability, obtain either a complete releaſe, or honourable terms, for the gallant troops under his command. The fortifications thrown up at the place where the river St. Lawrence becomes extremely narrow at its fall into lake Erie, in Canada, were deſignated Detroit, on account of the manner in which the adjacent country, as well as the river contracts, and forms a very limited debouchure from the upper country.

DETRUSOR URINÆ, in *Anatomy*, the muſcular covering of the bladder. The membranous receptacle, which receives the urine ſecreted in the kidnies, is covered by a thin ſtratum of muſcular fibres, which ſerve the purpoſe of expelling the contained fluid, when it has accumulated to a certain quantity. This muſcular covering of the urinary bladder has been deſcribed as a muſcle by ſeveral anatomiſts, who have diſtinguiſhed it from its office, by the name of detruſor urinæ. For a more particular account of it, ſee KIDNEY, in which article the whole of the urinary organs will be conſidered.

DETTELBACH, in *Geography*, a ſmall town of Germany, in the grand duchy of Wurzburg, in the circle of Franconia. It is ſeated on the river Mayn. Its church is celebrated for a fine image of the Virgin.

DETTEZ, a town of France, in the department of the Saone and Loire, and diſtrict of Autun; 8 miles W.S.W. of Montcénis.

DETTINGEN, a village of Germany, in the circle of the Lower Rhine, belonging at that time to the elector of Mentz, is famous for the victory which the allied troops of Auſtria and England, led on by king George II. of Great Britain, gained in its vicinity over the French on the 16th of June 1743. It is ſituated on the Mayn, in the diſtrict of Seligenſtadt, between that town and Aſchaffenburg.

DETTOR, a river of N. Wales, which runs into the Tivy, in the county of Cardigan.

DETUNDA, in *Ancient Geography*, a town of Spain, in Bœtica, belonging to the Turduli. Ptolemy.

DEVA, a town of Arabia Felix. Ptolemy.

Deva, a river of ancient Britain, which is evidently the river Dee in Galloway, which falls into the ſea at Kirkcudbright.

Deva, called alſo *Deuna*, or *Deonna*, a place in the ſecond route of Antonine's Itinerary, between Condate and Bovium, in the country of the Cornavii, unqueſtionably ſituated where the city of Cheſter now ſtands; it was a place of great conſideration, a Roman colony, and the head-quarters of the 20th legion. This legion came into Britain in the reign of the emperor Claudius, and was employed in the conqueſt of this iſland, and in many important works and expeditions in different parts of it. Though the 20th legion continued more than two centuries in Britain, it ſeems to have left this country a conſiderable time before the final departure of the Romans. It is moſt probable that it was recalled about the end of the fourth, or beginning of the fifth century, when the continental provinces of the empire began to be much haraſſed by the incurſions of barbarous nations.

Deva, in *Geography*, a ſmall town of Spain, in Biſcay, in the province of Giupuzcoa. It is ſituated on the river of the ſame name, which forms a harbour in the bay of Biſcay, 36 miles S.E. of Bilbao, and 15 N. of Placentia. W. long. 3°. N. lat. 43° 30'.

Deva, a town of Tranſylvania; 10 miles W. of Millenbach.

DEVANA Texalorum, in *Ancient Geography*, a place of Britain, in the country of the Texali, near the eſtuary of the river Diva or Dee, now Old Aberdeen.

DEVAPORATION, in *Phyſics*, is a term uſed by way of contraſt to *evaporation*, which ſee. As heat ſeems to be the principal cauſe of evaporation, as well as of ſolution, and of fluidity in general, the privation of heat may be eſteemed the principal cauſe of devaporation; for, though the air may, by its own power of attraction, or by means of the electricity it may contain, diſſolve and ſuſpend a portion of water, as water diſſolves and ſuſpends a portion of ſalt; yet, by the application of cold, theſe are reſpectively precipitated; and, therefore, heat may be aſſumed as the immediate cauſe of theſe ſolutions. Beſides, water boils *in vacuo* with leſs heat; that is, it evaporates *in vacuo*, more rapidly or more eaſily than in the open air, and therefore the attractive power of the atmoſphere does not ſeem neceſſary to evaporation. When the barometer ſinks, whatever may be the cauſe, the lower ſtratum of air becomes expanded by its elaſticity, being releaſed from a part of the ſuper-incumbent preſſure, and, in conſequence of its expanſion, robs the vapour which it contains of its heat; whence that vapour becomes condenſed, and is precipitated in ſhowers; as is viſible in the receiver of an air-pump. There are, however, two curious circumſtances, relating to the devaporation of water. 1. That the deduction of a ſmall quantity of heat from a cloud or expanſe of vapour, compared with the quantity of heat which was neceſſary to raiſe that vapour from water, will evaporate the whole. This circumſtance is evident in the operation of common ſteam-engines, in which a ſmall jet of water, whoſe heat is often above 48 degrees, perpetually devaporates the ſteam raiſed by a comparatively very great quantity of heat under the boiler. This phenomenon may be thus explained; if a ſmall part of the quantity of vapour be ſuddenly condenſed, a vacuity takes place, and the contiguous walls of vapour expand themſelves into this vacuity; and thus a large area of vapour, perhaps of many miles in circumference, becomes more or leſs expanded; by this expanſion cold is produced, (that is, its capacity of receiving heat is increaſed,) and the whole is devaporated. Something ſimilar to this is often ſeen at the commencement of thunder-ſtorms; a ſmall black cloud at firſt appears, in a few minutes the whole heaven is covered with condenſing vapour, and the accumulation or eſcape of electric matter, ſeems to be rather the conſequence than the cauſe of this ſudden and general devaporation. A ſecond curious circumſtance of aerial devaporation is, that when the particles of aqueous vapour begin to approach each other by the diminution of their heat, they do not generate water exactly in proportion to ſuch diminution of heat; but the condenſation proceeds further, and not only a greater quantity of water is produced, but alſo a quantity of heat is ſet at liberty along with this exceſs of devaporation, and the atmoſphere becomes warmer than before the beginning of condenſation. This exceſs of devaporation beyond the cold which produced it is probably owing to the acquired momentum of the aqueous particles towards each other at the beginning of their condenſation, which carries them ſtill nearer each other: and to the ſmall moleculæ at firſt formed, poſſeſſing a greater attractive power over the uncondenſed vapour in their vicinity, and thus preſſing out more of the latent or combined heat. On this ſubject ſee Dr. Darwin's paper in Phil. Tranſ. vol. lxxxviii.

DEVASTAVIT, or Devastaverunt *bona teſtatoris*, a writ that lies againſt executors or adminiſtrators, for paying debts upon ſimple contract and legacies, before debts on bonds and ſpecialties, &c. for in this caſe they are as liable to action, as if they had ſquandered away the goods of the deceaſed, or converted them to their own uſe; and are compellable to pay ſuch debts by ſpecialty out of their own goods, to the value of what they ſo paid illegally. (Dyer, 232.) But if an executor pays debts upon ſimple contract, before he hath any notice of bonds, it is no devaſtavit; and regularly this notice is by an action commenced againſt him, for the law doth not oblige him to take notice of it himſelf, nor of a judgment againſt his teſtator; becauſe he is not privy to acts done either by or againſt him. 1 Mod. 175. 1 Lev. 115.

Executors keeping the goods of the deceaſed in their hands, and not paying the teſtator's debts; or ſelling them, and not paying off debts, &c., or not obſerving the law which directs them in the management thereof; or doing any thing by negligence or fraud, whereby the eſtate of the deceaſed is miſemployed, are guilty of a devaſtavit, or waſte; and they ſhall be charged for ſo much *de bonis propriis*, as if for their own debt. (8 Rep. 133.) But the fraud or negligence of one executor is not chargeable on the reſt, where there are ſeveral executors. 1 Rol. Abr. 929. See Debt and Executor.

DEVAUX, John, in *Biography*, a native of Paris, born in the year 1610, was educated to the practice of ſurgery, which he appears to have followed to a late period, and with reputation, as we find him inveſted, for the third time, with the preſidency, or deanſhip, of the company of ſurgeons, at the time of his death, which happened in September 1695,

when

when he was in the 85th year of his age. This account we have from his ſon, alſo named John, who ſucceeded to the honourable ſtation, held by his father. It does not appear that the father had publiſhed, or that he left any thing written on the ſubject of medicine, but the deficiency was abundantly ſupplied by the ſon, who beſides ſome not inconſiderable original works, introduced to his countrymen, as editor, or tranſlator, a great number of medical works, written by foreigners. Among the tranſlations, are "Allen's Synopſis Medicinæ Practicæ;" "Harris de Morbis Infantum;" "Cockburne de Gonorhœa;" and "Friend's Emmenologia:" alſo "Epitomes of Anatomy," by Heiſter; and "Dionis. Saviard's Chirurgical Obſervations;" "Boerhaave on the powers of Medicine;" "La Motte's Treatiſe of Midwifery." His original works are, "Le Medicin de ſoi-meme, ou l'art de ſe conſerver la ſante, par inſtinct." Leid. 1682, 12mo. Diſeaſes are cauſed, he ſays, by repletion in the veſſels, and by corruption of the contents of the bowels. They are to be cured by bleeding, by emptying the bowels, and by abſtinence, to prevent a re-accumulation. He cenſures the phyſicians for their general want of ſucceſs in practice, and ſhews them that illiterate countrymen frequently effect cures they are incapable of performing. "Art de faire les rapports en Chirurgie, par M. D. Prevot de la Comp." Paris, 1727. Giving rules for detecting the cauſe of death in perſons who have been ſtrangulated, poiſoned, &c. Both this and the former works have gone through ſeveral editions.

DEUBACH, in *Geography*, a village of Germany, in the duchy of Saxe-Gotha, famous for its brooms, baſkets, and hampers, with which it carries on a conſiderable trade.

DEUCALEDONII, or CALEDONII, in *Ancient Geography*, a people who inhabited the northern part of the iſle of Albion; called by Ammianus Marcellinus *Dicaledones*. See CALEDONIA.

DEUCALION, a name given by Strabo to an iſland, which he places over-againſt a promontory of Theſſaly, in the environs of the Maliac gulf.

DEUCALION, in *Mythology*, was the ſon of Prometheus, who married Pyrrha, the daughter of his uncle Epimetheus. Prometheus, it is ſaid, had been baniſhed into Scythia, to the confines of Caucaſus, during the wars of the Titan princes. His ſon Deucalion, weary of this melancholy retreat, came and ſettled in Theſſaly, in the vicinity of Phthia, or rather, according to the Parian marbles, in Lycoria, near Parnaſſus. The era of his arrival is marked in the ſame chronicle, at the 9th year of the reign of Cecrops at Athens, which commenced, according to the Arundelian marbles, in the year 1582 B. C., or according to the account given by Euſebius, in the year 1556 B. C. or 780 years before the 1ſt Olympiad. Deucalion, it is ſaid, not contenting himſelf with the petty ſtates which he had ſeized upon, made war upon his neighbours, and made himſelf maſter of the Lower Theſſaly, near the river Peneus; the name of the province at that time was Phthiotis, from Phthius of Arcadia, who had ſeized upon it 160 years before, according to Pauſanias (in Arcad.) Moſt authors are of opinion that the deluge which happened in the reign of this prince, about the year 1503 B.C., according to Euſebius's account, or, according to the marbles 26 years earlier, was occaſioned by the river Peneus, whoſe courſe was probably ſtopped by ſome earthquakes between mount Oſſa and Olympus, where is the mouth of that river, through which it diſcharges itſelf into the ſea, with the accumulation of water furniſhed by five other rivers. This overflow, as it is ſaid, together with a vaſt quantity of rain that fell that year, laid all Theſſaly, which is a low country, under water. (See Herodotus, l. i.) Some time after, the waters having retired, the country was very ſoon re-peopled. When the waters were aſſuaged, Deucalion, according to the Parian Chronicle, went to Athens, where, in gratitude to the gods for having preſerved him from the general inundation of the country, he offered ſolemn ſacrifices to Jupiter, in a temple which he built to his honour, and which was ſtill ſubſiſting in the time of Piſiſtratus, who, at a great expence, rebuilt it.

Some have ſuppoſed that Deucalion, whom the Greeks have repreſented under a variety of characters, and concerning whom their poets have given many fabulous accounts, was the ſame with the patriarch Noah; and that Deucalion's flood in Theſſaly, as well as that of Ogyges in Attica, and of Prometheus in Egypt, were the ſame with that of Noah, recorded in Scripture. Diodorus Siculus expreſsly ſays, that, in the deluge which happened in the time of Deucalion, almoſt all fleſh died. Apollodorus having mentioned Deucalion εν-λαρνακι, *conſigned to an ark*, takes notice, upon his quitting it, of his offering up an immediate ſacrifice, Δι-φυζιω, *to the god who delivered him*. As he was the father of all mankind, the ancients have given him great dignity and univerſal monarchy; though ſometimes he is reduced to a petty king of Theſſaly. Apollonius Rhodius makes him a native of Greece, and the ſon of Prometheus. We may learn, however, from their confuſed hiſtory, that the perſon repreſented was the firſt of men, through whom religious rights were renewed, cities built, and civil policy eſtabliſhed in the world: none of which circumſtances are applicable to any king of Greece. Philo aſſures us, that the Grecians call the perſon Deucalion, but the Chaldæans ſtyle him Noe, in whoſe time there happened the great eruption of waters. But as Lucian has given us the moſt particular hiſtory of the deluge, and that which comes neareſt to the account given by Moſes; and as he was a native of Samoſata, a city of Commagene upon the Euphrates, a part of the world where memorials of the deluge were particularly preſerved, and where an obvious reference to that hiſtory may be obſerved in the rites and worſhip of the country, we ſhall terminate this article with an extract of what he ſays on the ſubject.

Having deſcribed Noah under the name of Deucalion, he ſays, that the preſent race of mankind are different from thoſe who firſt exiſted; for thoſe of the antediluvian world were all deſtroyed. The preſent world is peopled from the ſons of Deucalion; having increaſed to ſo great a number from one perſon. In reſpect to the former brood, they were men of violence, and lawleſs in their dealings. They regarded not oaths, nor obſerved the rites of hoſpitality, nor ſhewed mercy to thoſe who ſued for it. On this account they were doomed to deſtruction: and for this purpoſe there was a mighty eruption of waters from the earth, attended with heavy ſhowers from above; ſo that the rivers ſwelled, and the ſea overflowed, till the whole earth was covered with a flood, and all fleſh drowned. Deucalion alone was preſerved to re-people the world. This mercy was ſhewn to him on account of his juſtice and piety. His preſervation was effected in this manner: he put all his family, both his ſons and their wives, into a vaſt ark which he had provided, and he went into it himſelf. At the ſame time animals of every ſpecies, boars, horſes, lions, ſerpents, whatever lived upon the face of the earth, followed him by pairs; all which he received into the ark, and experienced no evil from them: for there prevailed a wonderful harmony throughout by the immediate influence of the Deity. Thus were they wafted with him, as long as the flood endured.

After this, he proceeds to mention that, upon the diſappearing of the waters, Deucalion went forth from the ark, and raiſed an altar to God. Diod. Sic. lib. i. p. 10. Apollod. lib. i. p. 20. Apollon. Rhod. lib. iii. v. 1085. Philo Jud. de Præmio & Pœna, vol. ii. p. 412. Lucian de Dea Syria, vol. ii. p. 882.

Dr. Bryant produces a variety of monuments, that bear an obvious reference to the deluge, in the Gentile hiſtory, beſides this account of Deucalion and his flood. Analyſis of Ancient Mythology, vol. ii. p. 193—250. See DELUGE.

DEVELTO, or ZAGORIA, in *Geography*, a town of European Turkey, in Bulgaria, the ſee of a Greek archbiſhop, near the Black ſea; 59 miles N.E. of Adrianople, and 106 N.N.W. of Conſtantinople. N. lat. 42° 25′. E. long. 27° 22′.

DEUELTUS, or DEUELTON, in *Ancient Geography*, a town in the interior of Thrace, towards the Euxine ſea, not far to the weſt of Apollonia, on the border of a lake. It became a Roman colony under Veſpaſian, who fixed his veterans there; from this prince it took the name of Flavia, as it is found upon medals.

DEVENERUNT, in *Law*, a writ anciently directed to the eſcheator, on the death of the heir of a tenant of the king holding *in capite*, within age, and in the king's cuſtody; commanding the eſcheator, to enquire, upon the oaths of good and lawful men, what lands and tenements, by the death of the tenant, come to the king (Dyer 360.) This writ is now diſuſed.

DEVENISH, in *Geography*, an iſland in Lough Erne, in the county of Fermanagh, Ireland, which is remarkable for fine ſcenery. There are in this iſland a round tower, and the ruins of a priory, which Ledwich ſuppoſes to have belonged originally to the Culdees, and which afterwards under the Auguſtinians acquired great poſſeſſions. It is a few miles from Enniſkillen. Ledwich.

DEVENTER, HENRY, in *Biography*, a celebrated accoucheur, was born at Deventer, in the province of Over-Yſſel, in Holland, towards the end of the 17th century. Though ſkilled in every branch of medicine, and honoured with the dignity of doctor in that faculty, he was principally employed in ſurgery, and in the latter part of his life he almoſt entirely confined himſelf to the practice of midwifery, in which art he made conſiderable improvements. He acquired alſo no ſmall ſhare of fame by his various mechanical inventions, for aſſiſting in preventing and curing deformities of the body, in young ſubjects. In that capacity he was repeatedly ſent for to Denmark, whence he drew a conſiderable revenue. His knowledge of mechanics did not, however, prevent his obſerving that much miſchief was done by the too frequent uſe of inſtruments in midwifery.

The greateſt difficulty to the birth of the child occurred, according to his doctrine, from the uterus being placed obliquely in the pelvis. In conſequence of this poſition, the pains or contractions of that viſcus forced the preſenting part of the child againſt one ſide of the collum uteri, inſtead of preſſing it immediately into its orifice. This defect he attempted to remedy, by paſſing his hand into the uterus, and bringing the vertex of the head of the fœtus into the opening or mouth of the womb. When the pelvis of the woman was too ſtraight, he often remedied the evil, by puſhing back the os coxygis with his hand. This, however, muſt be done very delicately, or abſceſſes in the part, or incurable lameneſs, may be produced. Deventer had probably met with accidents of the kind, as in the latter part of his life he admitted the neceſſity of ſometimes opening the head of the child, and then drawing it away with the crotchet. When an arm of the child preſented, he paſſed his hand into the uterus, and brought it away by the feet, without firſt twiſting off the preſenting arm, as had been recommended and practiſed by former writers on the ſubject. He taught his pupils to diſtinguiſh ſpurious from true labour pains, and to quiet the ſpurious pains, by emptying the bowels, by glyſters and mild eccoprotics, and by giving one or more of his anodyne or opiate pills; the compoſition of which he for a long time kept ſecret. Theſe were ſerious improvements in the art, and gave him a decided preference over Mauriceau, his almoſt immediate precurſor. Satisfied with the principles on which his practice was founded, he publiſhed, in 1701, "Operationes Chirurgicæ novum lumen exhibentes, obſtetricantibus," Leiden, 4to. It had been before publiſhed, *viz.* in 1696, in his native language. This was followed by a ſecond part, in 1724, 4to., "Ulterius examen partuum difficilium, Lapis Lydius obſtetricum, et de neceſſaria cadaverum inciſione." The two parts were publiſhed together, much improved in 1733, but the work had already been tranſlated and publiſhed in moſt of the countries in Europe. How long the author continued to live after the emiſſion of this improved edition is not known.

He had often, he ſays, been required to let the world know, by advertiſement, what kind of defects in the form of the body he was able to cure or relieve, but had not thought it expedient to do ſo; theſe he has enumerated and deſcribed at the end of the work. They are 22 in number; among them are the following: When the head, from a contraction of the tendons, fell on one of the ſhoulders, he enabled the party to hold his head erect. On the other hand, when a child came into the world club-footed, ſo that it could only touch the ground with its ankles, he completely, he ſays, cured the defect, and he was ſo ſure of his principles, that he required no part of his ſtipulated pay, until the cure was effected. Some time after his death, *viz.* in 1739, a poſthumous work was publiſhed on the rickets, in his native language. Haller ſpeaks favourably of it, and has given a brief analyſis of its contents, by which it appears to contain ſome uſeful practical obſervations. Haller. Bib. Chir.

DEVENTER, in Latin *Daventria*, or *Devonturum*, in *Geography*, a conſiderable and populous town of Holland, chief place of the department of Over Yſſel, ſituated on the river Yſſel, over which it has a bridge of boats. It brews an excellent beer, is famous for its cakes, and has an academy, or *Gymnaſium illuſtre*, and a canon foundery. Anciently it was a free imperial Hanſeatic town. Deventer is the native city of James Gronovius, Henry Deventer, and Everard Bronchorſt. It is 12 miles N. of Zutphen, 66 E. of Amſterdam, 51 W. of Benthem, in E. long. 5° 8′. N. lat. 52° 15′.

DEVEREUX, ROBERT, in *Biography*, ſecond earl of Eſſex, a perſon of great diſtinction in the reign of queen Elizabeth, was born at Netherwood, in Herefordſhire, in the year 1567. His father, Walter, earl of Eſſex, dying when Robert was but ten years old, left him to the guardianſhip of Cecil lord Burleigh. Two years after this event, he was ſent to Trinity College, Cambridge, where he was put under the tuition of Dr. Whitgift, afterwards archbiſhop of Canterbury. In his ſeventeenth year he was introduced at court, and in 1585 he accompanied the earl of Leiceſter, who had married his mother, to Holland, where he ſo much diſtinguiſhed himſelf at the battle of Zutphen, as to be created a knight banneret in the camp. Upon his return home, he was made maſter of the horſe in the place of the earl of Leiceſter, who was advanced to the poſt of high ſteward; and in 1588 he accompanied the queen to Tilbury, to reſiſt the Spaniſh invaſion, and was there appointed maſter of the horſe,

horſe, and was decorated with the order of the garter. Theſe high honours rendered him haughty and preſumptuous, qualities which led him into ſerious difficulties. In 1589, he gave proof of his enterprizing diſpoſition by joining, without leave, an expedition under the conduct of ſir John Norris and ſir Francis Drake, for the purpoſe of reſtoring Don Antonio to the throne of Portugal. In this buſineſs the earl of Eſſex had an opportunity of exhibiting his courage: while ſkirmiſhing in the neighbourhood of Liſbon, he challenged, by the ſound of the trumpet, the governor, or any perſon of equal quality with himſelf, to ſingle combat. Elizabeth, at firſt, expreſſed herſelf very indignantly at the conduct of the earl for leaving the kingdom without permiſſion; but ſhe was ſoon reconciled, and beſtowed upon him ſignal marks of favour in various grants of land of conſiderable value. Upon the death of his father-in-law a new field ſeemed to be opened to his ambition: he made himſelf the head of the Puritan party, and married privately the widow of ſir Phillip Sydney, with which the queen was diſpleaſed: ſhe, however, very ſoon forgave him, and ſent him with a body of 4000 men to the aſſiſtance of Henry IV. king of France, then fighting againſt the league. He was ſoon after created privy counſellor, and, in 1596, was appointed joint commander with lord Howard in an expedition to the coaſt of Spain. In this expedition, which makes a conſiderable figure in Engliſh hiſtory, lord Eſſex diſtinguiſhed himſelf and acquired much popularity. At court he had many enemies, who were jealous of his fame, and envious of the honours which he acquired by his valour and heroiſm: theſe attempted to injure him in the ſovereign's eſtimation, but without effect; ſhe made him maſter of the ordnance; and when Ireland was threatened with a Spaniſh invaſion, ſhe appointed him to the chief command of a fleet equipped for the purpoſe. In this affair little glory was acquired by any concerned in it; and lord Eſſex was highly offended by the conduct of ſome of his brother officers; he was, however, ſoothed by his elevation to the dignity of earl marſhal of England. When peace with Spain was propoſed, he would liſten to no terms of accommodation; in debating the ſubject in council he excited the anger of lord Burleigh, who drew out a prayer-book from which he read, addreſſing himſelf to lord Eſſex, "Men of blood ſhall not live out half their days." On this occaſion he felt it neceſſary to vindicate himſelf from the opprobrium of being thought inimical to peace; he accordingly drew up an eloquent apology on the ſubject. On the death of lord Burleigh, he was appointed to the chancellorſhip of Cambridge. About this period a private council was called to determine upon a proper perſon to be ſent governor of Ireland. Eſſex and the queen were at variance as to the fitteſt man. The diſpute was warm, and the miniſter, unable to perſuade his ſovereign, contemptuouſly turned his back upon her. Provoked at his inſolence, ſhe bade him retire and be hanged, accompanying her command with a blow on the face. Eſſex, thrown off his guard, claſped his ſword, ſwearing the affront was ſuch as he could not and would not put up with. He withdrew in anger, and for ſome time ſeemed to ſet at defiance the queen's diſpleaſure, but at length he ſubmitted and was reſtored to favour. A renewal of troubles in Ireland required a new governor, and Eſſex was appointed to this office, which he accepted, though probably much againſt his inclination, for in a letter which he wrote to the queen before his departure, he aſks, "From a mind delighting in ſorrow, from ſpirits waſted with paſſion, from a heart torn in pieces with care, grief, and travel; from a man that hateth himſelf, and all things elſe that keep him alive; what ſervice can your majeſty expect, ſince any ſervice paſt deſerves no more than baniſhment and proſcription to the curſedeſt of all iſlands?" He however went, but his ſucceſs did not correſpond with the expectations that had been formed by the queen, and that had indeed been excited by his own letters; he reſolved to return to vindicate his conduct. Arriving unexpectedly, and in defiance of the commands under which he ought to have acted, he threw himſelf at the feet of his ſovereign, who at firſt ſeemed to receive him with more favour than he had anticipated; but he was ſoon after treated with much ſeverity, committed to private cuſtody, examined with rigour before the council, and ſuſpended from almoſt all his employments. He endeavoured to bear the reverſe of fortune with patience and fortitude, but his feelings and paſſions overcame his reaſon, and he ſunk into an alarming illneſs; during this he had the ſatisfaction of being favoured with ſome extraordinary tokens of the queen's remaining regard; and he might ſtill have reinſtated himſelf in her favour; but, being ſet at liberty, and liſtening to the dangerous counſels of Cuffe, who had been his ſecretary in Ireland, he ſeemed anxious to take revenge on his enemies. A conſpiracy was formed againſt the perſon of the ſovereign, which being diſcovered, lord Eſſex and others were apprehended under a charge of high treaſon. He and his chief adherent, the earl of Southampton, were committed to the Tower, and were afterwards tried by a jury of their peers, and were found guilty of the crimes with which they were charged. Sentence was pronounced, and the earl of Eſſex heard it with compoſure as a man prepared for his fate. The queen was long before ſhe could be brought to ſign the fatal warrant for the execution of her once favourite miniſter: ſhe waited for an application for mercy, and conſtrued his ſilence to an obſtinacy not to be forgiven. He was executed on the 25th of February 1601. He met his death not with any apparent anxiety or terror, but with a humility and contrition which his religion inſpired. He ſuffered in his thirty-fourth year. His character was adorned with many ſplendid virtues: he was brave, open, and affectionate; but it muſt be admitted that his conduct was often marked with raſhneſs, violence, and precipitancy. He was a friend and the patron of literature. His memory has been always popular, and his unfortunate end has been the ſubject of four different tragedies. The queen, after the unfortunate death of her favourite, gave herſelf up to melancholy. She had given him a ring during the height of his favour, as a pledge, on the return of which ſhe promiſed to pardon any offence he might commit. This ring, it is believed, the unhappy man entruſted to his relation the counteſs of Nottingham, who was not ſuffered by her huſband, the capital enemy of Eſſex, to deliver it. The counteſs, on her death-bed, confeſſed the fact to the queen, imploring her forgiveneſs, of which ſhe had not the ſmalleſt chance. "God may forgive you," exclaimed the indignant ſovereign, "but I never can." Biog. Brit.

Devereux, Robert, ſon of the preceding, was born in 1592, and was of courſe old enough at his father's death to feel his unfortunate ſituation. He was at that time, or very ſoon after, entered at Merton College, Oxford, under the particular care of the warden, Henry Saville, who had been his father's intimate friend. King James, almoſt immediately upon his ſucceſſion to the throne, reſtored the youth to all his hereditary honours. He was already in poſſeſſion of his father's high ſpirit, of which he gave a ſufficient indication in a quarrel which he had with prince Henry. Some diſpute aroſe between them at a game at tennis; the prince called his companion the ſon of a traitor, who retaliated by giving him a ſevere blow with his racket; and the king was

obliged to interfere to reſtore peace. At the age of fourteen this young man was betrothed to lady Frances Howard, who was ſtill younger than himſelf. The earl immediately ſet out on his travels, and during his abſence the affections of his young wife were eſtranged from him, and fixed upon the king's favourite Carr, afterwards earl of Somerſet. The conſequence was a ſuit inſtituted againſt the huſband for impotency, in which, to the diſgrace of the age, the king interfered, and which ended in a divorce. The earl of Eſſex, feeling himſelf diſgraced by the ſentence, retired to his country ſeat, and ſpent ſome years in rural ſports and amuſements. In the year 1620, being wearied of a ſtate of inaction, he joined the earl of Oxford in a military expedition to the Palatinate, where they ſerved with companies of their own raiſing under ſir Horatio Vere. In the following year they ſerved in Holland, under prince Maurice. In the courſe of the winter they returned to England, and lord Eſſex appeared in the ranks of the oppoſition in parliament. On this account he was not favourably received at court, which was the mean of attaching him the more cloſely to foreign ſervice. He commanded a regiment, raiſed in England for the United States, in 1624, and though nothing very important was atchieved by the Engliſh auxiliaries, yet the earl of Eſſex acquired experience, and diſtinguiſhed himſelf among the nobility of the time. On the acceſſion of Charles I. he was employed as vice-admiral in an expedition againſt Spain, which proved unſucceſsful. In 1626 he made another campaign in the Low Countries, and ſhortly after he married the daughter of ſir William Paulet, but his lady's conduct cauſed a divorce within two years. He now reſolved to give himſelf up entirely to public life: he courted popularity, and made friends among the officers of the army and the Puritan miniſters. He was, however, employed by the king in various important ſervices; but when the raſh meaſures of government forced the ſovereign and his court from the metropolis, lord Eſſex pleaded in excuſe his obligation to attend in his place as peer of the realm; he was accordingly deprived of all his employments. This ſtep fixed him in oppoſition to the king, and in July 1642 he accepted the poſt of general of the parliamentary army: he oppoſed the king in perſon at Edge-hill, where the victory was ſo indeciſive, that each party claimed it as his own. After this he was ſucceſsful in ſome few inſtances, but in other important truſts he did little to recommend him to the perſons in whoſe intereſts he was employed. He was, however, treated with external reſpect; but the ſelf-denying ordinance (ſee CROMWELL) threw him entirely out of the command: he reſigned his commiſſion, but not without viſible marks of diſcontent. Unwilling to loſe him altogether, the parliament voted that he ſhould be raiſed to a dukedom, and be allowed ten thouſand pounds *per annum*, to ſupport his new dignity. Neither of theſe were realized, and the earl died ſuddenly, September 14, 1646. Parliament directed a public funeral for him, which was performed with great ſolemnity in the following month, at Weſtminſter Abbey. Such was the end of this nobleman, whoſe conduct as a warrior will be again referred to in ſeveral hiſtorical articles of this work. With him the title of Eſſex became extinct. Biog. Brit.

DEVERON, in *Geography*, a river of Scotland, which runs into the Frith of Murray, at Banff.

DEVERRA, in *Mythology*, the tutelary goddeſs of children.

DEVERRONA, the goddeſs who preſided over the reaping of the crop or productions of the ſoil.

DEVESE, LA, in *Geography*, a ſmall town of France, in the department of Gers, near Mirande; 24 miles S.W. of Auch.

DEVEST, DEVESTIRE, in *Feudal Writers*, is uſed for the oppoſite to inveſting. *Inveſtire* ſignifies *poſſeſſionem feudi tradere*. On the contrary, *deveſtire* is *poſſeſſionem auferre*. Feud. lib. i. c. 7. Cowell.

DEVIAC, in *Geography*, a town of France, in the department of the Charente, and diſtrict of Barbezieux; 15 miles S. of Angouleſme.

DEVIATAIA, a river of Siberia, which runs into the Oſenoka. N. lat. 62° 25′. E. long. 149° 34′.

DEVIATION, in the *Old Aſtronomy*, a motion of the deferent, or eccentric, whereby it advances to, or recedes from, the ecliptic. See DEFERENT.

The greateſt deviation of a planet is equal to the inclination of its orbit to the plane of the ecliptic. See INCLINATION *of a Planet*.

DEVIATION *of a falling Body*. The queſtion of the diurnal revolution of the earth has long ſince ceaſed to be a diſputed point. Nevertheleſs, an experimental demonſtration of the fact can never fail to merit attention.

It has been generally admitted, that a heavy body, deſcending from a conſiderable height, ſhould not fall exactly on the point perpendicularly under it, but ſhould deviate a very ſmall quantity towards the eaſt.

Let the point A, and the point B, directly under it, (*Plate* IX. *Aſtronomy, fig.* 63.) be ſuppoſed to have a common motion in the direction A *c*, or B C, parallel to it, A *c* being equal to B C. If a body be let fall from A, it will fall on the point C, directly under *c*; but if A has a greater motion, previous to its deſcent, as A *c′*, it will then arrive at ſome point C′ forwarder than C, or more diſtant from B.

M. Guglielmini publiſhed, in 1792, ſome very curious experiments on this ſubject, made at Bologna in a work entitled "De diurno terræ motu experimentis confirmato opuſculum." The height was 241 French feet; and he found a deviation of 8 lines towards the eaſt.

Similar experiments have been repeated lately by M. Henzenberg at Hamburgh.

From a height of 235 feet, he found the deviation 4 lines.

In each of the above experiments, a ſmall deviation was obſerved towards the ſouth, the cauſe of which it is not eaſy to explain.

Laplace, who has inveſtigated the theory of this phenomenon, gives the following reſult:

Let b be the height;

g double the height a body deſcends in one ſecond;

n the angle of rotation of the earth in one ſecond;

θ the co-lat. of the place.

The deviation towards the eaſt will be equal to $\frac{2}{3} n b$ ſin. $\theta \sqrt{\frac{2b}{g}}$.

This, in M. Henzenberg's experiment, gives 3.9 lines.

In M. Guglielmini's the obſerved deviation was nearly double that indicated by the theory.

DEVIATION, in *Marine Inſurances*, denotes a voluntary departure, without any neceſſity, from the uſual courſe of the voyage inſured. From the moment this happens, the voyage is changed, the contract is determined, and the inſurer is diſcharged from all ſubſequent reſponſibility. By the terms of contract, the inſurer only runs the riſk of the voyage agreed upon, and of no other: and it is, therefore a condition neceſſarily implied in the policy, that the ſhip ſhall proceed by the ſhorteſt and ſafeſt courſe to her port

of

of deſtination, and on no account to deviate from that courſe, but in caſes of neceſſity.

In determining what ſhall amount to a deviation that will diſcharge the inſurers, it ſhould be conſidered, that the courſe of the voyage does not mean the neareſt poſſible way, but the uſual and regular courſe. Stopping at certain places in the voyage, though out of the direct line, is no deviation, if it be cuſtomary ſo to do. The effect of a deviation is not to *vitiate* or *avoid* the policy, but only to determine it from the time of the deviation, and to diſcharge the inſurer from all ſubſequent reſponſibility; who is, nevertheleſs, entitled to retain the whole premium. The contract, however, is determined by the deviation, though the ſhip ſhould afterwards reſume her proper courſe, and be in a condition to complete the voyage. The true reaſon why a deviation diſcharges the inſurer, is not the increaſe of the riſk; but that the party contracting has, without neceſſity, ſubſtituted another voyage for that which was inſured. However, if a deviation can be juſtified by neceſſity, the inſurer will ſtill remain liable. One general principle pervades all the caſes on this point; namely, that if the captain, in departing from the uſual courſe of the voyage, acts fairly and *bonâ fide*, and according to the beſt of his judgment, for the benefit of all parties concerned, and has no other view but to conduct the ſhip and cargo, by the ſafeſt and ſhorteſt courſe, to her port of deſtination; what he does is within the ſpirit of the contract, and the voyage will ſtill be protected by it. In all caſes, therefore, in order to determine whether a departure from the direct courſe of the voyage inſured amounts to a deviation that will diſcharge the inſurer, it will be proper to attend to the motive, end, and conſequences of the act, as the true criterion of judgment. The caſes of neceſſity, which are moſt frequently adduced to juſtify a departure from the direct courſe of the voyage inſured, are ſtreſs of weather, want of neceſſary repair, joining convoy, eſcaping from, or avoiding an enemy, and mutiny of the crew. From an examination of the moſt approved authorities for determining caſes of this kind, it is inferred, that nothing will juſtify a deviation but a real and imperious neceſſity; and that the extent of the deviation muſt be juſtified by the degree of that neceſſity. Beſides, if a ſhip be compelled by any neceſſity to deviate from the uſual and regular courſe of the voyage, ſhe muſt purſue the new voyage of neceſſity ſo far as to get to her port of deſtination by the ſhorteſt and ſafeſt courſe ſhe can take; and any wilful departure from the direct courſe of this voyage, or any unneceſſary delay, will be a new deviation, which will diſcharge the under-writers in like manner as if it had been a deviation from the original voyage. Marſhall's Treatiſe on the Law of Inſurance, vol. ii. p. 392, &c.

DEVICE, in *Printing*. See DEVISE.

DEVICZA, in *Geography*, a town of Poland, in the palatinate of Sandomirz; 48 miles S.S.W. of Sandomirz.

DEVIL, DIABOLUS, an evil angel; one of thoſe celeſtial ſpirits, ſaid to have been caſt down from heaven, for pretending to equal himſelf with God.

The word is formed from the French *diable*, of the Latin *diabolus*, which comes from the Greek διαβολος, which, in its ordinary acceptation, ſignifies *calumniator, traducer*, or *falſe accuſer*, from the verb διαβαλλειν, *to calumniate, &c.*; or from the ancient Britiſh *diafol*.

Dr. Campbell, in his "Preliminary Diſſertations to the Four Goſpels," (vol. i. p. 182.) obſerves, that, though the word is ſometimes, both in the Old Teſtament and the New, applied to men and women of this character, it is, by way of eminence, employed to denote that apoſtate angel, who is exhibited to us, particularly in the New Teſtament, as the great enemy of God and man. In the two firſt chapters of Job, it is the word in the Septuagint, by which the Hebrew שָׂטָן, *Satan*, or *adverſary*, is tranſlated. Indeed, the Hebrew word, in this application, as well as the Greek, has been naturalized, ſays this writer, in moſt modern languages. Thus we ſay, indifferently, *the devil*, or *Satan*; only the latter has more the appearance of a proper name, as it is not attended with the article. There is, however, this difference between the import of ſuch terms, as occuring in their native tongues, and as modernized in tranſlations. In the former, they always retain ſomewhat of their primitive meaning, and, beſide indicating a particular being, or claſs of beings, they are of the nature of appellatives, and mark a ſpecial character, or note of diſtinction in ſuch beings. Whereas, when thus Latinized or Engliſhed, they anſwer ſolely the firſt of theſe uſes, as they come nearer the nature of proper names. Διαβολος, as Dr. Campbell has obſerved, is ſometimes applied to human beings; but nothing is more eaſy than to diſtinguiſh this application from the more frequent application to the arch-apoſtate. One mark of diſtinction is, that, in this laſt uſe of the term, it is never found in the plural. When the plural is uſed, the context always ſhews that it refers to human beings, and not to fallen angels. It occurs in the plural only thrice, and only in the epiſtles of St. Paul. 1 Tim. iii. 11. 2 Tim. iii. 3. Tit. ii. 3. Another criterion, he ſays, whereby the application of this word to the prince of darkneſs may be diſcovered, is its being attended with the article. The term almoſt invariably, with a few exceptions, is ὁ διαβολος. The excepted inſtances occur in the addreſs of Paul to Elymas the ſorcerer, Acts. xiii. 10; and that of our Lord to the Phariſees, John viii. 4. The more doubtful caſes are thoſe in 1 Pet. v. 8, and Rev. xx. 2. Theſe, ſays Dr. Campbell, are all the examples in which the word, though uſed indefinitely or without the article, evidently denotes our ſpiritual and ancient enemy; and the examples, as he adds, in which it occurs in this ſenſe, with the article, are too numerous to be recited. Thoſe who maintain the doctrine of a devil and of his agency, and the opinion of his being and influence has for a long time and very generally prevailed, ſuppoſe that there are various orders of evil angels, united under one head, who from the malignity of his nature is called *Satan*, or the *devil*. In proof of the exiſtence and influence of theſe inveterate enemies of God and of mankind, and of their original apoſtacy and rebellion, and of their ſubſequent influence over mankind, they refer to the hiſtory of the fall of our firſt parents, and to a variety of paſſages in the ſacred writings. See Matt. iv. 5—8; xii. 24. 28; xxv. 41. Epheſ. ii. 2; vi. 12. Col. ii. 15. Jude, v. 6. Rev. xii. 7. Theſe inviſible beings, it is ſaid, urged by a principle of enmity to God, and envy and malice againſt mankind, do their utmoſt to ſeduce men into ſin; and for that purpoſe are employed in ſtudying men's tempers, and making obſervations on the various circumſtances and occurrences of their lives. (1 Chron. xxi. 1. Zech. iii. 1, 2. Matt. xiii. 19. Luke, xxii. 31. John, viii. 44; xiii. 20. 22. Acts, v. 3. 2 Cor. ii. 11; iv. 4; xi. 3, 14, 15. Eph. ii. 2; vi. 11, 12, 16. 1 Theſſ. iii. 5. 2 Theſſ. ii. 9, 10, 18. 1 Pet. v. 8.)

Theſe malignant ſpirits, it is ſaid, are made uſe of as the inſtruments of divine Providence, to inflict calamities on the children of men; whilſt their malicious attempts are overruled by the ſuperior wiſdom and goodneſs of God, to anſwer the purpoſes of his government. (Luke, xiii. 16. 1 Cor. v. 5. Job, i. 2. 1 Tim. i. 20. Heb. ii. 14, 15.) They ſometimes, as the advocates of this opinion maintain, carry on their attempts in a ſecret and inviſible manner; and they

they ſometimes interpoſe more openly and without diſguiſe, or at leaſt have formerly been permitted to do ſo; particularly in the inſtances of dæmoniacal poſſeſſions, oracles, magic, witchcraft, and violent ſuggeſtions, and impulſes. It has alſo been an opinion generally received, that the devil has in ſome caſes entered into the bodies of men, and afflicted them ſeverely, by his ſupernatural agency. And even thoſe, who have rejected all ſtories of magical operations, performed by a combination with the infernal ſpirits, or of diabolical appearances; as being either the dreams of a diſordered imagination, the contrivance of art, or the vain fictions of thoſe who aimed at impoſing upon mankind; have nevertheleſs maintained, that Satan appeared in a viſible form to Chriſt, and that he animated the body of a ſerpent in the firſt temptation. From the ſeveral paſſages and facts above adduced, it has been inferred by the advocates of dæmoniſm, that the devils are beings of great power and knowledge; and that the purpoſes to which they ſeem to have interpoſed have generally been ſo malignant, as ſufficiently to prove they are evil dæmons, and as ſuch to be denounced and deteſted: and ſuch appearances, where Chriſtianity is known, ſhould be conſidered as confirming rather than weakening it: ſince the exiſtence, power, and malice of Satan conſtitute ſo great a part of the Chriſtian ſcheme. Where the goſpel is unknown, natural religion might teach men that there is a ſovereign almighty being of the moſt benevolent nature, and conſequently that theſe miſchievous beings were to be deteſted as his enemies, whatever power they might have, from which he would not fail to protect them who ſhould faithfully ſerve him. (See 2 Theſſ. ii. 9. 12.)

On the other hand, many objections have been alleged againſt the empire and agency aſcribed to the devil; and ſome have even denied his exiſtence, as well as his interference in the concerns and influence on the minds of men. Accordingly, it has been argued that we find no mention of the word devil in the Old Teſtament; but only of Satan, nor do we meet with the word devil in any heathen authors, in the ſignification attached to it among Chriſtians; that is, as a creature revolted from God: their theology went no farther than to evil genii or dæmons, who haraſſed and perſecuted mankind. Thus the Chaldæans believed both a good principle, and an evil principle, which was an enemy of mankind. See DÆMONS, and DÆMONIACS.

It has alſo been urged, that the agency of a being altogether malevolent, who is to every practical purpoſe omnipreſent and omniſcient, and endowed with formidable and indefinite powers, whoſe ſole employment is to do miſchief, and to tempt men to ſin, implies ſuch a reflection upon the wiſdom and benevolence of the Supreme Sovereign, that nothing ſhort of the moſt deciſive evidence can eſtabliſh the fact. For which purpoſe it ſhould firſt be proved, that the ſacred writers believed and taught the exiſtence and agency of this ſtrange and anomalous being; and, ſecondly, that this doctrine was communicated to them by revelation, and that they were authorized to make it known to the world. If neither of theſe points, ſay the antidæmoniſts, can be evinced to the ſatisfaction of an intelligent and critical reader of the Scriptures, the doctrine itſelf is untenable. It is alleged, that the exiſtence of an evil ſpirit is no where expreſsly taught as a doctrine of revelation; that it was unknown to the Jews previouſly to the captivity; and that it was probably borrowed by their learned men, at that time, from the oriental philoſophy, of which it is well known to have conſtituted an eſſential part. After their return it became, in proceſs of time, the popular creed, and the popular language, being gradually faſhioned to it, was adopted equally by thoſe who did, and thoſe who did not believe the theory upon which it was founded. Hence in the New Teſtament we find evil, natural and moral, often aſcribed to the devil, to dæmons, or the ghoſts of wicked men. But neither Jeſus nor his apoſtles, it is ſaid, ever explicitly declare, that they themſelves admitted the philoſophy which governed the language of the country in which they lived, much leſs do they profeſs to teach it as of divine authority. They leave the mythology of evil ſpirits, like many other popular opinions and prejudices, in the ſame ſtate in which they found it, to be corrected in the courſe of time by the principles which they taught, and by the growing good ſenſe of mankind. The firſt teachers of Chriſtianity neither poſitively affirm, nor authoritatively contradict, the exiſtence and agency of an evil ſpirit; but expreſs themſelves upon this ſubject exactly as the reſt of their contemporaries would; and they content themſelves with eſtabliſhing principles, which ſerved gradually to undermine and expoſe the vulgar and popular opinion. It has been ſaid, that the evil ſpirit is entitled to the denomination of the prince of this world (John, xiv. 30.) The true meaning of this expreſſion may probably be, that Jeſus was about to be unjuſtly arreſted by order of the magiſtrate. A ſimilar expreſſion occurs in 1 Cor. ii. 8; where the Jewiſh rulers who crucified our Lord are certainly the perſons intended. As for the paſſage in Jude, v. 6, it ſhould be recollected, that the writer of this obſcure epiſtle is arguing with his readers upon their profeſſed principles, alluding to a mythology which was probably at that time familiar, but is now loſt; nor can any thing be inferred from a compoſition, the genuineneſs of which is known to be very doubtful. But whatever be the true meaning of the paſſage, it proves nothing concerning diabolical agency; for it repreſents the fallen angels not as ranging at liberty, but as bound in chains. Thoſe who reject the notion of diabolical agency, allege the total want of evidence to prove it. As philoſophers, they diſcover no phenomena which countenance the hypotheſis of an inviſible malignant energy; and as attentive readers of the Chriſtian Scriptures, they ſee nothing to warrant ſuch a concluſion, but a ſort of language which a competent acquaintance with the oriental ſtyle would teach them to interpret in a figurative and mythological, and not in a literal and hiſtorical ſenſe. The principle of evil, they ſay, is perſonified, and the properties, operations, and effects of this principle are aſcribed in the eaſtern language and in the ſacred writings to a malignant being. The empire and agency of ſuch a being, in the natural and in the moral world, are ſaid to be incompatible with the rank and powers aſſigned to all creatures, and with the limited ſphere of their operation, and equally inconſiſtent with the rectitude and benevolence of the Supreme Ruler of the univerſe, who would not ſubject his rational offspring, frail and erring in themſelves, to a conflict with powers ſo ſuperior to their own, and the exerciſe of which is ſo adverſe to their ſpiritual and immortal intereſts, as well as to their temporal welfare. It has been further ſaid, that the doctrine of diabolical agency, in the extent to which ſome have maintained it, has an immoral tendency, furniſhes a plea for criminal conduct, and diminiſhes the guilt of the tranſgreſſor; not to add, that it has been the occaſion of a variety of ſuperſtitious opinions and practices of the moſt abſurd and flagitious kind.

The relation we have of the religion of the Americans aſſures us of ſome idolatrous nations, who worſhip the devil: but the term devil muſt not be here taken in the common ſenſe: thoſe people have an idea of two collateral independent beings; one whereof is good, and the other evil. And they place the earth under the guidance and direction of that evil being, which our authors, with ſome impropriety, call the

devil.

devil. The Ethiopians paint the devil white, to be even with the Europeans, who paint him black. Ludolph.

Devil *in a buſh*, in *Botany*. See Nigella.

Devil *in a buſh*, in *Agriculture*, the vulgar name of a weed which is extremely troubleſome in corn lands. Its ſtalks are ſlender, riſing to the height of about a foot, ſometimes branching out at the bottom, having fine cut leaves, ſimilar to thoſe of Dill. The flowers are blue, but the ſeeds are of a blackiſh colour, and rough; from which circumſtance they are highly injurious to wheat, when ground with it. From its being an annual plant, it may be readily extirpated, by being pulled up by the root before it flower.

Devil's *Bit*, in *Botany*. See Scabiosa.

Devil's *Bit*, in *Agriculture*, a name vulgarly applied to a weed which infeſts both corn and paſture, or meadow-lands, (*Leontodon autumnale*). It has a ſtrong, thick, fibrous perennial root, running deep into the ground, and which ſends out ſeveral branching ſtalks, riſing to the height of three feet. It is beſt deſtroyed by having it drawn up by the roots.

Devil's *Bit*, *yellow*, in *Botany*. See Leontodon.

Devil's *Guts*, in *Agriculture*, a name often vulgarly applied to bind-weed; (*Convolvulus arvenſis.*)

Devil's *Iſlands*, in *Geography*, are iſlets, or ſmall ſhoals, the moſt conſiderable of which bears the name of *Joura*, which form the extremity of a chain of iſlands and rocks, placed before the entrance of the gulf of Salonica, and extending to the eaſt, from the great promontory of Volo, the ancient Œantium of Theſſaly, till it faces mount Athos.

Devil's *Iſland*, an iſland of America, on the eaſt ſide of Cheſapeak bay, in Somerſet county, Maryland, between Fiſhing bay and Nanokin river.

Devil, *Iſle of*, one of the ſmaller Molucca iſlands.

Devil's *Mouth*, a name given by ſailors to a frightful volcano, near Leon Nicaragua, in New Spain, ſeated near the lake. N. lat. 13° 10′. W. long. 65° 10′.

Devil's *Noſe*, a promontory on the ſouth ſide of lake Ontario, 16 miles E. of Fiſhing bay, and 23 N. W. of the mouth of Geneſſee river.

Devil, *Sea*, *Diabolus marinus*, in *Ichthyology*, the name of an ugly and ſtrangely ill-ſhaped fiſh. Its noſe or ſnout is bifid, and runs out into two horns; and its ſides are both terminated by thin fins: its ſkin toward the head is variegated with duſky ſpots. It grows to a very conſiderable ſize, being ſometimes caught to ſix or ſeven feet length. Ray's Ichthyology. Append. p. 5. See Lophius.

Devil's *Wall*, in *Geography*, a rock of Hungary, near Gyongyes, in the Matra mountains, forming a façade of thirty feet or more in height, which is conſidered as a natural curioſity. Dr. Robert Townſon, in his travels in Hungary, found it to be nothing more than what is known in Scotland by the name of whin dykes, and attributes its height to the waſhing away of the rocks through which it runs. It is compoſed of a porphyric baſaltes. Many looſe blocks approach nearer to porphyry.

DEVINCTION, Devinctio, in *Antiquity*, was uſed to ſignify a love-charm or incantation to gain the affection of a perſon beloved.

It was done by tying knots, and differed little from what was called obligatio, or catadeſmus. Virgil, in his eighth Eclogue, deſcribes it thus:

" Nectè tribus nodis ternos, Amarylli, colores:
Nectè, Amarylli, modo; & Veneris die, vincula nectо."

DEVISE, Device, or Badge, in *Heraldry*, a name common to all figures, cyphers, characters, rebuſes, mottoes, &c. which by their alluſion to the names of perſons, or families, denote their qualities, nobility, or the like.

Deviſe, in this ſenſe, is of a much older ſtanding than heraldry itſelf; being that which gave the firſt riſe to armories. Thus, the eagle was the deviſe of the Roman empire: S. P. Q. R. was the deviſe of the Romau people, and ſtill continues to be what they call the eſcutcheon of the city of Rome.

The firſt deviſes were mere letters diſtributed on the borders of the liveries, houſings, and banners, and at length on the ſhields. Thus the K was the deviſe of the French kings of the name of Charles, from Charles V. to Charles IX.

There were alſo deviſes by rebuſes, equivocals, or alluſions, both to names and arms. The dukes of Guiſe took for their deviſe an A in an O, to ſignify, *chacun A ſon tour*, every one in his turn: and the houſe of Seneſai, *in virtute & honore ſeneſces*: ſome, that had towers in their arms, *turris mea Deus*, &c.

There are alſo enigmatical deviſes: as that of the Golden Fleece, with *Autre n'aurai*; intimating, that Philip the Good, who inſtituted that order, renounced every other woman but Iſabella of Portugal, whom he then married. Deviſes ſometimes contain entire proverbs: as that of Cæſar Borgia, *aut Cæſar, aut nihil*.

The word deviſe is formed from the Latin *dividere*, and was applied to the things juſt mentioned, as well as thoſe hereafter mentioned; becauſe they ſerve to divide, ſeparate, and diſtinguiſh perſons, parties, &c. Father Menetrier obſerves, that there are as many different kinds of deviſes, as there are different manners of diſtinguiſhing one another, or as there are ſimple figures or words, capable of expreſſing qualities, offices, virtues, actions, &c. of perſons; and of notifying, or diſtinguiſhing them from others.

Badges, impreſſes, and deviſes were greatly in vogue in England from the reign of king Edward I., until that of queen Elizabeth, when they ſunk into diſuſe. Several heraldic writers contend that this event was owing to the diſcontinuance of tilts, tournaments, juſts, and other once faſhionable public and ſolemn proceſſions. They further tell us, that after ſuch diſcontinuance the nobility placed on wreaths and coronets, and bore as creſts, thoſe ſeveral figures which they and their dependants had before worn as badges and deviſes; but in this reſpect they are probably miſtaken, more eſpecially as many of the now exiſting ancient families of the nobility ſtill retain and wear the badges which belonged to their anceſtors.

Devise is now taken, in a more reſtrained ſenſe, for an emblem; or a repreſentation of ſome natural body, with a motto, or ſentence, applied in a figurative ſenſe, to the advantage of ſome perſon.

Father Bouhours gives an accurate explication of the word deviſe, in an extract inſerted in the Memoirs de Trevoux. A deviſe, ſays he, is a compoſition, or aſſemblage of figures drawn from nature and art, called the body; and of a few words adapted to the figure called the ſoul: ſuch a compound, adds he, we make uſe of to denote our thought, or intention, by compariſon: for the eſſence of the deviſe conſiſts in a compariſon: taken from nature, or art, and founded on a metaphor.

This he illuſtrates in the following inſtance: a young nobleman, of great courage and ambition, bore, for his deviſe, in the laſt carouſal at the court of France, a rocket mounted in the air, with this Italian motto, " poco duri," purche m'inalzi;" may I laſt but a ſhort time, provided I mount high: which may be explained thus: as the rocket riſes a great pitch, though it only endures a little while, ſo

it does not concern me to live long, provided I attain to glory and eminence; which is a juſt compariſon.

On this footing, a deviſe, to define it rightly, is a painted metaphor; or rather an enigma inverted: for, whereas enigmas repreſent nature, or art, by the events of hiſtory, and the adventures of fables; a deviſe is a repreſentation of human qualities by natural, or artificial bodies.

Thus to expreſs the character of Louis XIV. a ſun was painted; which yet, luminous as it is, has more power than luſtre: and the better to determine the ſenſe of the painting to this ſignification, the Caſtilian motto is added; "Mas virtud que luz." The perſonal merit of Mary, queen of Scots, was repreſented by a pomegranate, with theſe words: "Mon prix n'eſt pas de ma couronne:" and the talent of an apoſtolical perſon, who became all things to all men, by a looking-glaſs, with thoſe words of Saint Paul, "Omnibus omnia."

Deviſes are uſed on coins, counters, ſeals, ſhields, triumphal arches, artificial fire-works, and other ſolemnities. They are a ſort of images, very pertinently and artfully repreſenting the enterpriſes and intrigues of war, love, piety, ſtudy, fortune, &c.

The French have diſtinguiſhed themſelves in this way, eſpecially ſince the time of cardinal Mazarin, who had a wonderful fancy for deviſes.

The Italians have reduced the making of deviſes into an art, and laid down laws and rules for this purpoſe. Some of the principal are, 1. That there be nothing monſtrous, or extravagant, in the figures; and nothing contrary to the nature of things, or to the common opinion of mankind. 2. That figures be not joined which have no affinity, or relation, to each other; the metaphor being to be founded on ſomething real, and not on hazard, or imagination, excepting ſome whimſical combinations eſtabliſhed in mythology, which cuſtom, and the authority of the poets, have made paſs for natural. 3. That the human body be never taken into deviſes; as this would be to compare a man with himſelf. 4. That there be a ſort of unity in the figures which compoſe the body: we do not mean, that there muſt only be a ſimple figure; but that, if there be ſeveral, they muſt have a relation, and ſubordination to each other, ſo that there be one principal figure whereon all the reſt depend: though ſtill the fewer figures there are in the body of the deviſe, and the leſs they are confuſed, the more perfect and elegant is the deviſe. 5. The motto, which is to animate the figure, muſt agree ſo accurately thereto, as that it could not ſerve for any other. 6. Nothing is to be named that appears to the eye, and which the bare inſpection might notify. 7. The motto is to have a complete ſenſe of itſelf; for, being to make a compound with the figure, it muſt only be a part, and, conſequently, muſt not ſignify the whole. If the words alone have a complete ſignification, you have a full and diſtinct notion independently of the figure; whereas the ſignification ſhould reſult from both. 8. The ſhorter the motto, the more beautiful: and a ſuſpenſion of the ſenſe, which leaves ſomewhat to gueſs, is one of the principal graces of the deviſe. Laſtly, it is accounted a happineſs, where the words of a poet are applied in a ſenſe which he never dreamed of, and yet ſo pertinently, that it ſhould ſeem they had been intended for the ſame.

Devise, or *Diviſe*, in *Common Law*, the act whereby a teſtator gives, or bequeaths, his lands, or goods, by his laſt will, in writing. Though, in ſtrictneſs, a deviſe of goods is more properly termed a bequeſt.

He who makes the deviſe is called the deviſor; and he to whom it is made, the deviſee.

A deviſe in writing is, in conſtruction of law, no deed; but an inſtrument by which lands are conveyed.

The words of a will the law interprets in a larger, and more favourable ſenſe, than thoſe of a deed: for if land be deviſed to a man to have to him for ever, or to have to him and his aſſigns; in thoſe caſes, the deviſee ſhall have a fee ſimple: yet if given in the ſame manner by feoffment, he ſhall have but an eſtate for life.

So, if one deviſe land to an infant in his mother's belly, it is a good and valid deviſe; though it is otherwiſe by feoffment, grant, or gift. For, in thoſe caſes, there ought to be one of ability to receive preſently; otherwiſe it is void. See Deed, and Will.

Devise, *Executory*. See Executory *Deviſe*.

DEVIZES, in *Geography*, a market and borough town of Wiltſhire, England, is a place of remote antiquity; and though it has not been proved to be a Roman ſtation, yet various ancient remains, belonging to the Romans, have been found here. Dr. Stukeley contends, that a town, a ſtation, called *Punetuobiee*, occupied the ſite of the preſent Devizes, and that it was ſurrounded by a "vallum and ditch." Dr. Davies, in a work containing much ingenious criticiſm, entitled "Origines Diviſianæ," controverts the opinion of Stukeley. A ſtrong caſtle, on a commanding ſituation, was built here at an early period. This was occupied by Roger biſhop of Sarum, during the reign of Henry I.; and here, in the ſucceeding reign, the biſhop, with his ſon, and nephews, were made priſoners within its gates. In the various civil wars that progreſſively occurred in England, this caſtle was the ſcene of repeated conflicts, and its walls frequently aſſaulted. In the 27th year of Edward I, that monarch ſettled this caſtle and town, with ſeveral other places in Wiltſhire, on his queen Margaret, by way of dower. Leland deſcribes this fortreſs in the following terms. "It ſtood on the ſouth-weſt ſide of the town, ſtately advanced on a high ground, defended partly by nature, partly by dykes. It was made by biſhop Roger; and ſuch a piece of caſtle work, ſo coſtly and ſtrongly, was never afore, or ſince, ſet up by any biſhop of England. The keep, or dungeon, on a hill caſt up by hand, is a piece of work of incredible coſt; there appeared on the gate ſix or ſeven places for portculliſes, and much goodly building was in it. It was then ruined; part of the front of the towers of the gate of the keep and chapel was carried full profitably to build Mr. Baynton's place at Bromham, ſcarce three miles off; and divers goodly towers in the outer hall were going to ruin; the principal leading into the town was yet of great ſtrength." The fortreſs thus deſcribed, has ſince been entirely deſtroyed; and nothing remains but parts of the valla and mount. Theſe are now encloſed within the pales of a gentleman's ſhrubbery.

During the civil wars of the ſeventeenth century, Devizes was occupied by a party of the king's army, which was attacked by the parliamentary forces under ſir William Waller. A dreadful battle enſued, and terminated in favour of the royaliſts. About ſix hundred of the parliamentary ſoldiers were ſlain, and nine hundred more taken priſoners.

As a borough, Devizes has had ſeveral charters granted it by different monarchs. The firſt of theſe was conferred by the empreſs Maud, and confirmed by her ſon, Henry I. Succeeding kings either ratified, or extended the liberties and immunities of the burgeſſes.

The town occupies an elevated ſite, and is therefore deprived of any river; which is of ſo much importance and utility to places of trade, and indeed to every ſpot where perſons

perſons make a permanent ſettlement. Devizes conſiſts of two pariſhes, and a chapelry: and is provided with two churches and one chapel, belonging to the eſtabliſhed religion. Beſides theſe there are four meeting-houſes.

Richard of Devizes, and Joſeph Allen, were natives of this town.

About two miles north-eaſt of Devizes is Roundway-hill, on the ſummit of which is a large entrenchment, which comprehends an area of about 140 yards, by 120 yards. North-eaſt of this is another large earth-work fortreſs, called Oldbury caſtle. Between theſe are a very conſiderable vallum and ditch, which extend ſeveral miles from weſt to the eaſt, and is known by the name of Wanſdyke. In the vicinity of Devizes is New park, a handſome ſeat, belonging to Mrs. Sutton: and Stoke park, the ſeat of Joſhua Smith, eſq. M.P. The latter houſe is a commodious and handſome building, and the park abounds with fine woods, and is ornamented with a large lake.

Devizes contains 890 houſes, and 4851 inhabitants. It has two weekly markets, and ſix fairs annually.

DEULE, a ſmall river of the department of the North in France, which forms the canal of Douay at Lille, and runs into the Lys.

DEULEMONT, a town in France, in the department of the north, at the conflux of the Deule and the Lys; ſix miles N. W. of Lille.

DEUNA. See DEVA.

DEUNX, a diviſion of the Roman libra, or pound, containing eleven ounces; or eleven twelfths of any thing. See As.

DEVOIRS OF CALAIS, in our *Old Statutes*, cuſtoms due to the king for merchandize brought to, or carried out of Calais, when our ſtaple was there. 34 Edw. III. c. 18. and 2 Rich. II. ſtat. 1. c. 3.

Devoir is French, ſignifying *duty*.

DEVOLVED, ſomething acquired by right of devolution. Such a right is devolved to the crown: ſuch an eſtate devolved on M—— by the death of N——.

The word is alſo uſed for a right, acquired by a ſuperior, of conferring a benefice, when the inferior, and ordinary collator, has neglected to confer, or has conferred it on an unqualified perſon.

If a patron neglects to preſent a benefice in ſix months, the preſentation lapſes, or devolves, upon the biſhop, from thence to the primate, and from thence to the king.

DEVOLUTION, in the *French Law*, a right acquired by deſcent, or ſucceſſion, from degree to degree.

Devolution, in general, is an impediment provided by the cuſtoms of ſeveral provinces, whereby the huſband who ſurvives his wife, or the wife ſurviving her huſband, is prohibited to alienate the real and immoveable effects of the deceaſed, and obliged to preſerve them for the children iſſued from that marriage; ſo that they may ſucceed thereto in excluſion of thoſe born of a ſecond marriage.

DEVON, in *Geography*, a river of Scotland, in Clackmannſhire; which is navigable for barges to the coal mines near Madlock fort, about 2½ miles from its influx into the Forth river.

DEVONA, in *Ancient Geography*, a town of Germany, according to Ptolemy.

DEVONSHIRE, in *Geography*, a county of England, bounded on the north by the Briſtol channel, on the ſouth by the Engliſh channel, on the eaſt by Somerſetſhire and Dorſetſhire, and on the weſt by Cornwall. This area of country meaſures about 73 miles in length, and 63 in breadth; and is eſtimated to contain nearly 1,600,000 acres of land. The external aſpect of the county is exceedingly varied and irregular; and the heights in many parts, but particularly in Dartmoor and its vicinity, ſwell into mountains: the altitudes of the principal eminences being from 1500 to 1800 feet. On approaching this tract from the ſouth and ſouth-eaſt, the eye is bewildered by an extenſive waſte, exhibiting gigantic tors, large ſurfaces covered with vaſt maſſes of ſcattered granite, and immenſe rocks, which ſeem to have been precipitated from the ſteep declivities into the vallies. A prominent natural feature of this county is Dartmoor, or Dartmoor Foreſt, which has been already deſcribed in a former volume of this work.

The vale of Exeter differs widely in appearance from Dartmoor; though in ſome parts, particularly between Tiverton and Exeter, and the latter place and Collumpton, it has an irregular billowy ſurface, and preſents eminences of conſiderable magnitude; but the central and ſouthern parts preſerve the vale character. The area of this diſtrict contains about 200 ſquare miles: its boundaries on the north, are the hills that range from Clanaborough, by Halberton and Uffculm, to Blackdown, a dreary mountainous ridge, which, with its contiguous branches, ſkirt the eaſtern ſide of the vale: on the ſouth-eaſt it is bounded by the heights of Sidmouth-hill, Eaſt-down, and Woodbury; and on the weſt by the mountainous tract of Haldon, and the undulating eminences that ſtretch toward Bow. The diſtrict called the South-hams, is frequently termed the garden of Devonſhire, from its fertility. Its natural boundaries are Dartmoor, and the heights of Chudleigh, on the north; Plymouth Sound on the weſt; Torbay on the eaſt; and on its ſouthern point, the Engliſh channel. Its area, including the rich valley of the Dart, which extends towards Aſhburton, comprehends nearly 250 ſquare miles. This tract is ſtrikingly diverſified by bold ſwells, winding coombs, and fine vales; and in many parts, particularly towards the north, the ſcenery is pictureſque, and highly romantic. Numerous ſprings flow from the ſides of the hills, and uniting into brooks and rivulets, ſpread luxuriance and beauty through a conſiderable extent of country. Great quantities of cyder are made in this diſtrict, as well as in the vale of Exeter; and as almoſt every farm has its orchard, the general produce affords a conſiderable ſurplus for exportation. Preference is generally given to thoſe apples which are moſt juicy, yet they are ſeldom ſorted: the red-ſtreak is the ſpecies conſidered as moſt productive. The ſweet cyder is chiefly made in the vicinity of Staverton, but of the ſame kind of fruit as the rough: the ſweet taſte ariſes from its being often racked, which checks the fermentation. The cyder made in the neighbourhood of Exeter, Chudleigh, Newton-Buſhel, Peignton, Totneſs, and ſome contiguous places, is deemed of ſuperior flavour. In this diſtrict alſo a conſiderable quantity of butter is made: the mode of producing the cream is almoſt peculiar to Devonſhire; it is raiſed by heating the milk in earthen or braſs pans, and is then worked into butter by the hand of the dairy-maid, who turns it all one way in a bowl or tub, without the aſſiſtance of the churn. After the cream is taken off, the ſcalded milk is made into an inferior kind of cheeſe.

The breed of catttle in Devonſhire is ſpoken of by Mr. Marſhall, in his Rural Economy of the Weſt of England, as being in many reſpects the moſt perfect in England. This accurate obſerver imagines all the varieties to be ſprung from the native breed of the iſland, and remarks, that with the exception of colour, they exactly reſemble the wild cattle which are ſtill preſerved at Chillingham park, in Northumberland. The Devonſhire breed are of the middle-horned kind, but vary conſiderably, both in ſize and form, in different parts of the county. "North Devon," ſays

Mr. M., " takes the lead in both theſe particulars; and its breed are in both nearly what cattle ought to be. In ſize, they are rather below the deſirable point for the heavier works of huſbandry; but they make up for this deficiency, in exertion and agility; and are, beyond compariſon, the beſt workers I have any where ſeen. As dairy cattle the Devonſhire breed are not excellent; rearing for the eaſt-country graziers having long been the main object of the farmers of this county; but as grazing cattle, individuals in every part of the county ſhew the breed to be excellent. In Weſt Devonſhire the breed is conſiderably ſmaller than in the northern diſtrict, and their quality in every reſpect lower." Oxen have, from time immemorial, been the plough-team of this county; ſometimes with horſes before them, but more generally alone. Four aged oxen, or ſix growing ſteers, are the uſual number yoked to one plough.

Among the products of Devonſhire ſhould be noticed the great variety of fiſh which abound in its rivers and on its coaſts; and, in addition to the home conſumption, afford a very conſiderable ſupply to the Bath and London markets. In the rivers Tamar and Tavy, great numbers of ſalmon are annually taken, producing large ſums to the proprietors of the eſtates which have the right of fiſhing. The ſalmon-fiſhery on the Tavy is appendant to the lands of Buckland-place, the ſeat of the Drake family, by whoſe anceſtor, the celebrated circumnavigator, the eſtate was purchaſed. The weir belonging to this fiſhery is a work of conſiderable magnitude. It conſiſts of a ſtrong dam, about twelve feet high, thrown acroſs the river in a part where two projecting rocks ſerve as buttreſſes to the maſonry, which is built arch-wiſe to reſiſt the preſſure and force of the waters in times of flood, when they collect from the ſlopes of the Dartmoor hills, and ruſh down with extraordinary impetuoſity. The fiſhing ſeaſon commences in the Tavy about the middle or latter end of February, (but on the Tamar not till ſeveral weeks later,) and cloſes in October or November, when the weir is thrown open. When the water is clear, many ſalmon are taken with the ſpear by poachers, who throw this weapon with great dexterity. The ſalmon of the Tamar and Tavy are of inferior quality to thoſe taken in many other rivers in Devonſhire. Thoſe of the Exe are conſidered the moſt delicate, and fineſt flavoured. In the river Dart they are caught in great abundance; their uſual weight is from ſix to fourteen pounds each: though they are frequently taken of the weight of twenty pounds or upwards. Thoſe that aſcend the Teign are often ſold at Chudleigh ſo low as two-pence or three-halfpence *per* pound. The prevailing river fiſh of Devon is the trout, which are provincially called ſhots, from their rapid motion through the water. The river Otter is remarkable for its trout, and ſalmon-peal; the former having a peculiarly rich flavour, and the latter being very large and firm. The plaiſe of the Devonſhire rivers are eſteemed particularly delicious; more ſo, perhaps, than thoſe of any other part of the world. The torpedo, or electric ray, has occaſionally been caught at Torbay, and ſometimes in the river Dart.

The mineralogical ſubſtances of Devonſhire are various and numerous; and from the confuſed intermixture of the ſtrata in different parts of the county, it is conſidered that earthquakes or volcanoes have prevailed here at ſome remote periods.

Among the minerals of the calcareous genus, limeſtone is the moſt conſiderable, being found of almoſt every deſcription in different parts of the county: many quarries have been opened, to procure it for the purpoſes of agriculture, building, and ornament. In the eaſtern part of Devon it approaches to the nature of chalk, and, in general, is ſcarcely ſuſceptible of a poliſh: in other parts, and particularly in the South-hams, it aſſumes the qualities of marble, and for hardneſs and beautiful veinings, reſembles the beſt marbles of Italy; and when poliſhed, is hardly inferior in luſtre. In the pariſh of South Moulton are many quarries of black marble, variegated with ſmall ſtreaks of white, which takes a fine poliſh, but is moſtly burnt into lime. Gypſum is obtained in various parts of the county, though not in particular abundance: near Plymouth it appears in union with the lime-ſtone. It is alſo found at Salcombe-Regis, and at many places in the lime-ſtone diſtrict, ſouth-weſt of Exeter. In the mines of Beer-Ferris fluor-ſpar is procured in great plenty, and of ſeveral varieties, both as to ſhape and colour: a ſpecimen of ſtellated ſpar has been found at Oxton, near Haldon.

Argillaceous ſubſtances abound in almoſt every part of the county. In the vale of King's-Teignton, pipe and potter's clay is procured in great quantities; and ten or twelve thouſand tons are annually ſent from the port of Teignmouth, to ſupply the potteries of London, Liverpool, and other parts. Schiſtus is common to almoſt the whole county, and conſiſts of a great number of laminæ, differing in thickneſs, from three feet to half an inch.

In the ſilicious claſs are quartz cryſtals, which have been found in various parts of Devonſhire, but generally very ſmall. On Dartmooor they have been ſometimes met with in the fiſſures of the granite: they have alſo been diſcovered in abundance in the red ſoil, or rock, at Rougemont caſtle; and near Samford-Spinney, in great plenty: their common form is the hexagonal priſm, terminating with two pyramids. Flints exiſt in great abundance, but particularly in the mountainous tract of Haldon. The principal kinds of free-ſtone are dug in the pariſhes of Salcombe, Branſcombe, and Beer.

Varieties of lava, here called iron-ſtone, whin-ſtone, and baſalt, are found in different parts of the county, and bear a ſtriking reſemblance to the Derbyſhire toad-ſtone: it exiſts, however, in the greateſt plenty in the vicinity of Exeter; and the entire rock on which the caſtle ſtands has been conſidered as volcanic.

Granite, called alſo moor-ſtone, is, as in Cornwall, found in various places, but particularly in Dartmoor, where the mountains commence which extend into that county. It generally lies in vaſt irregular maſſes, and in great variety, as to texture and colour. Specimens of the red granite are exceedingly beautiful when well poliſhed. On expoſure to the atmoſphere, it acquires ſolidity; but when firſt raiſed, may be worked with little difficulty.

The moſt remarkable of the inflammable ſubſtances diſcovered in Devonſhire is the Bovey coal, the origin of which has given riſe to conſiderable diſcuſſion among geologiſts. It is obtained in the extenſive flat called Bovey Heathfield, which appears to have been formerly covered by the tide, and is ſuppoſed to be lower than the level of the ſea. The nature and peculiar properties of this mineral, are fully deſcribed by Mr. Polwhele, in his Hiſtory of Devonſhire.

Pyrites is found in various parts of the county, and frequently appears in globular balls of different ſizes. A great number were met with a few years ago in the ſchiſtus, near Chudleigh, lying at ſome diſtance from each other. Several of them are in the cabinet of P. Raſhleigh, eſq. of Menabilly.

The principal metallic ſubſtances of Devonſhire are the ores of tin, lead, iron, and manganeſe. Gold, ſilver, copper, biſmuth, antimony, and cobalt have alſo been found, but in ſmall quantities. The tin-works were anciently numerous and valuable, but have in a great meaſure been

abandoned; the mines of Cornwall being conſiderably more productive: though in the reign of king John, Devonſhire produced greater quantities of tin than that county; its coinage being ſet to farm at 100*l.* annually, and that of Cornwall at no more than 100 marks. The importance of its trade in tin is, indeed, manifeſted from its ſtannary courts, and coinage towns, of which there are four; Plympton, Taviſtock, Aſhburton, and Chagford. The members of theſe courts have the privilege from time to time, and under the direction of the lord warden, of chooſing certain jurats to meet in a general aſſembly at Crockern Tor, in the midſt of Dartmoor, with power to make laws for the regulation of the mines and ſtannaries. "There are numberleſs ſtream-works on Dartmoor, and in its vicinities," Mr. Polwhele obſerves, "which have lain forſaken for ages. In the pariſhes of Manaton, King's-Teignton, and Teigngrace, are many old tin-works of this kind, which the inhabitants attribute to that period when wolves and winged ſerpents were no ſtrangers to the hills or the vallies. The Bovey Heath-field has been worked in the ſame manner; and, indeed, all the vallies from the Heath-field to Dartmoor bear the traces of ſhoding and ſtreaming; which, I doubt not, was either Britiſh or Phenician. Lead was alſo familiar to the weſtern Britons. That the Danmonians had iron-works is plain from Cæſar, who mentions the *exigua copia* of our iron in the maritime parts: the iron-pits of Blackdown were, I conceive, originally Britiſh, and were afterwards worked by the Romans." The lead ore of this county is chiefly of a greyiſh blue colour, but of ſeveral varieties. The potter's or teſſellated ore is of a ſhining, rectangular, tabulated ſtructure, always breaking into cubical granules: another kind is of a flaky, ſmooth, gloſſy texture, breaking into more ponderous fragments: and a third ſort is very cloſe grained; fracture, ſparkling and uneven, and very rich in ſilver: the latter variety has been obtained in plenty at the Beer-ferris mines. Some very rich lead ore was diſcovered a few years ago near the ſurface at Comb-martin. Iron-ſtone is found in various parts of the county, and in many varieties; but does not appear to be particularly rich in metal. Native ſilver has been found in different ſubſtances, and in various forms; granular, filamentous, capillary, arboreſcent, and cryſtallized. Manganeſe is chiefly obtained at Upton Pyne, where it was diſcovered about forty years ago. Antimony has been found in ſeveral places within the three pariſhes of Chudleigh, Hennock, and South Bovey. Cobalt, interſperſed with numerous filaments of ſilver, has been diſcovered in conſiderable abundance at Sampford.

Mineral waters are very numerous in this county, and are chiefly of the chalybeate kind; though they have not in any particular degree been appropriated to medicinal purpoſes. The ſtrongeſt ſprings of this deſcription ariſe at Gubb's Wall, near Cleave; at Bella Marſh, near King's-Teignton; at Ilſington, in the vicinity of Totneſs; at Brook, near Taviſtock; and at Bampton: the ſpring at the latter place is ſaid to be more ſtrongly impregnated with iron than any other.

Devonſhire abounds with rivers: ſome of them flow northward into the Briſtol Channel; and others ſouthward into the Britiſh Channel: being enlarged in their progreſs by innumerable leſſer ſtreams. The principal are the Taw, the Torridge, the Dart, the Teign, and the Exe: the moſt conſiderable of the ſecondary rivers are the Tavy, the Plym, the Yealm, the Arme or Erme, the Aven, the Otter, the Sid, the Axe, and the Lyn. The Tamar is ſometimes included among the Devonſhire rivers, as being equally common to this county as to Cornwall, but is more generally conſidered as belonging to the latter from riſing within its limits.

The ancient inhabitants of Devonſhire were the Danmonii. Under the Roman ſubjugation, this county was included in the diſtrict called Britannia Prima: by the Saxons it was made part of the kingdom of Weſſex; and ſo continued till the incorporation of the Saxon ſtates into one monarchy under Egbert.

Devonſhire is in the dioceſe of Exeter, and in the weſtern circuit. It is divided into thirty-three hundreds; and contains 40 market towns, 394 pariſhes, 61,190 houſes, and 343,000 inhabitants. The members returned to parliament are twenty-ſix: two for the county, and two for each of the following places; Exeter, Totneſs, Plymouth, Oakhampton, Barnſtaple, Plympton, Honiton, Taviſtock, Aſhburton, Dartmouth, Bere-Alſton and Tiverton. The county pays twenty-one parts of the land-tax; and ſupplies 1600 men to the militia. The aſſizes are held at Exeter. Marſhall's Rural Economy of the Weſt of England. Polwhele's Hiſtory of Devonſhire. Beauties of England and Wales.

DEVONSHIRING, in *Agriculture*, a name formerly applied to the proceſs of paring and burning.

DEVOTION, of *devoto*, from *devoveo*, I conſecrate, a ſincere, ardent worſhip of God.

Monſ. Jurieu defines devotion, a ſoftening and yielding heart, with an inward conſolation, which the ſouls of believers feel in the exerciſes of piety.

Devotion, according to Dr. Blair (ſee Sermon x. vol. i.) is the lively exerciſe of thoſe affections, which we owe to the Supreme Being, comprehending ſeveral emotions of the heart, which all terminate on the ſame great object. The chief of theſe are veneration, gratitude, deſire, and reſignation. Veneration is an affection compounded of awe and love, and looks up to the Diety, as he is in himſelf:—gratitude for the divine benefits is a warmer emotion than ſimple veneration, and regards God as he is towards us:—deſire regards the favour of the Supreme Being as its chief good and final reſt:—and theſe ſeveral ſentiments and affections produce, and are accompanied by, an entire reſignation of the ſoul to God, as the conſummation of truſt and hope. Accordingly, devotion expreſſes, not ſo much the performance of any particular duty, as the ſpirit which ought to animate all religious duties. It ſtands oppoſed, not merely to downright vice; but to a heart which is cold, and inſenſible to ſacred things; which from compulſion, perhaps, and a ſenſe of intereſt, preſerves ſome regard to the divine commands, but obeys them without ardour, love, or joy. This excellent preacher obſerves, that in the culture and exerciſe of a devout ſpirit, it is of the utmoſt conſequence to guard againſt extremes of every kind in religion; as ſuperſtition, on the one hand, which attaches men, with immoderate zeal, to the ritual and external part of religion, and enthuſiaſm, on the other, directing their whole attention to internal emotions, and myſtical communications with the ſpiritual world: while, neither the one, nor the other, has paid ſufficient regard to the great moral duties of the Chriſtian life. Some perſons, eagerly anxious to avoid theſe two great abuſes of religion, have neglected to obſerve, that there are extremes oppoſite to each of the former, into which they are in danger of precipitating themſelves. Thus, the horror of ſuperſtition has ſometimes produced contempt for all external inſtitutions; as if it were poſſible for religion to ſubſiſt in the world, without forms of worſhip, or public acknowledgement of God. Others, well affected in the main to the cauſe of goodneſs, obſerving that perſons of a devout turn have at times been carried away, by warm affections, into unjuſtifiable exceſſes,

have thence haſtily concluded, that all devotion was akin to enthuſiaſm; and ſeparating religion totally from the heart and affections, have reduced it to a frigid obſervance of what they call the rules of virtue. In order to guard againſt this extreme, it ſhould be conſidered, that true devotion is rational and well-founded; that it is of the higheſt importance to every other part of religion and virtue; and alſo, that it is moſt conducive to our happineſs. Pure and rational devotion, as our author well obſerves, ſhould be carefully diſtinguiſhed from that which is, in any degree, ſpurious and adulterated. For this purpoſe devotion ſhould not be made to conſiſt in the mere performance of any external act of worſhip; nor ſhould the pleaſures and advantages of it be conceived as open indiſcriminately to all; nor ſhould it be repreſented as requiring an entire retreat from the world, or as enjoining a total contempt of all the pleaſures and enjoyments of human ſociety; nor again, ſhould it be believed, that devotion nouriſhes a ſpirit of ſeverity, in judging of the manners and characters of others; or, that perpetual rapture and ſpiritual joy belong to devotion.

Uuder the name of devotions are uſually underſtood certain religious practices, which a perſon makes it a rule to diſcharge regularly; and with reaſon, if this exactitude be founded on ſolid piety; otherwiſe it is vanity, or ſuperſtition.

Devotion, among the Romans, was a ſort of ſacrifice, or ceremony, whereby they conſecrated themſelves to the ſervice of ſome perſon.

The ancients had a notion, that the life of one might be redeemed by the death of another: and hence were thoſe devotions ſo frequent for the lives of the emperors. Theſe were either private or public; of the former ſort were the devotions of the two Decii and of Curtius, who devoted themſelves to ſave the Romans. The devotion of Decius, who, after devoting himſelf to his country, threw himſelf into the hands of his enemies, and was killed, is ſaid to have gained the Romans the victory. On this occaſion Decius gave notice to the pontiff Valerius, to pronounce the form of devoting: "Deorum ope," ſays he, "Valeri, opus eſt; agedum; præi verba quibus me pro legibus devoveam." The public devotions were performed by the dictator or conſul, at the head of an army. The form is tranſmitted to us by Macrobius (Sat. l. 3. 9.) and is as follows: "Father Dis, Pluto, Jupiter, Manes, or by whatever name it is lawful to call you, I beſeech you to fill this city of Carthage, and the army I mean, with terror and conſternation: Grant that they who bear arms againſt our legions and army, may be put to the rout, that the inhabitants of their cities, and of their fields, with all that dwell in them, of every age, may be devoted to you, according to the laws, by which our greateſt enemies are devoted. I, by the authority of my commiſſion, devote them, in name of the Roman people, in name of the army, and in name of our legions, that you may preſerve both the commanders and thoſe who ſerve under them."

But devotion to any particular perſon was not known till Auguſtus. The day after the title Auguſtus had been given to Octavius, Pacuvius, a tribune of the people, began to ſay, he would devote and conſecrate himſelf to him, as was practiſed among the barbarous nations, to obey him even at the expence of life, if he were commanded. His example was immediately followed by all the reſt; and it came at length to be eſtabliſhed into a cuſtom, never to go to ſalute the emperor, without declaring, they were devoted to him. Auguſtus, though ſeeming to oppoſe this vile and infamous flattery, yet rewarded the author.

Cornelius Nepos uſes the word devotion for a kind of puniſhment, conſiſting of direful curſes, and marks of infamy. See Accursed, and Execration.

Whenever the law devoted any one to death, it was permitted to kill him. One of Romulus's laws was conceived in theſe terms: "Si patronus clienti fraudem faxit, ſacer eſto. *i. e.* If any patron defrauds his client, let him be devoted." It was to Pluto or Dis, and the other infernal deities, that criminals were devoted.

DEVOURING, in *Heraldry*. When fiſhes are borne in an eſcutcheon, in a feeding poſture, the heralds denominate it devouring; becauſe fiſhes ſwallow all their food whole.

DEUPRAG, in *Geography*, a town in the country of Thibet; 15 miles S. of Sirinagur.

DEVRACOTA, a tract of land on the coaſt of Orixa, in the ſouthern part of Hindooſtan, called the Deccan, which had been ceded to the French Eaſt India company by the viceroys of Golconda. It is about 20 miles S. of Maſulipatam, and renowned for its uncommon fertility. Its clear value to the French, before 1754, was 100,000 rupees, or 240,000 French livres *per annum*. Herbin Statiſtique de la France, vol. vii.

DEUREN, or Duren, anciently *Marcodurum*, was formerly a town of the duchy of Juliers, in the circle of Weſtphalia, in Germany, but is now a town of France, in the department of the Roer, diſtrict of Aix-la-Chapelle, ſituated on the river Roer, 15 miles S. of Juliers, 30 S. W. of Cologne. E. long. 9°. Lat. 50° 46'. It contains 3489 inhabitants, and is the chief place of a canton, which, in 57 communes, compriſes a population of 16,695 individuals.

DEURIOPUS, in *Ancient Geography*, a country of Macedonia, forming a part of Pæonia; ſituated between the rivers Axius and Erigon. Its principal towns were Bryanium, Alalcomenæ, and Stymbara, ſuppoſed to be the ſame with Stubera.

DEUS Dedit, or God's gift, in *Biography*, pope, ſucceſſor to Boniface IV. in the year 614. He reigned but three years; and we have but few particulars tranſmitted to us reſpecting him, farther than that he was a native of Rome, and ſon of a ſubdeacon of the church, and that his election to the pontificate was unanimous. He was a pious and benevolent man, and to him have been imputed divers miracles. Moreri mentions one in which he healed a leprous man by bringing their mouths in contact. The biographer probably gave little credit to ſuch a report, but thought it neceſſary to inſert it to quiet the minds of the devotees to the Catholic religion. Moreri.

DEUS Vult, *Deus le Volt*: the cry of battle among the Croiſaders, in their ſeveral expeditions into the Eaſt for the recovery of the Holy Land. In the council of Clermont, held by pope Urban II, in the year 1096, for inſtituting the firſt croiſade, the whole aſſembly there preſent, laity, as well as clergy, anſwering his exhortations with a general and ſudden cry of *Deus Vult*, It is the will of God, the pontiff repreſented this as the effect of inſpiration, and appointed thoſe words to be the ſignal for attacking and rallying in the enſuing battles againſt the Saracens, which they continued to be in all future croiſades as well as in the firſt. See Croisade.

DEUSINGIUS, Anthony, in *Biography*, a learned phyſician, and voluminous writer on every part of medicine, and on other branches of natural philoſophy, was born at Meurs, in the duchy of Juliers, October 16th, 1612. After acquiring a proficiency in the learned languages, to which were added the Arabic and Perſian, he went to Leyden,

den, where he completed his education by taking the degree of doctor in medicine, in 1634. Three years after he was appointed profeſſor in mathematics at Meurs. In 1639, he was called to ſucceed Iſaac Pontanus, in the chair of natural philoſophy and mathematics, and, in 1642, to that of medicine at Harderwick, to which was added the office of phyſician to the city. From Harderwick, he went to Groningen, where, in addition to the offices ſimilar to thoſe he held at Harderwick, he was appointed rector of the univerſity, and ancient of the church. Amid the buſineſs which ſuch accumulated duties heaped upon him, he found leiſure to write a greater number of treatiſes on the different parts of medicine and philoſophy, than have fallen from the pen of almoſt any other man. In the liſt Haller has given, we find the titles of fifty-four treatiſes, or diſſertations. But a ſmall number of theſe are on practical ſubjects. Many of them are metaphyſical, and a ſtill greater number are controverſial. Theſe are written with great acrimony, particularly thoſe relating to his controverſy with Silvius, though the ſubjects, which are moſtly phyſiological, do not ſeem calculated to excite ſo much rancour as we ſee infuſed into them. A few of the titles follow, for the reſt the reader is referred to the different parts of the Bibliotheca of Haller. "Joannes Cloppenburgius, Weautontimorumenos, ſeu retorſio injuriarum de libello falſidico, cui titulus, Res judicata, cumulatarum," 1643, 4to. The ſubject of diſpute is the nature of the ſoul, and on the intelligences that direct the courſe of the ſtars. "Canticum Avicennæ de Medicina, ex Arab. Lat. reddit," 1649, 4to. "Diſſertationes duæ, prior de motu Cordis et Sanguinis, altera de lacte ac nutrimento fœtus in utero," 4to. 1651. In this he defends the circulation of the blood, as deſcribed by our countryman Harvey. "Synopſis Medicinæ univerſalis," 1649., &c. Deuſingius died in the winter of 1666, of a pleuritic affection, occaſioned by taking a long journey, in very ſevere weather, to viſit the count of Naſſau, to whom he was phyſician. Eloy Dict. Hiſt.

DEUTEROCANONICAL, compounded of *δευτερος*, *ſecond*, and *κανονικος*, *canonical*, in *Biblical Hiſtory*, an appellation given to certain books of the Holy Scriptures, which were added to the canon after the reſt; either becauſe they were not wrote till after the compilation of the canon, or becauſe of ſome diſputes as to their canonical authority.

The Jews, it is certain, acknowledge ſeveral books in their canon, which were put there later than the reſt. They ſay, that, under Ezra, a great aſſembly of their doctors, which they call, by way of eminence, the *great ſynagogue*, made the collection of the ſacred books, which we have now in the Hebrew Old Teſtament: and they agree, that they put books therein which had not been ſo before the Babyloniſh captivity. Such are thoſe of Daniel, Ezekiel, Haggai, &c. and thoſe of Ezra and Nehemiah.

And the Romiſh church has ſince added others to the canon that were not, nor could be, in the canon of the Jews; becauſe ſome of them were not compoſed till after the canon was formed. Such is the book of Eccleſiaſticus; with ſeveral of the apocryphal books, as that of the Maccabees, Wiſdom, &c. Others were added ſtill later, becauſe their canonical authority had not been yet examined; and, till ſuch examen, and judgment, they might be ſet aſide, at pleaſure.

But ſince that church has pronounced as to the canonical authority of theſe books, there is no more room now for her members to doubt of them than there was for the Jews to doubt of thoſe of the canon of Ezra: and the deuterocanonical books are, with them, as canonical as the protocanonical; the only difference between them conſiſting in this, that the canonical authority of the one was not generally known, examined, and ſettled, ſo ſoon as that of the others.

The deuterocanonical books, in the modern canon, are, the book of Eſther, either the whole, or at leaſt the ſeven laſt chapters of it; the Epiſtle to the Hebrews; that of James; and that of Jude; the ſecond of St. Peter; the ſecond and third of St. John; and the Revelation. The deuterocanonical parts of books are, the Hymn of the Three Children; the Prayer of Azariah; the hiſtories of Suſanna, of Bel and the Dragon; the laſt chapter of St. Mark; the bloody ſweat, and the appearance of the angel, related in St. Luke, chap. xxii. and the hiſtory of the adulterous woman in St. John, chap. viii. See CANON and BIBLE.

DEUTERONOMY, one of the ſacred books of the Old Teſtament; being the fifth book of the law, and the laſt of thoſe written by Moſes; cloſing, according to the computation of Uſher, the hiſtory of 2552½ years, from the beginning of the world to the death of Moſes. The word is Greek, compounded of *δευτερος*, *ſecond*, and *νομος*, *law*.

It does not appear that Moſes, who ſeems, from ſeveral paſſages that occur towards the beginning, to have been the author of this book, made any diviſion of what he wrote, into diſtinct books; or that he gave different names and titles to the different parts of his work; nor do the Jews, even at this day, diſtinguiſh them in the copies they uſe in the ſynagogues, but write them all running as one ſingle work, without any other diſtinction beſide that of little and great paraſches. It is true, in the other copies, uſed by private perſons, they are divided, into five parts, as among us; but they give them no other name but the firſt word wherewith each diviſion begins; much as we do in quoting a decree, or chapter of the canon law.

Thus the firſt part of Moſes's work they call בראשית *Bereſchit*, becauſe it begins with that word; the ſecond, they call ואלה שמות *Veelleh Schemoth*; the third, ויקרא *Vajickra*; the fourth, וידבר *Vajiedabber*; and the fifth, אלה הדברים *Elleh Haddebarim*; which is one of the firſt words thereof. This cuſtom is very ancient among the rabbins, as appears from the ancient commentaries on thoſe books, called בראשית רבה *Bereſchit Rabba*, רבה ואלה שמות *Veelleh Schemoth Rabba*, &c. from the *Prologus Galeatus* of St. Jerom. The Greeks, when they firſt tranſlated the law, gave the five parts into which it was divided, the names of Geneſis, Exodus, Leviticus, Numbers, and Deuteronomy. Accordingly the names are Greek, excepting that of Leviticus, which is Hebrew; and they expreſs what is contained in thoſe books, or at leaſt the moſt remarkable things contained therein; which is the uſual Greek manner of giving titles.

The book of Deuteronomy was ſo called, becauſe this laſt part of the work of Moſes comprehends a repetition, or recapitulation, which that legiſlator made to the Iſraelites, before his death, of the law he had before delivered to them at large: and hence Deuteronomy is ſtill called, by the rabbins, משנה *Miſchneh, repetition*; משנה תורה *Repetition of the law, ſecond law*, they likewiſe call it ספר תוכחות *the Books of Reprimands*; on account of the twenty-eighth chapter, which is full of bleſſings, promiſed to ſuch as keep the law; and of curſes, threatened to ſuch as tranſgreſs it.

The book of Deuteronomy was written in the fortieth year after the delivery from Egypt, in the country of the Moabites beyond Jordan: Moſes being then in the 120th year of his age; or in the laſt year of his life. It contains, in Hebrew,

Hebrew, eleven paraſches, though only ten in the editions of the rabbins at Venice; twenty chapters and 955 verſes. In the Greek, Latin, and other verſions, it contains thirty-four chapters: the laſt was not written by Moſes, becauſe it contains a relation of his death and burial. Some ſay it was added by Joſhua, immediately after Moſes's death; others will have it added by Ezra, which is the moſt probable opinion; who likewiſe made ſome interpolations in the book itſelf, as chap. ii. ver. 12. chap. iii. 11. and 14. Eichorn, in his "Introduction to the Old Teſtament," publiſhed at Leipzig, in four volumes, 1787—1795, conſiders this book as the work of another and later perſon than Moſes, who had ſurvived ſeveral of thoſe leaders of the people, who had been educated in the ſchools of the prophets. Dr. Kennicott, in his "State of the printed Hebrew Text of the Old Teſtament, &c:" (vol. i.) has pointed out ſeveral alterations and interpolations in this book; and reſtored the true reading, particularly in chap. xxxiii. 1—5. See PENTATEUCH.

DEUTEROPOTMI, Δευτεροποτμοι, from δευτερος, *ſecundus*, and ποτμος, *fortuna*, or *mors*, among the Athenians, a deſignation given to one who had been thought dead, and after the celebration of the funeral rites, unexpectedly recovered. It was unlawful for the deuteropotmi to enter into the temple of the Eumenides, or to be admitted to the holy rites, till after they were purified by being let through the lap of a woman's gown, that they might ſeem to be new born. Pott. Archæol. Græc. tom. i. lib. ii. cap. 4. p. 223.

DEUTEROSIS, the Greek name by which the Jews called their miſchna, or ſecond law. Deuteroſis in Greek has the ſame ſignification almoſt as miſchna in Hebrew; both ſignify an iteration. Euſebius accuſes the Jews with corrupting the true ſenſe of Scripture with the trifling explanation of their deuteroſes. Calmet, Dict. Bibl. in voc.

DEUTICHEM, or DEUTIKEM, in *Geography*, a ſmall town of Holland, in the department of Gueldre, on the Old Yſſel, famous for a conſiderable iron foundery.

DEUTSCH, NICHOLAS MANUEL, in *Biography*, an eminent artiſt, was a native of Berne, in Switzerland, and flouriſhed in 1518. He is mentioned as a celebrated painter in his time. He alſo cut on wood ſeveral of his own deſigns in a bold and free, but ſlight ſtyle; and the naked parts of his figures are ſometimes incorrect. The two following prints of this artiſt are mentioned by Strutt; *viz.* "A woman ſtanding," a middling ſize upright print, and "Several women figures in a compoſition;" alſo a middling-ſized print, lengthways. To the initials of his name and a dagger, is added the date 1518. This, ſays Strutt, is one of his neateſt and beſt engravings.

DEUTSCH EYLAU, in *Geography*. See EYLAU.

DEUTSCHBROD, *Broda Germanica*, in the Bohemian language *Brod Niemeczky*, is an ancient town of Bohemia, in the circle of Czaſlaw. It is called Deutſch, or German Brod, in contradiſtinction to Brod, or Bohemian Brod, a town in the circle of Kaurzim, in the neighbourhood of which the Huſſites ſuffered a conſiderable defeat in the year 1434.

DEUTZIA, in *Botany*, (in honour of preſident John Deutz, one of the magiſtrates of Amſterdam, a patron of Thunberg, who promoted and contributed to the expences of his botanical expedition to Japan.) Thunb. Nov. Gen. faſc. 1. 19. ic. Jap. 10. Linn. Syſt. Veg. ed. 14. 425. Schreb. 305. Willd. Sp. Pl. v. 2. 730. Juſſ. 431. Claſs and order, *Decandria Trigynia*. Nat. Ord. probably *Saxifragæ* of Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, inferior, ſomewhat bell-ſhaped, three times ſhorter than the petals, downy, with five, rarely ſix, ovate, obtuſe, upright, deciduous teeth. *Cor.* Petals five, rarely ſix, inſerted into the rim of the calyx, oblong, obtuſe, undivided, entire. *Stam.* Filaments ten, inſerted into the rim of the calyx, alternately ſhorter than the corolla, linear, with three teeth at the ſummit, of which the middle one is awl-ſhaped and bears the anther; anther globoſe, of two lobes and two cells. *Piſt.* Germen inferior, globoſe, crowned with a prominent border; ſtyles three, rarely four, ſpreading, thread-ſhaped, the length of the ſtamens; ſtigmas obtuſe. *Peric.* Capſule globoſe, truncate, the ſize of a ſmall pea, perforated, hard, rough, ſomewhat three-cornered, crowned with the hardened ſpreading baſes of the ſtyles; internally of three valves, and three, rarely four, cells, burſting finally at the baſe. *Seeds* ſeveral in each cell.

Eſſ. Ch. Calyx bell-ſhaped, five-cleft. Petals five. Filaments with three points. Capſule of three cells, crowned with the permanent ſtyles, burſting at its baſe.

Sp. D. *ſcabra*. Thunb. Jap. 185. t. 24. Willd. Sp. Pl. v. 2. 730. (Joro; Kæmpf. Amæn. 854.) Found in the mountains of Japan, flowering in May and June. It forms a ſmall branching tree like elder, with round, ſlender, purpliſh, ſomewhat hoary branches. Leaves oppoſite, moſtly ſtalked, ſimple, ovate, acute, ſerrated, veiny, very rough on both ſides with minute ſtarry briſtles. Buds of ſeveral ovate, hoary, permanent ſcales. Stipulas none. Flowers in terminal hoary panicles, white, the ſize of thoſe of the common lime tree.

Kæmpfer ſays the wood is hard, tough, and ſmooth, uſed for making cabinets and very fine bodkins; and that the inner bark, which is green and very bitter, enters into the compoſition of plaſters. Thunberg informs us that the leaves are uſed for poliſhing the articles made of the wood.

DEVUIDER, in the *Manege*, is applied to a horſe, that, upon working upon volts, makes his ſhoulders go too faſt for the croup to follow; ſo that inſtead of going upon two treads, as he ought, he endeavours to go only upon one. This comes from the reſiſtance he makes in defending againſt the heels; or from the fault of the horſe-man, who is too haſty with his hand. See HASTE.

DEUX-PONTS, in German *Zweybrück*, in Latin *Bipontium*, in *Geography*, was formerly the capital of the German duchy of the ſame name, in the circle of the Upper Rhine, which, at the peace of Luneville, was ceded to the French, together with ſeveral other countries ſituated on the weſtern ſhore of the Rhine. It conſtituted at that time part of the dominions of the elector, now king of Bavaria.

Deux-Ponts at preſent is a town of France, in the department of Mont Tonnere, chief place of a diſtrict of the ſame name, ſituated on the river Erlbach, 45 miles S. W. of Worms, 66 N. by W. of Straſburg, 57 N. E. of Metz, 63 S. W. of Mayence, N. lat. 49° 20′. It has a ſub-prefect, a court of juſtice, and a regiſter office. Its canton contains only 3 communes, and 5532 inhabitants, 4976 of whom belong to the town itſelf.

The ſoil of the diſtrict of Deux-Ponts is mountainous and not very fertile, yet it produces ſufficient food for its inhabitants. Madders and potatoes thrive well; the paſtures are excellent; there is much wood, and game in plenty. The vine grows along the banks of the river Glane. There are iron, copper, and coal mines, and a mine of agate, which contains ſtones as precious as any of the Indian agates. They are uſed for ſnuff boxes, rings, ſeals, ſleeve-buttons, &c. Contwig has a ſteel manufactory, and Hombourg a manufacture of muſlin.

The

The diſtrict of Deux-Ponts counts nine cantons, 154 communes, and 55,568 inhabitants, upon a territorial extent of 1795 kiliometres.

DEW, Deap, *ros;* water depoſited by the atmoſphere in conſequence of ſimple cooling, commonly by night, and in drops too ſmall to be viſible, until collected on the leaves of plants and other objects.

Caſaubon derives the word from the Greek *δεύω*, which is ſtrictly *I dew;* the *ω* being the perſonal pronoun ſuffixed by contraction. It is quite as probable, nevertheleſs, that a ſubſtantive, anſwering to our Angloſaxon primitive, gave riſe to this verb in the Greek.

Dew is a phenomenon proper to clear weather. It begins to be depoſited about ſun-ſet, is moſt conſtant in vallies and on plains, near rivers, and other collections of water; and abounds on thoſe parts of the ſurface which are clothed with vegetation. It is often ſuſpended when rain is approaching, as likewiſe in windy weather, and before thunder ſtorms: an unuſually copious depoſition, however, ſometimes precedes rain. In general it does not fall when a cloſe veil of clouds, however ſlight, remains over the ſky after ſun-ſet. Its approach, in the extenſive valley watered by the Thames, preſents the following appearance. After a clear warm day there is gradually formed on the horizon a continuous haze, riſing ſometimes to a conſiderable height, and often tinged by the ſetting ſun with a fine gradation of red and violet ſhades. This is the precipitated water, become faintly viſible in its deſcent. Dew is always to be found on the graſs by the time that this haze has become conſpicuous, and its abundance is proportioned to the denſity and permanence of the latter.

The quantity of dew, thus depoſited, differs conſiderably at different places, and at different ſeaſons in the ſame place; nor does it fall upon bodies of every kind indiſcriminately. In explanation of theſe phenomena, ſeveral hypotheſes have been ſuggeſted, but no ſatisfactory theory has as yet been eſtabliſhed reſpecting them. We ſhall endeavour to give our readers a clear idea of the ſubject, by ſtating whatever belongs to it in the following order. We ſhall, in the firſt place, deſcribe the facts which have been aſcertained by means of experiments and obſervations; ſecondly, we ſhall briefly mention the principal hypotheſes that have been offered for their explanation; and, laſtly, we ſhall ſubjoin ſome accounts of peculiar occurrences, which ſeem to belong to the preſent article.

1. In this iſland the dew is obſerved (like the drops of a miſſling rain upon the leaves of graſs and other vegetables, upon wood, glaſs, porcelain, &c., or upon the earth, which is thereby frequently rendered ſenſibly moiſt,) more copiouſly in ſpring and ſummer mornings; than at other times of the year. In autumn, however, and even in winter, it frequently happens, under the concurrence of particular circumſtances, that an abundant dew is depoſited in the courſe of the night.

2. In countries ſituated nearer to the equator, the dews are generally obſerved in the morning throughout the whole year; and in ſome places they are ſo very copious, as in great meaſure to ſupply the deficiency of rain, which ſeldom falls in thoſe places. But the quantity of theſe effects is not entirely proportional to the latitude, other local circumſtances concurring to their production.

3. The condenſation of the vapour which forms the dew moſtly takes place whilſt the ſun is below the horizon; but no particular experiments have been inſtituted for the purpoſe of determining whether the condenſation goes on regularly during the night, or alters its rate with any particular law. It has, however, been obſerved, that in moſt countries a conſiderable depoſition of moiſture takes place not long after the ſetting of the ſun; but ſoon after the depoſition proceeds with a ſlackening pace, until the riſing of the ſun in the morning. But the regularity of theſe effects is frequently counteracted by accidental circumſtances; ſuch as the change of wind, the preſence of clouds, &c.

4. In cloudy weather there is little or no dew depoſited. The greateſt quantity of it is obſerved in a morning ſubſequent to a clear, ſtill, and cool night, which has followed a pretty warm day.

5. Mr. Du Fay, at Paris, placed two ladders againſt one another, meeting at their upper ends, and ſpreading wide aſunder below. Their height was 32 feet. To the ſeveral ſteps of theſe he faſtened large panes of glaſs, ſo diſpoſed as not to overſhade one another. With this apparatus expoſed to the ambient air, he found that the lower ſurface of the loweſt pane of glaſs was firſt wetted with dew, then its upper ſurface, then the lower ſurface of the pane next above it was wetted, and ſo on, until all the panes to the very top of the ladders became covered with dew. He alſo tried the experiment with pieces of cloth inſtead of panes of glaſs, and the reſult was ſimilar to the above. He weighed all the pieces of cloth on the morning following their expoſure, and found that thoſe which had been placed lowermoſt, had imbibed more moiſture than thoſe which had been ſituated higher up; he owns, however, that the reſult of this experiment did not prove ſo ſatisfactory as the preceding. In general the lower parts of bodies that are expoſed to the ambient air, are firſt covered with dew.

6. Muſchenbroeck repeated the above mentioned experiments of Du Fay, with this difference however, *viz.* that he placed the ladders, &c. upon a plane covered with ſheet lead, but the experiment was attended with the like reſult.

7. By ſhaking the leaves of plants that are covered with dew, or by expoſing glaſs veſſels, or otherwiſe, the dew water may be collected, and on examination it will be found to be a pretty pure water; unleſs duſt and other accidental impurities happen to be gathered with the dew water. Some particular caſes are recorded, in which the dew was found to differ conſiderably from pure water; but thoſe accounts will be noticed hereafter.

8. The moſt ſingular phenomenon which attends this aqueous condenſation is, that the dew is not depoſited upon all kinds of ſubſtances indiſcriminately; it falls upon certain bodies much more abundantly than upon others, and upon ſome even not at all. Alſo, the very ſame bodies have been found to receive the dew in a greater or leſs degree, or not at all, according to certain circumſtances. Theſe anomalous effects not appearing at preſent reconcileable to any ſatisfactory theory, it is incumbent upon us to ſtate the principal reſults of the experiments that have been made on purpoſe by various philoſophers, in order that the ingenious reader may form whatever opinion he thinks beſt upon the ſubject.

9. The drops of dew attach themſelves to glaſs, cryſtals, and porcelain, much more readily than to other bodies; next to thoſe come the leaves of vegetables, wood, eſpecially when varniſhed, and common earthen-ware; but the dew adheres leaſt of all to all ſorts of metallic bodies.

10. Muſchenbroeck obſerved that on a leaden gutter, dew condenſed on every kind of ſubſtance, and ſo it did on a table in a certain garden. The forty-ſecond volume of the Philoſophical Tranſactions, page 112, contains ſome obſervations on dew, made by Dr. L. Stocke, upon the leaded platform of a tower. He expoſed ſeveral ſubſtances, and found, upon the whole, that the dew fell plentifully upon glaſſes of various kinds; it fell leſs copiouſly upon certain pieces of wood, and leaſt of all upon metals, excepting, however, ſuch as were

rough;

rough; for he found that much dew fell upon what he calls *ferrum aſperum*, and *plumbum aſperum*. None fell upon ruſty iron.

11. Mr. Du Fay, at Paris, made the following experiments. He placed a china ſaucer in the middle of a ſilver plate, and adjoining to it he placed a china plate, having in its middle a ſilver diſh, much reſembling the above-mentioned ſaucer. All this he expoſed to the ambient air, and found that the china ſaucer was covered with dew, whilſt the ſilver plate, which extended four inches round it, was not moiſtened in the leaſt. Alſo the china plate was covered with a conſiderable quantity of dew, whilſt the ſilver diſh in the middle of it was quite dry.

12. Mr. Du Fay, in order to determine whether the nature of the body upon which the veſſel was placed to receive the dew had any influence in the effect, employed two equal watch glaſſes, one of which he placed, with its concavity uppermoſt, upon a ſilver plate; and placed the other in a ſimilar manner upon a china plate. The firſt of theſe glaſſes was ſurrounded with a ſilver ferril, the object of which was to prevent any adheſion of dew to its convex ſurface, which faced the ſilver plate. This apparatus having been expoſed for ſeveral ſucceſſive nights, he conſtantly found five or ſix times more dew in the watch glaſs, which ſtood upon the china plate, than in that which ſtood upon ſilver. He alſo obſerved, that in the latter, the ſmall quantity of dew ſtood principally about the centre, in the form of ſmall drops, which diminiſhed in ſize as their ſituation was more remote from the centre, and left a border of about half an inch, quite dry all round the edge of the glaſs.

13. Dr. Watſon, biſhop of Landaff, relates ſome experiments performed by himſelf, the reſult of which coincides with that of the preceding paragraph. "By means," he ſays, "of a little bees-wax, I faſtened a half-crown very near, but not quite contiguous, to the ſide of the glaſs; and, ſetting the glaſs with its mouth downwards on the graſs, it preſently became covered with vapour, except that part of it which was next the half-crown. Not only the half-crown itſelf was free from vapour, but it had hindered any from ſettling on the glaſs which was near it; for there was a little ring of glaſs ſurrounding the half-crown, to the diſtance of a quarter of an inch, which was quite dry, as well as that part of the glaſs which was immediately under the half-crown; it ſeemed as if the ſilver had repelled the water to that diſtance. A large red wafer had the ſame effect as the half-crown; it was neither wetted itſelf, nor was the ring of glaſs contiguous to it wetted. A circle of white paper produced the ſame effect, ſo did ſeveral other ſubſtances, which it would be too tedious to enumerate."

14. A much more extenſive ſeries of experiments on this ſubject, the reſult of which is highly deſerving of attention, was a few years ago inſtituted by Mr. Prevoſt; and a ſummary of which is as follows. He found that when plates of metal (which he calls armours) are fixed on pieces of glaſs, it ſometimes happens that they are as much covered with dew as the glaſs itſelf; but more frequently they remain dry, and in this caſe they are alſo ſurrounded by a dry zone. But when the other ſide of the glaſs is expoſed to dew, the part which is oppoſite to the metal remains perfectly dry. If the metal be again covered with glaſs, it will loſe its effect in preventing the depoſition.

15. Theſe experiments may be very conveniently made on the glaſſes of a window, when moiſture is attaching itſelf to either of its ſurfaces. Mr. Prevoſt remarks that it often happens that dew is depoſited externally, even when the air within is warmer than without. A plate of metal fixed internally on a window, receives a larger quantity of moiſture than the glaſs, while the ſpace oppoſite to an external plate remains dry; and if the humidity is depoſited from without, the place oppoſite the internal plate is alſo more moiſtened, while the external plate remains dry; and both theſe circumſtances may happen at once with the ſame reſult. A ſmall plate fixed externally, oppoſite to the middle of the internal plate, protects this part of the plate from receiving moiſture, and a ſmaller piece of glaſs fixed on the external plate, produces again a central ſpot of moiſture on the internal one; and the ſame changes may be continued for a number of alternations, until the whole thickneſs exceeds half an inch.

16. Gilt paper, with its metallic ſurface expoſed, acts as a metal; but when the paper only is expoſed, it has no effect.

17. When a plate of metal, on which moiſture would have been depoſited, is fixed at a ſmall diſtance from the glaſs, the moiſture is transferred to the ſurface of the glaſs immediately under it, without affecting the metal. If this plate is varniſhed on the ſurface remote from the glaſs, the effect remains, but if on the ſide next the glaſs, it is deſtroyed.

18. The oxydation of metals renders them alſo unfit for the experiment. When glaſſes, partly filled with mercury, or even with water, are expoſed to the dew, the latter is depoſited only on the parts which are above the ſurface of the fluid. But in all caſes when the humidity is too copious, the reſults are confuſed.

19. In order to reduce theſe facts to ſome general law, Mr. Prevoſt obſerves, that when the metal is placed on the warmer ſide of the glaſs, the humidity is depoſited more copiouſly either on itſelf, or on either ſurface of the glaſs in its neighbourhood; but that when it is on the colder ſide, it neither receives humidity, nor permits its depoſition on the glaſs. That a coat of glaſs or varniſh deſtroys the efficacy of the metal, but that an additional plate of metal reſtores it.

20. The quantity of water which falls upon the ſurface of the earth in the form of dew, has by no means been aſcertained either in this country or elſewhere; nor does it appear eaſy to deviſe means of aſcertaining it. Dr. Hales relates ſome experiments he made with a view of determining the quantity of dew which falls in the night. For this purpoſe, Aug. 15, 7 P. M. he filled two glazed earthen pans, three inches deep, and twelve inches diameter in ſurface, with moiſt earth: and he obſerves, that the moiſter the earth, the more dew falls on it in a night; and that more than a double quantity of dew falls on a ſurface of water, than on an equal ſurface of moiſt earth. Theſe pans increaſed in weight by the night's dew 180 grains; and decreaſed in weight by the evaporation of the day, 1 ounce, 282 grains; ſo that 540 grains more are evaporated from the earth every 24 hours in ſummer, than the dew that falls in the night; *i. e.* in 21 days near 26 ounces from a circular area of a foot diameter. If 180 grains of dew, falling in a night on ſuch an area, which is equal to 113 ſquare inches, be equally ſpread on the ſurface, its depth will be $\frac{1}{159}$th part of an inch, $= \frac{180}{113 \times 254}$. He likewiſe found the depth of dew in a winter's night to be the $\frac{1}{90}$th part of an inch. If, therefore, we allow 159 nights for the extent of the ſummer's dew, it will in that time ariſe to one inch depth; and reckoning the remaining 206 nights for the extent of the winter's dew, it will produce 2.28 inches deep; and the dew of the whole year will amount to 3.28 inches depth. But the quantity, which evaporated in a fair ſummer's day from the ſame ſurface,

pendicularly, or at leaſt very nearly ſo to the lines of defence. For when an enemy once makes a lodgment on the counter-ſcarp, he will diſcover them whether they be ſo placed or not. And if flanks be diſcovered, they alſo diſcover, and being either reveted or demi-reveted and formed of earth that is well ſettled, they are by no means ſo eaſily ruined as the batteries of the beſiegers, which are formed of gabions and newly raiſed earth.

Count Pagan's method of conſtruction on a polygon, (*fig.* 2.) is widely different from that of Errard, and alſo much preferable. For inſtead of making the angle of the flank acute in the octagon and figures of a ſmaller number of ſides, and only equal to a right one in any polygon of a greater number of ſides, as Errard does, he makes it obtuſe and places his flanks perpendicularly to the lines of defence, in order that they may diſcover more ground, and the better raſe and defend the faces of the baſtions, which are the moſt ſaliant and weakeſt parts of the body of the place and are firſt attacked, breaches being commonly made in them. This ingenious author makes his lines of defence like Errard's, always raſant, but does not like him make 90 degrees the maximum of his flanked angle, or angle of his baſtion.

He delivers conſtructions for three ſorts of fortifications, namely, the great, the mean, and the little. He fortifies or conſtructs inwards, and in the great fortification makes the exterior ſide equal to 200 toiſes, in the mean equal to 180 toiſes, and in the little equal to 160 toiſes. He allows 60 toiſes to each face of a baſtion in the great, 55 in the mean, and 50 in the little, in all figures above a ſquare. He makes the perpendicular to the exterior ſide in the great fortification in all figures, except the ſquare where it is 27 toiſes, equal to 30 toiſes; in the mean equal to 24 toiſes; and in the little equal to 21.

The dimenſions of theſe principal lines in theſe three kinds of fortification, are contained in the following Table.

	Great Fortification.		*Mean.*		*Little.*	
	Square.	In all other Polygons.	Square.	In all other Polygons.	Square.	In all other Polygons.
Exterior Sides.	200	200	180	180	160	160
Perpendiculars.	27	30	24	30	21	30
Faces of baſtions	60	60	55	55	45	50

Suppoſing then the exterior ſide A B, (ſee the figure,) equal to 200 toiſes in the great, to 180 in the mean, and to 160 in the little, biſect it in the point C. In C O, which is perpendicular to A B, take C D equal to 30 toiſes, in all regular figures of a greater number of ſides than four. Through the point D, draw the lines of defence A D H, B D G, on which take A E and B F, each equal to 60 toiſes in the great fortification, to 55 in the mean, and to 50 in the little. Then draw the flanks E G, F H, perpendicularly to the raſant lines or lines of defence B G, A H, and form the curtain by joining the points G, H. This is Count Pagan's conſtruction, without orillons and retired flanks.

The figure is a regular hexagon, ſuppoſed to have each of its ſides equal to 180 toiſes, as in his mean fortification. The angle A O B of the centre is therefore equal to 60 degrees, and the angle of the polygon to 120. A C, or B C, is equal to 90 toiſes, the perpendicular C D is equal to 30, and the face A E, or B F, to 55 by conſtruction.

Now by means of theſe lines and angles, the others are eaſily found. And in the firſt place, the angle *diminué* C A D, or the angle formed by the exterior ſide A B, and the line of defence A H, is formed by the following analogy,

As A C, equal to 90 toiſes,
Is to C D, equal to 30 toiſes,
So is radius
To the tangent of the angle C A D = 18° 26′ 6″ very nearly. If this angle be taken from 60 degrees, half the angle of the polygon, we get the angle O A H, or M A E, equal to 41° 33′ 54″. But this is equal to half the ſaliant angle of the baſtion, wherefore the whole flanked angle or angle of the baſtion is equal to 83° 7′ 48″. And the flanking angle A D B, being equal to the exceſs of 180 degrees above twice the angle *diminué*, is evidently equal to 143° 7′ 48″.

The tenaille A D, being equal to $\sqrt{AC^2+CD^2}$, is $= \sqrt{9000} = 10\sqrt{90} = 94.868329805$ nearly. Or it is found by this analogy.

As radius
Is to the ſecant of the angle *diminué* C A D,
So is A C, half the exterior ſide A B,
To the tenaille A D.

If from this there be taken the face A E, which is equal by conſtruction to 55 toiſes, we get the right line D E, and the following analogy for the flank E G.

As radius
Is to the ſine of double the angle *diminué* C A D,
So is the right line D E
To the flank E G.

And as the angle A E G of the epaule or ſhoulder is always, in regular conſtruction, equal to twice the angle *diminué* C A D, and the angle E G B formed by the flank and line of defence, the angle D E G is known, and D G is aſcertained by the following analogy.

As radius
Is to the ſine of the angle D E G,
So is the right line D E
To the right line D G.

The angle E G H of the flank, is in this conſtruction equal to 90 degrees, together with the angle *diminué*, or the angle formed by the exterior ſide, and one of the lines of defence.

The complement, D G, or D H, being thus found, the curtain G H is aſcertained by the following analogy.

As the ſine of the angle *diminué* D G H
Is to the ſine of double the ſaid angle,
So is the complement D G
To the curtain G H.

The lengthened curtain M H, or G N, is determined by the following analogy.

As the ſine of half the angle of the polygon
Is to the ſine of half the flanked angle,
So is the raſant line, or line of defence A H,
To the lengthened curtain M H. From which, and the curtain G H, the inward or interior ſide M N is immediately obtained.

And the capital A M is aſcertained by this analogy.

As the ſine of half the angle of the polygon
Is to the ſine of the angle *diminué*,
So is the raſant line, or line of defence A H,
To the capital A M of the baſtion.

It is manifeſt from the foregoing table, that the perpendicular in this learned and judicious author's great fortification, ſubtends in the ſquare an angle of about 15° 6′ 34″ nearly, and in all other regular figures of about 16° 41′ 57″ nearly; that in his mean fortification it ſubtends in the ſquare an angle of about

Baſes of the Explanation.

1. "The leſs the temperature of glaſs is elevated, the more humidity it attracts from the air."

2. "Metals attract it very little."

3. "Glaſs ſenſibly exerciſes its action on the humidity of the air, at a diſtance, and notwithſtanding the interpoſition of different bodies, ſuch as plates of metal, &c."

4. "Metals give to glaſs, near which they are placed, the property of more ſpeedily attracting caloric from hot air, and on the contrary, that of yielding it more ſpeedily to cold air."

N. B. "When I ſay that metals give glaſs this property, I mean that *they act as if they gave it;* which is evident by an examination of two thermometers, one of mercury, the other of alcohol, which are plunged at the ſame time in air either colder or warmer than that whoſe temperature they indicate. The metallic thermometer arrives much ſooner than the other to that of the new medium. Its glaſs then, if colder, muſt take up more ſpeedily from the medium the caloric which it tranſmits to the metal, or, if hotter, it muſt more ſpeedily give out that of the metal. This being premiſed, it is eaſy to comprehend that," "when the glaſs is armed on its warm face (§ 19.), it yields its caloric to the cold air more ſpeedily than that which is not armed (baſis 4.), and, conſequently, it attracts humidity more powerfully (baſis 1.), whether directly on the glaſs, or through the metal, or on the metal itſelf (baſis 3.), if this be in contact; but if it be at the diſtance of ſome millimetres, the humidity not meeting the metal on its paſſage, accumulates on the oppoſite glaſs in a greater quantity than elſewhere."

"If the metal be applied on the cold ſide (§ 19.), the glaſs moſt heated does not attract ſo much humidity (baſes 4 and 1.), and it accumulates on the unarmed part of the pane."

"If, in this caſe, the armour be covered with a plate of glaſs, the plate cools more ſpeedily than if the metal were not preſent; but as the partition is more heated than if it were not preſent, there is no effect, and the totality of the double glaſs armed within, is in the ſame caſe with that unarmed; it, therefore, accumulates neither more nor leſs humidity."

"A ſecond armour on the plate of glaſs will cauſe the phenomena to re-appear (§ 19.); and a ſecond plate of glaſs on this new armour will again make them diſappear, &c. (§ 15.) For, as long as the ſymmetrical glaſs ſhall have the interior armours, the cauſes of heat and cold will be found in equilibrio; but an additional armour will neceſſarily deſtroy the balance, and the heated glaſs will not attract humidity."

"If the glaſs be armed on both ſides (§ 15.), as it would not then be expoſed to the air, either on the cold or warm ſide, it ſeems that it ought to attract as much humidity on the armours, as on the reſt of the partition. But though the glaſs exerciſes its action through the metal, this is, nevertheleſs, an obſtacle which diminiſhes its force; humidity, in this caſe, will not then be ſo ſtrongly attracted by the doubly armed glaſs, as by the part perfectly unarmed, &c."

Mr. Prevoſt concludes with ſaying, "Theſe obſervations are not only intereſting, but they appear to eſtabliſh an important point in philoſophy; namely, that glaſs exerciſes its attraction for the humidity (which has a tendency to be depoſited from the air) through metals."

The French have, in common language, two different terms whereby to expreſs the evening and morning dew, calling the one *ſerein*, the other *roſée*; and, whether miſled by this peculiar nomenclature, or guided by more accurate obſervation, a modern chemiſt, C. A. Prieur, gives a very different account of the matter. "I was well aware," ſays he, ſpeaking of the circumſtances which led him to inveſtigate the ſubject, "that the moiſture depoſited on bodies, ſoon after ſun-ſet, is not the ſame with that which we find on them again at ſun-riſe. There is *conſequently* an interruption in the phenomenon, an evaporation of the *ſerein*, or evening dew, and a new production in the morning. It is uſual to explain the evening dew, by ſaying that the air, being then cooled, can no longer retain the water it has diſſolved in the day. But whence ariſes the breeze, which conſtantly blows from the ſun's place, during the precipitation of this water; and why does that luminary, in re-appearing on the horizon, give occaſion to a ſtill ſtronger breeze, to a greater degree of cold, and a more abundant production of dew?" (Annales de Chimie, tom. 28. p. 317.) Some important points of fact, thus taken for granted, this philoſopher proceeds to give a theory of the dew, conſidered generally, and with reſpect to the whole ſurface of the earth, of which we ſhall briefly ſtate the ſubſtance.

If the earth were deprived of its diurnal motion, and thus expoſed to the action of the ſun, the following might be conceived to be the effects of that action, in relation to the preſent ſubject. A large ſpace, immediately beneath the ſun, would be ſubject to continued evaporation, ſo long as there remained any water to be dried up. The air, charged with water, would paſs off above in all directions, towards the fixed horizon, or the boundary between the light and dark ſides of the globe; while its place would be ſupplied by freſh air flowing in beneath. In proportion as the vapourized air became cooler, in receding from the ſun, it would let fall its water in the form of dew. There would, conſequently, be a certain zone, or tract of the ſurface, perpetually ſubjected to the fall of dew, brought by a wind coming from the ſun. There would alſo be a ſpace turned directly towards the ſun, where dew would never fall, becauſe of the conſtant evaporation; and another ſpace, turned directly from the ſun, to which it would never reach from the heated ſpace, and in which evaporation could never take place to produce it. By combining this ſuppoſed circulation of the air with the actual ſtate of things, in other reſpects, Prieur attempts to ſhew why the fall of dew in the evening is accompanied with a weſterly breeze, and ceaſes before midnight; why the depoſition is renewed in the morning with a wind from the eaſtward; and why dew falls more copiouſly at ſun-riſe than at ſun-ſet; and beneath the torrid zone, than in the neighbourhood of the poles. He affirms, on this point, that in Egypt, in Aſiatic Turkey, at the Antilles, and in Mexico, the morning and evening dews wet the bodies expoſed to them, as effectually as a ſhower of rain; which, however, commonly happens in many parts of England. This hypotheſis, though undoubtedly more ingenious than ſolid, ought to have led to a more accurate examination of the truth of the ſuppoſitions on which it is founded. On the continent of Europe there may be ſituations in which the phenomena, aſſumed by Prieur, are more conſtant and diſtinguiſhable than in Britain, where we do not find that their occurrence has been ſufficiently marked.

The production of dew is admitted, on all ſides, to be a conſequence of the nocturnal refrigeration of the atmoſphere. Now it is a fact eſtabliſhed, by the obſervations of different meteorologiſts, that this refrigeration, after a clear day, begins near the ſurface of the earth, and proceeds upward. Yet it ſhould ſeem that the caloric eſcapes, not into the earth, but into the ſuperior atmoſphere: for the effect is ſometimes carried on to a much lower temperature than that of the earth's ſurface; and the denſe clouds, which

have

have ſubſiſted through the heat of the day, very commonly, in fair weather, break up and evaporate in the evening, at the time that dew is forming below; ſhewing that the region in which they are placed is growing warmer. Such, then, being the law of the nocturnal refrigeration, it follows that the loweſt ſtratum of the atmoſphere, ſeated over waters and in vallies, ought to be the firſt to part with its exceſs of water. When the air about ſunſet is very calm, the progreſs of the precipitation upwards may be ſo gradual as to admit of a definite boundary; ſo that, at a certain height from the ground, there ſhall be already ſmall drops floating in the air, and attaching themſelves to the bodies near them, while at only a foot higher, the vapour has not yet begun to be decompoſed. This may ſerve to account for the facts ſtated by Du Fay. At the ſame time, when the cooling has proceeded ſo far, as to affect a conſiderable portion of the atmoſphere, it cannot be doubted that the drops may deſcend at certain times, and in certain ſituations, from a height even of ſome hundred feet; as may be concluded from the appearance of the haze we have mentioned.

According to the hypotheſis of Prieur, dew ought to fall over the whole ſurface, without regard to hill or valley. By the explanation above given, it ought to be rare on the hills, which is the fact; for the difference between the diurnal and nocturnal temperature is there neither ſo conſiderable, nor ſo ſuddenly produced: indeed they are ſubject, if of great height, to the effect of the heat aſcending from the vallies into the atmoſphere around them, as above deſcribed.

The name of dew has likewiſe been applied to other things, which either ſeem to have been depoſited from the atmoſphere upon terreſtrial bodies at particular times, or may have ſome diſtant connection with the common dew.

It is recorded in one of the firſt numbers of the Philoſophical Tranſactions, that in the year 1695, there fell in Ireland, and particularly in the provinces of Leinſter and Munſter, during a great part of the winter and ſpring, a fatty ſubſtance, ſomewhat like butter, inſtead of the uſual dew. This ſubſtance is ſaid to have been of a dark yellow colour, and felt clammy, whence the natives called it *dew-butter*. It fell in the courſe of the night on the mooriſh low grounds; and it was found, in the morning, attached to the leaves of graſs, to the thatches of houſes, &c. in the form of pretty large lumps, and it is added, that it ſeldom fell twice in the ſame place. It had an offenſive ſmell, like that of a churchyard; yet it lay upon the ground a fortnight before it changed colour, after which it dried up and became black; but it never bred worms, nor did it prove noxious to cattle that fed in the fields where it fell. During the winter of the above-mentioned year, ſome very ſtinking fogs were obſerved on the ſame places where the *dew-butter* fell.

During a great part of the year 1783, (in which the repeated earthquakes of Calabria and Sicily deſtroyed almoſt the whole of the former and a great part of the latter place; when a very large meteor was obſerved in the month of September by moſt European countries, and when the Hecla in Ireland made a vaſt eruption of ignited matter) it is ſaid that many perſons obſerved a peculiar kind of clammineſs upon the leaves of trees, as if a dew of a glutinous nature had been depoſited from the atmoſphere; but we do not find that any particular experiments were made for the purpoſe of aſcertaining the nature of it.

The May-dew acquired conſiderable celebrity amongſt the learned perſons of a century or two ago, and many wonderful properties are attributed to it, and eſpecially to a ſpirit which is ſaid to be obtainable from it. But it is needleſs to recite particulars, claiming little or no credit. See Phil. Tranſ for May 1665.

Dew, *Honey*. This is a ſweet viſcid liquor, found ſometimes in great abundance on the hazel, the lime, the elm, &c. and on fruit trees. Some have ſuppoſed it a depoſition from the atmoſphere, as is evident by the name of dew being given to it: others have thought it the juice of the plant, ſecreted in conſequence of an injury, ſuſtained by ſudden changes in the air. To aſcertain its real origin, we have only to ſearch the under-ſurface of the leaves, immediately over thoſe on which it appears. They will be found covered with an inſect, of the genus *Aphis*, which, inſerting its probóſcis into the fine ſap veſſels, draws out the ſap, and by a peculiarity of conſtitution rejects, in the form of excrement, a product abundantly more rich and ſaccharine than the liquid it imbibes. See Aphis.

Dew, *Orange*. See Orange.

Dew, *Sun*. See Sun-*Dew*.

Dew, *Earth of*. See Earth.

Dew-*Born*, in the *Management of Cattle*, an exceſſive ſwelling of the body, proceeding from the greedineſs of a beaſt to feed, when put into rank paſture.

This ſwelling is often ſo great, that the creature runs the utmoſt hazard of burſting; in which caſe it ſhould be made to ſtir much, and purge well; but the proper cure is to bleed the creature in the tail, then putting a nutmeg into an egg, to thruſt it down the creature's throat, ſhell and all; after which, by walking him up and down, he will ſoon recover.

Dew-*Lap*, in *Rural Economy*, a name applied to the fleſhy membranous ſubſtance, which hangs down from the throats of cattle of the neat kind.

DEWAERT, in *Geography*, an inconſiderable iſland, lying at ſome diſtance E. of Terra Magellanica, in South America; ſo called from its firſt diſcoverer.

DEWAH, or Gogra, a river of Hindooſtan, which traverſes the country of Oude, and joins the Ganges; fifteen miles W. of Patna.

DEWBERRY Bush, in *Botany*. See Rubus.

DEWEE, in *Geography*, an iſland in South Carolina, which forms one of the three harbours of the city of Charleſtown.

D'EWES, *Sir* Symonds, in *Biography*, an induſtrious antiquary, born at Coxden, in the county of Dorſet, in the year 1602. He finiſhed his ſtudies at St. John's College, Cambridge, and began at an early age to make collections of materials for the hiſtory of his country. At the age of thirty he had completed his principal work, *viz.* the Journals of the Parliaments under Elizabeth, and had in his inquiries been enabled, according to his own account, to correct Camden's Britannia in almoſt every page. He was appointed high-ſheriff for the county of Suffolk in the year 1639, having been previouſly honoured with knighthood. In the following year he was elected repreſentative for the borough of Sudbury, in the long parliament. Sir Symonds was created a baronet in 1641; he, however, adhered to the parliament, and took the ſolemn league and covenant. In "the purge" of 1648, he was expelled the houſe, and from that period, to his death in 1650, he devoted himſelf to a retired and literary life, employing himſelf in copying records and other ancient documents, and in collecting coins and manuſcripts. The only work by which this author is remembered, has already been noticed. This was reviſed and publiſhed by Paul Bowes, eſq. in the year 1682. Several of his MS. collections, and a number of letters that paſſed between him and his antiquarian friends, are preſerved in the Britiſh Muſæum. Biog. Brit.

DEWIT, or De Wit, Jaques, a painter of hiſtory and portrait, was born at Amſterdam in 1695, and acquired the principles of his art from Albert Spiers, a portrait painter. He afterwards became a diſciple of Jacques Van Halen, an hiſtorical painter of conſiderable reputation; under whoſe inſtructions he made great improvement, particularly by copying ſome capital paintings of Rubens and Vandyck. In 1713, he obtained the firſt prize in the Academy, for deſigning after a living model, and the firſt prize for painting hiſtory; and he became more known by ſketching ſeveral of the cielings in the Jeſuits' church at Antwerp, originally painted by Rubens and Vandyck, which had been much injured by lightning. He declined the painting of portraits, though much ſolicited to engage in this branch of his art, and chiefly reſtricted himſelf to the painting of cielings and grand apartments, in which he excelled by an elegance of taſte, and tolerable correctneſs of deſign. His moſt noted work was for the burgo-maſters of Amſterdam, in their great council-chamber; in which he choſe for his ſubject Moſes appointing the 70 elders, and which he executed in a manner highly honourable to him as an artiſt. Without ever having ſeen Rome, he acquired the ſtyle of the Italian maſters, by ſtudying after the fineſt deſigns of the beſt artiſts of that country, which he collected with great judgment and expence. The colouring of Dewit is extremely good, and his compoſitions are grand and pleaſing; his pencil is free, and his touch abounds with ſpirit and brilliancy; and a better taſte of deſign would have rendered him truly eminent. But his ſingular excellence conſiſted in his imitations of bas-relief in ſtone, wood, or plaſter, which he painted both in oil and in freſco, ſo as to give them the appearance of real carvings. His ſketches, though ſlight, are much admired for their freedom and ſpirit, and are purchaſed by perſons of the beſt taſte. This artiſt, who died at Amſterdam, in 1754, etched, from his own deſigns, a ſet of ſix ſmall plates, repreſenting "groups of boys," which are executed in a very ſpirited ſtyle; and the "Virgin and Child." Pilkington. Strutt.

DE WITT, John, the celebrated Dutch penſionary, was born at Dort, where he was educated. He exhibited a ſtrong taſte for mathematical ſtudies, and publiſhed, when he was only twenty-three years of age, a work of conſiderable reputation, entitled "Elementa Curvarum Linearum." In the year 1650, he was choſen penſionary of Dort, and ſoon diſtinguiſhed himſelf as an able politician, and upright ſtateſman. He was the advocate of peace, and oppoſed very ſtrenuouſly the war between the Engliſh and Dutch. He was afterwards ſucceſsful in effecting a peace with Cromwell. In this treaty was inſerted a ſecret article for excluding the houſe of Orange, which rendered De Witt very unpopular. He was, however, re-elected penſionary of Holland in 1663. In the war with England, which broke out ſoon after this, he was appointed one of the commiſſioners to direct the navy, and afterwards appointed, with two others, to the command of the fleet; for his great ſervices in this particular, and likewiſe as penſionary, he merited and received the thanks of the ſtates-general. He afterwards fell into diſgrace: by a courageous defence of his own ſyſtem of liberty, and by oppoſing the repeal of the perpetual edict with reſpect to the ſtadtholderſhip, he became the object of horror to the Dutch populace, who conceived that their exiſtence depended upon a ſtadtholder. De Witt was attacked by four aſſaſſins, who wounded him, and left him for dead in the ſtreet. His brother Cornelius at this time was falſely accuſed of an attempt on the life of the prince of Orange. The only witneſs was a barber of infamous character. The puſillanimous judges did not dare to oppoſe the prevailing and popular cry: they condemned him to "ſuffer the queſtion." This man, who had bravely ſerved his country in war, and who had been inveſted with the higheſt dignities, was delivered into the hands of the executioner, and almoſt torn in pieces by the ſevereſt and moſt ſavage tortures. In the midſt of his agonies, he repeated, as applicable to himſelf, the ode of Horace.

"Juſtum et tenacem propoſiti virum," &c.

His life was ſpared, and he was condemned by the judges, who have ever been held up to public infamy, to baniſhment. The penſionary, who had not been prevented from performing the part of an affectionate brother and faithful friend, during this proſecution, reſolved not to deſert him on account of the unmerited ſufferings which he had endured. He followed him to priſon, and reſolved to accompany him to the place of his exile. A ſignal was given to the populace: they roſe in arms, broke open the priſon doors, dragged away the two brothers, and a thouſand ſavage hands vied with each other who ſhould be the firſt and deepeſt ſtained with the innocent blood of theſe uncorrupted, and incorruptible patriots. The brutal wretches were not ſatisfied even with their lives: on their dead bodies they exerciſed every indignity, which monſters in the ſhape of men could invent and deviſe. Thus ended the De Witts, whoſe actions will be more particularly noticed under the article United States. The penſionary, to whom this article is chiefly devoted, is deſcribed by Mr. Hume as "a miniſter equally eminent for greatneſs of mind, for capacity, and for integrity. Though moderate in his private deportment, he knew how to adopt in his public councils that magnanimity which ſuits the miniſter of a great ſtate. It was ever his maxim, that no independent government ſhould yield to another any evident point of reaſon or equity; and that all ſuch conceſſions, ſo far from preventing war, ſerved no other purpoſe than to provoke freſh claims and inſults." Hume's Hiſt.

DE WITTSBURGH, in *Geography*, a town of America, in the ſtate of New York, on the Suſquehana; 155 miles N.W. of New York.

DEX, a name uſed by many Greek writers for a worm or maggot, hatched of the egg of a beetle, and remarkable for its eroding wood. It is alſo called thrips and enxylon. The old Greeks uſed the pieces of wood eroded by it in various directions as ſeals. See Thrips.

DEXTANS, in *Antiquity*. See As.

DEXTER, in *Heraldry*, is applied to the right ſide, as ſiniſter is to the left.

The word is pure Latin, ſignifying right-handed; whence the word dexterity for addreſs and ability in the performing of any thing.

Dexter-*baſe*, is the right ſide of the baſe.

Dexter-*chief*, the angle on the right hand of the chief.

Dexter-*point*. See Point.

DEXTRARIUS, is underſtood of one who takes the right hand of another; and the word dextrarii has been uſed for light horſes, or horſes for the great ſaddle; from the French deſtrier, a horſe for ſervice.

DEXTROCHERE, or Destrochere, in *Heraldry*, is applied to the right-arm painted on a ſhield, ſometimes naked, ſometimes clothed, or adorned with a bracelet, and ſometimes armed, or holding ſome moveable, or member uſed in the arms.

The word is formed from the Latin dextrocherium, which ſignifies a bracelet worn on the right wriſt, mentioned in the Acts of the Martyrdom of St. Agnes, and the Life of the Emperor Maximus.

The dextrochere is ſometimes placed at the creſt.

DEY, the title of the ſovereign of Algiers, under the protection of the grand ſeignior, called at Tunis the bey. A prince under this title was appointed by the ſultan, at the requeſt of the Turkiſh ſoldiers, in the year 1710. The term dey, in the Turkiſh language, ſignifies an uncle by the mother's ſide; and the reaſon of the denomination is this; that the Turkiſh military conſider the grand ſeignior as their father, the republic as their mother, by which they are nouriſhed and maintained, and the dey as the brother of the republic, and conſequently the uncle of all who are under his dominion.

The dey is choſen out of the army; each order, even the moſt inferior, having an equal right and title to that dignity with the higheſt. Every bold and aſpiring ſoldier, however obſcure his original and rank, may be conſidered as the heir apparent to the throne; and with this farther advantage, that he lies under no neceſſity to wait till ſickneſs or old age has removed the preſent ruler; it is ſufficient that he can protect himſelf with the ſame ſcymitar, which he has ſheathed in the breaſt of his predeceſſor. As the chief command (ſuch was the caſe at the time when Dr. Shaw viſited this country) lies open to every bold pretender, the deys rapidly ſucceed one another; one in ten having rarely had the fortune to die in his bed; *i. e.* without a muſket-ball or ſcymitar. Thoſe few, who have thus peaceably departed, cannot attritbute it to any ſuperior regard and eſteem which the army had for them in particular, but rather to their own ſuperior good fortune, in preventing an inſurrection, by cutting off the conſpirators before they could put their deſigns in execution. Beſides the age, experience, and valour, which are neceſſary qualifications of a perſon to be elected to the office of dey, he muſt alſo be a native Turk, and have made the voyage to Mecca. He has no guards, nor conſiderable retinue; he preſides at the divan, and is moſt diſtinguiſhed by the reſpect and ſubmiſſion which are paid him.

DEYDESHEIM, or DIDINESHEIM, in *Geography*, a town of Germany, in the circle of the Upper Rhine, and biſhopric of Spire; 14 miles W. of Spire.

DEYNSE. See DEINSE.

DEYNUM, JOHN BAPTIST VAN, in *Biography*, was born at Antwerp in 1620, and devoted the early period of his life to the ſtudy and practice of the art of painting; in which he arrived at diſtinguiſhed excellence. His ſubjects were portraits in miniature, and alſo hiſtory and landſcapes in water-colours, which he executed with ſurpriſing neatneſs, judgment, and taſte. His works, moſt of which were purchaſed by the emperor and the king of Spain, were admired for the delicacy of his touch, for the ſweetneſs of his colouring, for the exquiſite manner in which they were finiſhed, and alſo for elegance of compoſition. Pilkington.

DEYSTER, LEWIS, an hiſtorical painter, was born at Bruges in 1656, and became a diſciple of John Maes, a painter of portrait and hiſtory: but perfected himſelf in deſign and colouring by the ſtudy of the antiques, and of the beſt modern productions at Rome for ſix years, and by copying and examining the beautiful compoſitions of the Venetian artiſts for ſix years more at Venice. His diſpoſition led him to ſeclude himſelf from public notice, after his return to his own country; but ſeveral performances for the public, in which he engaged, made him more known, and enriched him, while they raiſed his reputation. At Bruges he painted two excellent pictures; *viz.* "Rebecca with Abraham's ſervant at the well," and "Judith and Holophernes." But his moſt capital performances are "The death of the Virgin," and the "Reſurrection of Chriſt, with the appearing of Chriſt to Mary Magdalen, and the other Mary," in which the figure of our Saviour is accounted in no reſpect inferior to Vandyck, either in colouring or deſign.

He painted in the grand ſtyle, and much in the taſte of the Italian ſchool; he gave much elegance to the airs of his heads, and to the extremities of his figures; his draperies are looſe and light; his colouring is warm; and the ſhadows were only glazed in the finiſhing, with a compoſition called "ſphaltum." This artiſt died in 1711. His daughter, Anna, who died in 1746, aged 50, painted in the ſtyle and manner of her father, and imitated his touch and colouring ſo exactly in the copies after her father's works, that the ableſt judges could not poſitively diſtinguiſh the copies from the originals. Pilkington.

DEZAIGNE, in *Geography*, a ſmall town of France, in the department of the Ardêche; 12 miles W. of Annonay.

DEZALLIER, D'ARGENVILLE, ANTONY-JOSEPH, in *Biography*, was born at Paris in the beginning of the laſt century. He was educated in his native city, but a conſiderable time after this he ſpent in foreign countries, particularly in Italy, where he formed a taſte for the fine arts. He became acquainted with men of ſcience in various parts of Europe, and was elected member of the Royal Society in London, and of the Academy of Sciences at Montpelier. He wrote ſome conſiderable articles in the French Encyclopedia; and in 1747 he publiſhed, in quarto, a treatiſe on the theory and practice of gardening, and in 1757 a larger treatiſe on Conchology, in two volumes quarto. This is ſaid to be his moſt valuable work. His arrangement is made from the external form of ſhells, according to which he claſſes them as univalve, bivalve, and multivalve: he then divides them again into ſhells of the ſea; of freſh water; and of the lands. He alſo gave an account of the ſeveral genera of animals that inhabit ſhells. He publiſhed a work on oryctology, or a treatiſe on foſſils. Perhaps his moſt conſiderable literary production was a biography of celebrated painters, which was publiſhed in three volumes quarto, and likewiſe in four volumes octavo. He died at Paris in 1766; and his ſon has continued the biography began by the father by the addition of two volumes, containing the lives of architects and ſculptors. Gen. Dict.

DEZIZE, in *Geography*, a town of Egypt, on the Nile, ſuppoſed to be the place where the prophet Jeremiah was buried, near Cairo.

DEZKAK, a town of Perſia, in the province of Segeſtan, 110 miles E. N. E. of Zareng.

DEZNY, or DESNY, a ſmall town of Bohemia, in the circle of Bechin, or Bechynoko, remarkable for its excellent mineral waters.

DEJEFAN, a town of Arabia, in the country of Yemen, ſituated on the coaſt of the Red ſea; 22 miles W. of Abu-Ariſch.

DGIARON, a town of Perſia, in the province of Farſiſtan; 84 miles S. of Schiras.

DHAR, a town of Hindooſtan, in the country of Malwa; 42 miles W. of Indore, and 36 S. S. W. of Oudein.

DHARAMSALEH, a town of the country of Tnibet, 60 miles from Serangpour.

DHAUN. See DAUHN, or DAUN.

DHOOLPOUR, a town of Hindooſtan, in the country of Agra; 32 miles S. of Agra.

DHUL, or DUL, a lake of Aſia, in the country of Caſhmere; five miles N. E. of Caſhmere. One branch of the Baghyretty river is ſaid to proceed from this lake above Caſhmere; but Mr. Rennell obſerves, that as this lake has no outlet on the eaſt, from the valley of Caſhmere, every branch of the Ganges that comes from the north-weſt

north-weſt muſt, of courſe, ſpring from the mountains that lie on the eaſt of Caſhmere.

DHUY, a ſmall town of France, in the department of Sambre and Meuſe, diſtrict of Namur, with a population of 520 individuals. It is the chief place of a canton which upon a territorial extent of 152½ kiliometres, comprizes 31 communes and 10,258 inhabitants.

DIA, Δια, the beginning of divers terms in medicine, chirurgery, pharmacy, &c, Where theſe three letters commence the name of a remedy, unguent, plaſter, cataplaſm &c. they ſignify compoſition and mixture; as in diapaſma, diachylon, &c.

Dia is likewiſe the beginning of many terms in the other arts: as diameter, dialogue, &c. on all which occaſions, dia, which is an inſeparable particle, or prepoſition, is borrowed from the Greek δια, *ex*, or *cum*; which begins the ſame words iu the Greek.

Indeed we have words wherein dia is no prepoſition borrowed from a foreign language; though it is poſſible, the words themſelves may; as in diamond, dial, &c.

Dia, in *Mythology*, a goddeſs among the Romans, probably the ſame with Cybele.

Dia, in *Ancient Geography*, a town of Scythia, before Phaſis, near the Cimmerian Boſphorus.—Alſo, an iſland of the Mediterranean ſea, about three leagues from that of Crete, and rather a rock than an iſland; now called Standia. —Alſo, a town of Theſſaly, founded by Eacus, according to Steph. Byz.—Alſo, a town of Thrace, near mount Athos. —Alſo, a town of Eubœa, on the north ſide of the iſland, oppoſite to Theſſaly: it was alſo called Athenæ Diades, and is ſaid to have been founded by Dias, an Athenian, who called it after his own name, and that of his native city, Athens, Diades. The inhabitants of Dia peopled the city of Canæ, in Æolis.—Alſo, a town of the Peloponneſus, near the promontory *Scylleon*.—Alſo, a town of Luſitania, near the ocean.—Alſo, a town of Italy, near the Alps. Steph. Byz. ſays that ſeveral iſlands bore this name.

DIABATA, Diabeta, or Diabete, an iſland of the Mediterranean ſea, near that of Sardinia.

DIABATHRA, in *Antiquity*, a kind of ſhoe worn by the Grecian women. Pitiſc. Lex. Ant. in voc.

DIABE, in *Ichthyology*, the name of a prickly ſea-fiſh of the orbis, or globe-fiſh kind, and in all things reſembling the hiſtrix, or porcupine fiſh, except that its ſpines or prickles are all fixed into its ſkin by three inſertions. See Diodon.

DIABETÆ, in *Ancient Geography*, iſlands of the Mediterranean ſea, in the vicinity of that of Rhodes. Pliny ſays that there were four iſlands of this name.

DIABETES, in *Medicine*, a diſeaſe characteriſed principally by a profuſe excretion of urine.

The term diabetes is derived from διαβαινω, *tranſeo, I paſs through*, becauſe not only the fluid ingeſta, but ſome of the ſolid, paſs off by the urine.

Various other names have been given to this diſeaſe by the old writers. Thus, it has been called *dipſacus*, and *morbus ſitibundus*, from the great thirſt which accompanies it; *cachexia urinaria*, from the conſtitutional failure which enſues; alſo *fluxus urinæ*, *diarrhœa ad urinas*, *diarrhœa ad matulam*, &c.

The etymology of the word may admit of every immoderate diſcharge of urine being called diabetes; but its application is confined by phyſicians to an aſſemblage of ſymptoms, of which the increaſed flow of urine is the moſt obvious, at leaſt, in the commencement. The other diagnoſtic ſymptoms are, a great thirſt; and an unuſual craving for food; a dry, ſhrinking, and parched ſkin; a waſting of the fleſh and ſtrength; and particularly a ſweetneſs, or ſaccharine quality of the urine. In ſome caſes, indeed, this quality, without any increaſe of quantity, is the principal characteriſtic of the diſeaſe.

This diſeaſe commonly comes on ſlowly, and almoſt imperceptibly, without any previous diſorder. It often ariſes to a conſiderable degree, and ſubſiſts long, without being accompanied with evident diſorder in any particular part of the ſyſtem. There is, indeed, ſome difficulty in aſcertaining the firſt and earlieſt ſymptoms of the diſeaſe, or that ſtate of it in which the ſweetneſs and increaſe of the urine take place; as the diſcharge of the urine is generally conſidered by the patients as the neceſſary effect of the thirſt, and quantity of drink; it is thus for a long time often overlooked. But when the hectic fever, and waſting appear, the diſeaſe is then generally detected, and the hiſtory of it from that period has been accurately detailed.

Dr. Rollo affirms, that it can ſcarcely be doubted, that a previous affection of the ſtomach takes place before the period, or at the time when the peculiar character of the diſeaſe, by the production of ſaccharine matter, is formed, and ſenſibly ſhewn in the urine. In his firſt caſe, the bulimia canina exiſted, at leaſt, ſix months before the hectical ſtate of diabetes appeared, and ſome time before the increaſe in the diſcharge of urine; and morbid affections of the ſtomach are ſaid to have preceded the detection of the diabetic diſeaſe, in the caſes communicated. But this does not appear to have been always obſerved; and ſuch ſtatements of facts muſt be received with caution, where a particular hypotheſis is to be aided by their eſtabliſhment.

The moſt remarkable ſymptoms of diabetes, when completely formed, are voraciouſneſs of appetite, or a frequent craving for food, which is not followed by the feel of entire ſatiation; a parched mouth, with conſtant ſpitting of a thick viſcid phlegm, of a mawkiſh, ſweetiſh, or bitteriſh taſte; intenſe thirſt; a whitiſh tongue, with red bright ſides; red and ſwelled gums, with the teeth feeling as on edge from acids, and looſe in their ſockets; head-ach; a dry hot ſkin, with fluſhing of the face; a pulſe ranging from 80 to 90, but moſt generally about 84 or 86; an increaſe of clear urine, of a light ſtraw colour, having a ſweetiſh taſte reſembling ſugar, or rather honey and water; an uneaſineſs of the ſtomach and kidneys; a waſting of fleſh; a wearineſs and diſinclination to motion or exertion, with the feeling of weakneſs; an excoriation, with foreneſs of the glans, penis, and prepuce, which is ſometimes ſwelled, and often in the contracted ſtate of phymoſis; and the venereal appetite is altogether loſt. In females there is a peculiar uneaſineſs about the meatus urinarius. Theſe ſymptoms continuing, the patient becomes ſo enfeebled as to be confined to bed; an unremitting febrile ſtate and ſlight delirium take place, ſometimes with a removal of the peculiar character of diabetes.

In ſome inſtances the progreſs is ſlow, the ſymptoms remaining ſtationary, and even ſometimes becoming ſo ſlight as to induce the patient to ſuppoſe himſelf nearly in health. This ſtate, however, ſeems to have depended upon the accidental forbearance of thoſe things which aggravate the complaint. Deviations in diet and regimen; and mental emotions, eſpecially grief, anxiety, and vexation, generally increaſe the ſymptoms.

The appearance of the urine in different inſtances, and even at different periods of the ſame caſe, varies conſiderably; nay, it varies at different parts of the ſame day, according to the quantity and quality of the food, the length of time after eating, and the ſtate of the ſtomach at the time with regard to activity, which in the more chronic

degrees of the diſeaſe is variable, as to voraciouſneſs and craving, while in the acute it is more ſteady. In general the urine is not only copious, but of an odorous ſmell, tranſparent, of a light ſtraw colour, of a ſweetiſh taſte, and yielding, by evaporation, a ſaccharine matter, reſembling treacle or molaſſes. Sometimes, however, it ſcarcely exceeds in quantity the ordinary diſcharge of health; but in quality, has the diabetic character, of yielding the ſaccharine extract on evaporation; which, like all ſweet and ſaccharine ſubſtances, is capable of undergoing the vinous and acetous fermentations, and has every other quality of vegetable ſugars. The quantity of urine diſcharged is generally, however, greater than the quantity of liquid taken. Dr. Home, ſpeaking of one of his patients, ſays, "Arthur paſſed from 12 to 15 pints of urine during 24 hours. When he drank 10 pints, he paſſed 12; when he drank 12 pints, he paſſed 14 or 15; ſo that his urine exceeded his drink generally by two pints." His other patient, Murray, paſſed an exceſs of urine over his drink of 7 or 8 pints in the 24 hours: "when he drank 4, he paſſed 12 pints a day; when he drank 3, he paſſed 10 pints." The urine itſelf, in ſeveral caſes, has exceeded the whole ingeſta, ſolid and liquid; and in general there is a daily diminution of weight, ſo that the urine, together with the other diſcharges, generally exceeds the quantity of ingeſta. This loſs of weight was aſcertained in one or two caſes, publiſhed by Dr. Rollo, by weighing the patieut daily. And Dr. Home obſerves, with reſpect to his patient, Murray, that his ſolid food amounted nearly to the exceſs of his urine above his drink. But immenſe diſcharges of urine are mentioned by ſome authors; as in the caſe of the girl deſcribed by Cardanus, where 36 pints were paſſed each day, when her body weighed only 250 pounds, and her meat and drink only 7 pounds; and as in that of a woman mentioned by Shenckius, where the urine paſſed in a few days was more than the weight of her own body. But there is ſo much room for deception in ſuch inquiries, that theſe ſtatements muſt be received with caution.

The urine varies in other reſpects occaſionally. In ſome inſtances a whitiſh fluid, reſembling the chyle itſelf, is ſaid to have paſſed off from the kidnies. In other inſtances, the urine is ſaid to be inodorous and deſtitute of the ſaccharine quality; hence, writers have thought it neceſſary to mark this diſtinction by peculiar terms; this form of the diſeaſe being denominated diabetes *inſipidus*; the former D. *mellitus*, from the honey-like flavour of the urine. A reſpectable teacher in London, conſidering theſe two forms of the diſeaſe as altogether different in their nature, has propoſed to deſignate them by different generic titles, and to call the former *polyuria debilitans*, and the latter *melituria tabifica*, which ſufficiently expreſs the nature and tendency of the two diſorders. The diabetes, with clear inſipid urine, is a more rare occurrence. Dr. Cullen, who had ſeen twenty caſes of diabetes, had met with only one, in which the urine was not ſweet. He doubts, indeed, whether a caſe of idiopathic diabetes ever occurs, in which the urine is perfectly free from the ſaccharine matter.

While under the diabetes mellitus, the conſtitution may be attacked with other diſeaſes, which ſeem to be commonly of an inflammatory nature, and may prove fatal; indeed, the diabetic diatheſis appears to render the body very ſuſceptible of inflammation. It is curious, however, that the diabetes is ſometimes ſuſpended by the attack of another diſeaſe. We recollect to have heard Dr. Gregory, profeſſor of medicine at Edinburgh, mention two inſtances of this ſort which occurred in his practice; in one all the diabetic ſymptoms were ſuſpended during an attack of pneumonia, which ſupervened; and in the other during that of an inflammatory ſore throat.

The diabetes is mentioned in the writings of phyſicians of almoſt all ages. For if it has not been noted by Hippocrates or Proſper Alpinus, it has occupied the attention of Theophilus, Actuarius, Aretæus, Aetius, Paulus Ægineta, Avicenna, Galen, &c. Aretæus has given a long and clear hiſtory of the diſeaſe, and pointed out the profuſe diſcharge of urine, the emaciation and debility, the inextinguiſhable thirſt, yet the drink not equalling the urine in quantity. the parched ſkin, &c. all belonging to true diabetes. Galen ſays that he had ſeen but two caſes of diabetes, in which there was a conſtant thirſt, and diſcharge of liquids, unchanged in their quality; and he compares this diſeaſe of the kidnies to a lientery. But as he deſcribes many caſes of bulimous appetite, and great thirſt, it is probable that he had ſeen a greater number, in which the urinous affection had been overlooked.

It is ſingular, however, that the peculiar condition of the urine was unnoticed, as characteriſtic of the diſeaſe, till our countryman, Dr. Willis, pointed out its ſaccharine taſte; neither the ancients nor the moderns, in the other countries of Europe, had obſerved it, till they were directed to it by the Engliſh; hence the diabetes mellitus is called by Sauvages D. *anglicus*. The urine had been taſted, however, long before the time of Willis. For Trincavella deſcribes a caſe in which a julepum roſaceum was adminiſtered; and he affirms that the urine had the ſame colour and ſmell as the julep; and that ſome of the attendants who choſe to taſte it, ſaid that there was no change in the flavour. (De Rat. Curand. Partic. &c. lib. x. cap. 11.) And Hercules Saxonia mentions one ſpecies of diabetes, which he defines, "Legitima diabetes, eſt excretio rei potulentæ prorſus non mutatæ in odore; colore, et *ſapore*, per vias lotii." But like his friend Trincavella, he attributed the ſweet ſmell, colour, and taſte of the urine, to the ſweetened ptiſan which the patient had drunk. The ſaccharine beverage and diet of the eaſtern countries, Dr. Girdleſtone obſerves, will perhaps account for the ancient writers omitting to notice the honey-like taſte of the urine of diabetic patients. And as it was generally the practice of the French and Italian phyſicians to preſcribe, in moſt diſeaſes, ptiſans ſweetened with honies or ſyrups, it is not to be wondered at, that Willis was the firſt phyſician who poſitively noticed the honey-like taſte of the urine in true diabetes, as ariſing from a change which the drink had undergone. It may be remarked that that accurate obſerver of diſeaſes, Sydenham, has taken no notice whatever of the ſweetneſs of the urine in diabetes, notwithſtanding it had previouſly been pointed out by Willis.

The quantity of ſaccharine matter in the urine is, in ſome caſes, very conſiderable, and it is combined with a quantity of animal extractive matter. In the inſtances related by Dr. Home, the urine was evaporated by Dr. Black; Arthur's urine afforded an ounce and a half of a brown ſaccharine matter from each pound; Murray's, treated in the ſame way, gave but one ounce for each pound of a ſubſtance reſembling coarſe brown ſugar. So that Arthur paſſed twenty ounces and a half of this matter in twenty-four hours, when he made fifteen pints of urine. Dr. Home obſerves that this is a wonderful proportion of ſugar to the fluid; ſince a pound of aſs's milk affords only half an ounce of ſugar; and a pound of cow's milk, only half that quantity. The quantity of ſugar detected in the urine of captain Meredith, whoſe caſe is related by Dr. Rollo, was calculated at twenty-nine ounces in the twenty-four hours.

This ſugar-making proceſs, then, conſtitutes the eſſential part of the diſeaſe; it has been the ſubject of much enquiry;

quiry; and many hypotheſes have been reſorted to, to explain the nature of the proceſs, and to determine in what part of the ſyſtem, or by what organs, it is carried on. Dr. Mead conſidered diabetes as "akin to jaundice," and affirms that ſteatomatous tumors were always found in the liver; and "as to the ſweetneſs of the urine, this is all bilious, for the water of the bile ſeparated from its ſalt is ſweet." (Treatiſe on Poiſons, Eſſay 1ſt.) But in Dr. Home's patients, and others, no diſeaſe of the liver has been diſcovered on diſſection; and a better chemiſtry has refuted the notion that there is ſugar in the bile. Some authors conſider diabetes as a local diſeaſe of the kidneys, which not only pour out the increaſed quantity of urine, but by a morbid change in the action of the ſecretory veſſels, elaborate the ſaccharine matter too. Since the glands of the mammæ, they ſay, can ſecrete ſugar, why may not the kidneys? The analogy, however, is not correct. For the mammæ are formed by nature for the ſecretion of a ſaccharine fluid, the kidneys are not; we might therefore as well expect the kidneys to ſecrete bile, as to produce ſugar. Dr. Home has the merit of firſt ſuggeſting a theory, which, although exceedingly imperfect, approximates, perhaps, nearer to a rational and probable view of the ſubject than any other that has been conceived. Some had attributed it to ſpaſms of the ſecreting veſſels, in the kidneys, but he objects to this notion, becauſe antiſpaſmodics do not alleviate the ſymptoms, and becauſe ſpaſm will not account for the ſaccharine, aceſcent, and fermentable urine. In hyſteria the urine has none of the diabetic qualities. Others had attributed the diſeaſe to the perſpiration being diminiſhed, or the inhalation increaſed, as they can account for the quantity of urine ſo much ſurpaſſing the drink in no other way. But he juſtly objects, that this will not account for the particular qualities of the urine; that diaphoretics are not attended with any good effects in diabetes; and that in his two patients perſpiration and urine were increaſed at the ſame time.

"Were I to give a theory," ſays Dr. Home, "to explain the nature and ſymptoms of this wonderful diſeaſe, I would ſay, that it ariſes from a defect of the animal or aſſimilatory proceſs, by which the aliment is converted into the nature of our body. I have long looked on the exceſs or defect of this proceſs as the ſource of many diſorders. All putrid diſeaſes, the ſcurvy, &c. ſeem to be owing to its exceſs; acidity of the ſtomach, &c. to its defect. Among the latter diſeaſes diabetes may be arranged. For, 1. The remote cauſes ſhew it. It ariſes from what debilitates the body, as moiſture, preceding diſeaſes, great evacuations, &c. by which it becomes incapable to aſſimilate the food. So Sydenham thought, "Aſſimulandis ſuccis protinus impar eſt." 2. The white chylous matter, which is often ſecreted with the urine, ſhews, that the vegetable part of the chyle is not aſſimilated. The dilatation of the urinary excretories cannot, alone, account for this, as the ſerous part of the fluids would then eſcape too, which does not happen. 3. Sugar is found in diabetic urine. Sweet chyle is the firſt product of the ſtomachic and inteſtinal digeſtion; as chyle, in the thoracic duct, and milk, which is a ſpeedy ſecretion of it, contain much ſaccharine matter. This is changed, in ſome hours, by the animal proceſs, into an ammoniacal ſalt, which is that found in all the excretions. But the ſaccharine ſalt, ſtill remaining in the urine, which is the moſt perfectly animalized fluid, ſhews that there is great defect in the animal proceſs. 4. Urine being of a ſeptic nature, runs faſt into putreſcency. But the diabetic urine turns acidulous, and with, and often without yeaſt, undergoes the vinous fermentation. Theſe peculiarities ſhew its vegetable nature; as vegetable juices alone are capable of the vinous and acetous fermentations. Theſe arguments appear more convincing than any of the former. But it may be objected to them, 1. That animal food ſhould cure it, which it did not; 2. That ſeptics, which brought on putrid eructations, made no change; 3. That the proportion of ſaccharine matter is much greater in their urine, than in milk. But milk has not, perhaps, the whole ſaccharine ſalts of the chyle." (Clinical Experiments, p. 318, *et ſeq.*)

Dr. Cullen adopted a ſimilar opinion reſpecting the nature of diabetes, and believed that the proximate cauſe of the diſeaſe "is ſome fault in the aſſimilatory powers, or in thoſe employed in converting alimentary matter into the proper animal fluids" §1512 Firſt Lines. But he candidly acknowledged, that it was a theory embarraſſed with ſome difficulties which he could not very well remove.

Dr. Rollo has more recently taken up this theory, and attempted to reduce it to a more definite form. "The immediate cauſe of the diabetes mellitus," he ſays, "is a morbid condition of the ſtomach, forming or evolving from vegetable ſubſtances ſaccharine matter, which is quickly ſeparated, as a foreign body, by the kidneys. But to be more particular; we allege that this diſeaſe conſiſts in an increaſed morbid action of the ſtomach, with too great a ſecretion and an alteration in the quality of the gaſtric fluid, producing ſaccharine matter, by a decompoſition of the vegetable ſubſtances, taken in with the food, which remains unchanged." This hypotheſis is ſupported by the following arguments. 1ſt. That a ſtomach-affection generally precedes the urinary characteriſtic ſymptoms of the diſeaſe. 2dly. That a ſtomach-affection always accompanies the diſeaſe, and is materially different from that which is ſympathetic of primary affection in the kidneys. 3dly. That a diet of animal food, with an entire abſtinence from vegetable or other matters, capable of forming ſugar in the ſtomach, removes ſpeedily the general ſymptoms, the ſaccharine matter, the increaſe of urine, and its unnatural qualities: and, 4thly. That diſſection has ſhewn no morbid condition of the kidneys, but what may be referred to a continuance of increaſed action, from the application of a ſimple ſtimulus, augmenting merely the capacity of the veſſels. (Rollo on Diabetes, 2d edit. p. 436.)

It has been objected to this theory, that if the ſaccharine matter is formed by the ſtomach, it ſhould be detected in the blood, in its way to the kidneys; but that this has not been done. But to this it is replied, that the taſte is a very inaccurate teſt of the exiſtence of any matter in ſuch combination; that Dr. Dobſon affirmed that ſaccharine matter did exiſt in the ſerum of the blood, in a caſe treated by him, (Med. Obſ. and Inquir. vol. v.) that the ſerum in one or two caſes has been obſerved to be of a whey-like colour; and that certain matters, as nitre, turpentine, &c. may paſs by the kidneys, without being detected in the blood. Theſe ſtatements, however, can hardly be conſidered as ſatisfactory refutations of the objection, or as removing the doubt which hangs over the ſubject.

No light is thrown upon the nature of diabetes by a conſideration of its exciting cauſes; for the moſt various and even oppoſite cauſes have been aſſigned for it, in the various inſtances that are on record. The diſeaſe has been obſerved to follow acute diſeaſes, eſpecially fevers; Sydenham remarked that it followed intermittents, eſpecially if much venæſection had been uſed. Acrid purgatives are alſo ſaid to have given riſe to it by Sydenham; and Dr. Home affirms that he knew the chylous ſpecies brought on by too frequent doſes of jalap and calomel. The exceſſive uſe of cold watery liquors appears to have occaſioned diabetes in ſome caſes; as drinking largely of particular mineral waters; of weak acid

Rheniſh

Rheniſh wines; and more eſpecially of liquors impregnated with a diuretic quality. Cold-bathing, and expoſure to cold and moiſture, under various circumſtances, have likewiſe been ſaid to excite the diſeaſe. In ſeveral caſes, collected by Dr. Rollo, there was an obvious hereditary diſpoſition to the diſeaſe, which attacked individuals of the ſame, as well as of diff-rent generations, in the ſame family.

Diſſection has not contributed in any degree to elucidate the nature of diabetes. The liver has been frequently found in a perfectly ſound ſtate, contrary to the obſervation of Dr. Mead; and often no morbid change could be detected in any organ of the body. The kidneys have generally been found enlarged, eſpecially the tubular uriniferous portion, and ſofter than natural; but this is as probably the effect of the quantity of liquid conſtantly ſtraining through it, as the cauſe of the increaſed ſecretion. In ſome caſes even the kidneys have been found in a perfectly natural condition. (See the diſſections in Dr. Rollo's book, and in Dr. Home's; and two others related by profeſſor Rutherford, in the third number of the Edinburgh Medical and Surgical Journal, 1805. Another by Dr. Baillie, Tranſlations of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. ii.)

In this ſtate of uncertainty in regard to the ſeat and nature of the *diſeaſe*, the *cure* of diabetes cannot be directed with any certainty of ſucceſs, or upon the rational principle of removing the proximate cauſe. All thoſe who have ſeen the diſeaſe, agree in pronouncing it difficult of cure, eſpecially if the patient is old, if it aroſe from habitual drinking, or if it has been of long ſtanding; and various medicines have been reſorted to, according to the various opinions of the practitioners, or as the failure of preceding remedies ſuggeſted a change. Many of theſe have been ſaid to effect a cure in individual inſtances; but in the hands of different practitioners, they have ſo often failed reſpectively, that their efficacy muſt be doubted.

Some have ſuggeſted, that, by reſtoring the function of perſpiration, the unuſual determination to the kidneys would be diminiſhed; and have hence recommended ſudorific medicines, as the warm bath, warm clothing, friction with oil, &c. In one inſtance, the warm bath was ſaid to have cured the diſeaſe, under the direction of a Mr. Werner. (See London Medical Journal for 1790.) And Dr. Mac Cormick, of Antrim, mentions two caſes of diabetes, which were cured by the continued uſe of large doſes of Dover's powder at bed-time. (See Duncan's Medical Commentaries for 1783.) But in many other caſes, ſuch medicines have failed altogether to give relief. In thoſe treated by Dr. Home, although ſweating was produced, the excretion by the kidneys was not diminiſhed. Antiſpaſmodics have had no effect on the diſeaſe, nor have ſtimulants, ſuppoſed to act upon the lax kidneys, as ſuggeſted by Dr. Briſbane, been of any uſe. He recommended, upon this principle, the tincture of cantharides, a medicine which has not been obſerved to have any efficacy in this complaint. Aſtringents have been tried, as in other increaſed evacuations; ſuch as alum, and alum-whey, ſo ſtrongly recommended by Dr. Mead, upon theoretical principles; alſo gum kino, and catechu, in conſiderable doſes, but generally without ſucceſs. Dr. Fothergill's patient is ſaid to have recovered, after taking alum-whey, lime-water, and ſudorifics, calomel and rhubarb, and having a bliſter applied over the ſacrum. (Med. Obſervat. and Inquiries vol. iii.) And Morton cured a patient by a milk diet, an aſtringent julep, and electuaries of bole, and gum tragacanth. Tonic and corroborant medicines have alſo been employed, to reſtore the ſtrength and health of the conſtitution at large, and of the digeſtive organs in particular. Peruvian bark, bitters, chalybeates, the cold bath, &c., have been among the remedies of this claſs, that have been uſed; and theſe, like the others, in a few individual inſtances, have been ſaid to remove the ſymptoms; but more frequently, as in Dr. Home's caſes, and others, they have failed. In one of Dr. Ferriar's patients, cinchona and ſulphuric acid contributed to reduce the urine from 10*lb.* daily, to its natural ſtate. And the ſame author affirms, that he had lately cured three caſes of confirmed diabetes, by a combination of cinchona with uva urſi and opium; the ſucceſs of which had been ſo great as to prevent him from trying Dr. Rollo's plan. (Ferriar's Eſſay on Digitalis. See alſo his Medical Hiſtories and Reflections, vol. i.)

It is obvious, that all the medicines which have been employed for the cure of diabetes have been, in a great majority of caſes, altogether unſucceſsful; nor can all the caſes be conſidered as abſolutely cured, which have been recorded as ſuch. For it is certain that in many inſtances, where the ſymptoms of diabetes, eſpecially the morbid quantity of urine have been ſuſpended, they have nevertheleſs ſpeedily returned, where the remedies were omitted, and ultimately proved fatal. The moſt ſucceſsful plan of treatment that has yet been deviſed, we have now to mention.

Upon the ſuppoſition that the diſeaſe conſiſts eſſentially in a defect of the power of aſſimilation, whence the unanimalized, chylous juices, were ſuffered to paſs off in their crude ſtate; it was long ago ſuggeſted by the ſagacity of Sydenham, that the diabetic patient ought to eat meats of eaſy digeſtion, ſuch as veal, mutton, and the like, and to abſtain from all vegetables and fruit whatever. (See his Epiſtle to Dr. Brady.) Dr. Home again ſuggeſted the ſame expedient, and mentions its failure as a reaſon for doubting the correctneſs of the theory. But the ſuggeſtion had never been put to the teſt of ſevere experiment, and was therefore almoſt forgotten, till Dr. Rollo had the merit of calling the attention of the profeſſion to the ſubject.

As we are ignorant of the nature of the action of the chylopoetic or aſſimilatory organs, in producing the ſaccharine matter, the only practicable mode of preventing its formation, is the abſtraction of the pabulum of this matter, *i. e.* of all vegetable ſubſtances from the diet. And while we thus remove the means of forming ſaccharine matter, it is not unlikely that we may remove the morbid action, in the courſe of time, upon which its formation depends. This was the mode in which Dr. Rollo reaſoned. Animal food, confinement, with an entire abſtinence from every kind of vegetable ſubſtance, afforded the general means, which might perhaps be aided by the uſe of ſuch medicines as ſeem to be moſt remote from any thing like a vegetable, aceſcent, or ſaccharine quality; as ſulphur, ſulphurated potaſs, or ammonia, alkalies alone, and calcareous and teſtaceous ſubſtances. The ſucceſs of the excluſively animal diet was ſpeedy and great in the caſe of captain Meredith, related by Dr. Rollo; and in his ſecond caſe decided benefit accrued from its uſe, while it was perſevered in. The plan with which captain M. commenced was the following:

Breakfaſt.—One and a half pint of milk, and half a pint of lime water, mixed together, and bread and butter.

Noon.—Plain black puddings, made of blood and ſuet only.

Dinner.—Game or old meats, which have been long kept, and as far as the ſtomach may bear, fat and rancid old meats, as pork. To eat in moderation.

Supper.—The ſame as breakfaſt.

Secondly. A drachm of kali ſulphuratum, to be diſſolved in four quarts of water, which has been boiled, and to be uſed for daily drink. No other article, either eatable or drinkable, to be uſed than what has been ſtated.

In three days the diabetic ſymptoms were obviouſly diminiſhed. Every portion of vegetable matter was then omitted, even the bread. By perſevering in this regimen the ſymptoms were entirely removed. The urine returned to its natural quantity and quality; the patient regained his ſtrength, and recovered much of his fleſh, and went on actual ſervice. In the courſe of his cure, he one day ate an apple, which increaſed the urine by nearly a quart, and brought back its ſaccharine quality. The diſeaſe, in this caſe, had been but of ſeven months' duration, when the plan of cure was begun.

In Dr. Rollo's ſecond caſe, the diſeaſe was of at leaſt three years ſtanding; the animal diet produced a conſiderable alleviation of the ſymptoms, during the ſhort time that it was perſevered in; but, having relinquiſhed it, the patient ſuffered a return of all the ſymptoms, and died.

From the facts, which Dr. Rollo has ſtated from his own obſervation, and the caſes communicated to him by other practitioners, it cannot be doubted that the animal diet has a great influence on the ſymptoms of diabetes, and has contributed more directly and effectually to its alleviation, than any meaſure hitherto adopted; and that where the plan is proſecuted with great ſteadineſs and perſeverance in recent caſes, a cure may probably be effected. It is to be lamented, however, that this mode of cure is ſo contrary to the inclinations of the ſick, that it is almoſt impoſſible to prevail upon them to perſevere in its uſe. The deſire for vegetable matters in ſome ſhape or other ſeems to be almoſt irreſiſtible. Though perfectly aware of the efficacy of the regimen, ſays Dr. Rollo, yet they commonly treſpaſs, concealing what they feel as a tranſgreſſion againſt themſelves. They expreſs a regret, that a medicine could not be diſcovered, however nauſeous, which would ſuperſede the neceſſity of any reſtriction in diet.

When, during the uſe of the animal diet, the urine has loſt its ſaccharine quality, and at the ſame time its quantity continues greater than natural, and it contains more of the animal extractive matter in a viſcid and tenacious form, the appetite remaining keen, it may be preſumed that the morbid condition (the increaſed action according to Dr. Rollo) of the digeſtive organs is not removed. The hepatized ammonia, opium, and antimony, may then be reſorted to, until the urine ſhews a more natural condition; namely, becomes moderate in quantity, and high-coloured, with ſome turbidneſs, and furniſhing on evaporation an offenſively ſmelling and ſaltiſh-taſted reſiduum, without tenacity; and the ſtomach at the ſame time loathes food, and the appetite is loſt. At this time the tongue and gums will be found to have loſt their florid colour, and to have become pallid.

When ſuch a ſtate occurs, exerciſe is to be enjoined, and a gradual return to the uſe of bread, and of thoſe vegetables and drinks which are the leaſt likely to furniſh ſaccharine matter, or to become acid in the ſtomach, with the occaſional uſe of bitters, &c. Should this period of the diſeaſe be overlooked, and the confinement and animal food rigidly perſevered in, ſcurvy, or ſomething akin to it, might be produced. The vegetable ſubſtances, which have appeared to be the ſafeſt, in the change from the animal diet, are broccoli, ſpinage, cauliflower, cabbage, and lettuce. Theſe do not ſeem to furniſh ſugar, when prudently uſed, in the diabetic ſtomach, after a proper adoption of the animal diet. But when theſe vegetables have been ſafely taken, a return to a very ſmall quantity of bread has reproduced the ſaccharine matter in the urine, and the general ſymptoms of diſtreſs, as thirſt, &c. The urine ſhould, at this period, be very frequently examined, and on any appearance of a return of the diabetic ſtate of it, the animal diet muſt be again ſtrictly renewed. A frequent examination of the urine at all times will afford the beſt teſt of the ſtate of the diſorder, and of the nature of the treatment which may be required. Rollo.

It is to be remarked, however, that in ſome caſes, the animal diet has ſucceeded in changing the condition of the urine, whilſt the emaciation, and the eſſential conſtitutional condition have remained. And it is the obſervation of a very intelligent phyſician, that he never ſaw a confirmed caſe of diabetes, "wherein there was not ſome conſiderable diſorder of the conſtitution, or a defect of ſome organ eſſential to life." (Willan on Diſeaſes in London, p. 186.)

The preceding obſervations apply to the common form of the diſeaſe, the diabetes *mellitus*. In the D. *inſipidus*, where the diſeaſe conſiſts merely in a profuſe ſecretion of the natural urine, from a morbidly increaſed action of the ſecreting veſſels of the kidneys, the prognoſis is more favourable. The latter form of the diſorder appears to have been occaſionally produced by the ſtimulus of a calculus in the kidney; at other times without any obvious cauſe of ſtimulation in that organ. The indications in the D. *inſipidus*, will be, to leſſen the determination of blood to the kidneys, by increaſing the perſpiration by diaphoretic medicine, warm-bath, &c.; to avoid thoſe articles of diet and drink, which have a particular diſpoſition to excite the action of the kidneys, as much warm liquor, ſuch as tea, punch, &c.; and to ſtrengthen the ſyſtem at large by the various tonic medicines, bark, ſteel, bitters, &c. The aſtringent medicines are particularly indicated in this form of the diſeaſe, where the diminution of a natural excretion is alone to be attempted. Hence the alum or alum-whey, gum kino, bark, and ſulphuric acid, uva urſi, &c., may be adminiſtered with more rational hopes of ſucceſs, than in the D. *mellitus*. Drains from the vicinity of the region of the kidneys, as bliſters, or iſſues in the loins, may be alſo tried, as means of diverting the courſe of the fluids from the kidneys.

Diabetes, or *Exceſſive Staling*, in *Farriery*, a diſeaſe of horſes which, at its commencement, admits of an eaſy cure; but which often proves very obſtinate, and even incurable. At firſt the complaint conſiſts merely in an increaſed ſecretion of urine, which is generally tranſparent and colourleſs, like water; but at length the horſe becomes feveriſh, and ſuffers much from thirſt; his appetite is diminiſhed, and his pulſe is quickened; he is generally hide-bound, and gradually loſes fleſh and ſtrength. Some have recommended lime-water in this diſeaſe; others have had recourſe to diaphoretic medicines, in order to promote perſpiration. Bark and other tonics have been alſo preſcribed as uſeful remedies. Mr. White, in his "Compendium of the Veterinary Art," informs us, that, in recent caſes, he adminiſtered with ſucceſs the following ball; *viz.* opium, 1 dram, powdered ginger, 2 dr., and yellow Peruvian bark, ½ oz., formed into a ball with ſyrup, for one doſe. If this remedy ſhould fail, he recommends one of the following formulæ: 1. Emetic tartar, 2 dr., opium, 1 dr. made into a ball for one doſe: 2. Salt of hartſhorn, 2 dr., opium, ½ dr., powdered ginger, 1 dr., liquorice powder, 3 dr. formed into a ball for one doſe: 3. Salt of ſteel, ½ oz., myrrh, 2 dr., ginger, 1 dr. made into a ball for one doſe: 4. Powdered Columbo-root, 3 dr., caſcarilla, 2 dr., ſalt of ſteel, 2½ dr., prepared kali, 1½ dr., and tincture of opium, ½ oz.; the ſeveral ingredients to be mixed with ſtrong beer, or porter, and given as a drink at once. He obſerves, that the horſe's diet ſhould be nutritious, and eaſy of digeſtion; and that he ſhould be allowed to drink ſmall quantities of weak lime-water; or, if he refuſe this, common water, frequently. Mr. Taplin, in his "Stable Directory," recommends the following drink: "Take jeſuit's bark, 4 oz., biſtort and tormentil roots, of each 2 oz.; boil them in two

gallons of lime-water to the conſumption of one-half, and give a pint of the liquor three times a day. As this diſorder generally proceeds from too violent exerciſe, overſtraining, &c. repeated bleedings in ſmall quantities are abſolutely neceſſary, till the mouths of the veſſels cloſe up.

DIABETES, in *Hydraulics*, is applied to a ſyphon, the two legs or branches whereof are incloſed in one another; as in the glaſs deſcribed by Hero, which runs itſelf quite empty, without being inverted, as ſoon as the water is arrived at the height of the upper branch of the ſyphon.

DIABLINDI, in *Ancient Geography*, a people of Gaul, ſituated between the Redones on the weſt, and the Aulerci on the eaſt. Their capital was Nœodunum.

DIABOLUS MARINUS. See *Sea*-DEVIL.

DIABOTANUM, from *δια* and *βοτανη*, *herb*, in *Pharmacy* and *Chirurgery*, denotes a plaſter of herbs, wherewith wens, &c. are reſolved and diſcuſſed. The diabotanum is ſovereign for the hydatides.

DIABROSIS, in *Medicine*, a term uſed by the older writers to denote a rupture of the veſſels, in conſequence of the corroſion of acrid humours. It is derived from *δια* and *ϵρωσις*, *eroſion*. Thus an hæmoptyſis, or diſcharge of blood from the lungs, was ſaid to take place in ſeveral ways, as by a violent rupture of the veſſels, by a dilatation of their orifices, and by a diabroſis, when the veſſels were corroded by the acrimony of the fluids. Vogel has conſtituted a genus of diſeaſe, in his noſology, under the title of diabroſis, and defines it, "an eroſion of the ſkin by an acrid matter, either internal or external." See his Genera Morbor. claſs x. Ord. 6.

DIACARYON, or DIANUCUM, in *Pharmacy*. See DIANUCUM.

The word is formed from *δια*, and *καρυα*, walnut.

Galen is ſaid to have prepared his diacaryon with the juice of walnuts, mixed with as much honey as ſufficed to render it an agreeable compoſition.

DIACAUSTIC CURVE, or *Curve by Refraction*. See *Cauſtic* CURVE.

DIACENTROS, from *δια*, *through*, and *κεντρον*, *centre*, in *Aſtronomy*, is uſed by Kepler to ſignify the ſhorteſt diameter of the elliptical orbit of any planet; probably becauſe it paſſed through the centre, and not through the focus, which diſtinguiſhes it from the longer diameter.

DIACHALASIS, from *διαχαλαω*, *to be relaxed*, in the *Medicinal Works of the Ancients*, a term uſed to expreſs a ſolution of continuity in the bones of the cranium at the ſutures; that is, when the bones recede from their mutual indentation; an accident that frequently happens from large wounds in the head.

DIACHALCYTES, in *Pharmacy*, the name of a plaſter. See EMPLASTRUM.

DIACHER, in *Geography*, a town in Perſia, in the province of Mazanderan; 24 miles S. W. of Zaeveh.

DIACHERSIS, in *Ancient Geography*, a town of Africa, in the Cyrenaica, where the Romans had a garriſon.

DIACHRISTA, from *δια* and *χριω*, *I anoint*, a name given by the ancient writers in medicine to certain compoſitions, whoſe uſe was to be applied to the fauces, uvula, palate, and tongue, for the abſterſion of phlegm.

DIACHYLON, in *Surgery*, a ſpecies of plaſter, now called litharge plaſter by the college of phyſicians. It is one of the moſt ſimple and emollient applications adapted for the reſolution of indurated ſwellings. See PLASTER, and LITHARGE.

DIACODIATE, in the older writers on *Medicine*, ſynonymous with narcotic, or opiate, from *δια* and *κωδια*, the *poppy-head*, or capſule. See Van Swieten.

DIACODIUM, in *Pharmacy*, the name of a ſyrup, the principal ingredient of which is the white poppy-head, and which poſſeſſes much of the anodyne property of this plant. The ſyrupus diacodion was made in the following way: Take of white poppy-heads and of the ſeeds, of each two ounces, of cubebs two ounces and a half; cut them into ſmall pieces, and boil them ſlowly with a pint and a half of water, till only ten ounces of liquor remain, adding towards the end of the coction an ounce and a half of liquorice root. Collect the liquor, by ſtrongly ſqueezing the ingredients through a coarſe cloth, and diſſolve therein ſixteen ounces of fine ſugar, or, as ſome adviſe, of brown ſugar-candy, and ſtrain and deſpumate the ſyrup in the uſual way.

A variety of the diacodium is made by adding a dram of ſaffron to the above quantity of the ſyrup.

The diacodium is a medicine of very conſiderable value, being a weak opiate, which appears to produce very little of the inconvenience which opium in ſubſtance occaſions. It is particularly uſeful in various diſeaſes of very young infants, and its pleaſant taſte is no ſmall additional advantage. To adults, its opiate properties are hardly powerful enough to ſuperſede the opium in ſubſtance or in tincture.

As the ſimple ſyrup of poppies appears to poſſeſs all the virtues of the diacodium, it is now very generally ſubſtituted to it, and the diacodium is now omitted in our pharmacopœias.

DIACODUS, in *Natural Hiſtory*, a name given by ſome to the diadochos, a kind of beryl or ſapphire, of which many fabulous things are aſſerted,

DIACOLOCYNTHUS, in *Pharmacy*, an electuary, in which colocynth is the principal ingredient. It is now diſuſed.

DIACOMMATIC, in *Muſic*, has ſometimes been uſed to expreſs the frequent temperaments of a whole comma major in the melody, which are neceſſary for enabling the different parts of a piece of muſic always to make perfect harmony with each other. See Dr. Callcott's Muſical Grammar, p. 136.

DIACONICON, SACRISTY, a place adjoining to the ancient churches, where the ſacred veſtments, with the veſſels, relics, and other ornaments of the altar were preſerved, and anſwering to our veſtry.

The word is Greek, formed from *διακονεω*, *I ſerve, I miniſter*, becauſe here was kept every thing belonging to divine ſervice. It was alſo called *ασπαστικον*, and in Latin ſalutatorium; becauſe it was here that the biſhop received and ſaluted ſtrangers. Sometimes, too, it was called *μηπατωριον*, or *μιπατωριον*, *menſa*, on account of the tables kept therein, for diſpoſing the ſacred ornaments on; or rather from *μηπατον*, a ſort of inn, or houſe, for the lodging of ſoldiers.

DIACONISSA, and DIACONATE. See DEACON, and DEACONRY.

DIACOPE, *Διακοπη*, from *δια* and *κοπτω*, *I cut off*, in *Grammar*, the ſame with what is otherwiſe called tmeſis.

DIACOPE, in *Surgery*, denotes a deep cut or wound; or the act of cutting off any part.

DIACOPENA, in *Ancient Geography*, a country placed by Strabo in Aſia Minor, between the rivers Halys and Iris, near the country which he calls *Pimoleſina*.

DIACOPTON, a city of Achaia Propria, about 60 furlongs diſtant from the gulf of Corinth; formerly called *Pellene*, or *Pellina*.

DIACOUSTICS, (from *δια*, *through*, and *ακουω*, *I hear*;)

tain. On theſe ſet off 56 toiſes, from C to G, and D to H, for the faces CG, DH, of the counter-guards. The flanks and tenailles are found or determined as in his firſt method.

The ditch before the ſaliant angles of the towers is ſix toiſes broad, and its counterſcarp is drawn to the extremities of the flanks of the counter-guards. The right line, which joins the ends of theſe flanks, determines the inſide of the tenailles.

The ditch before the counter-guards is 12 toiſes broad at the ſaliant angles, and its counterſcarp is drawn towards the oppoſite ſhoulders, in the ſame manner as in his firſt method.

The capital of the ravelin is 45 toiſes, and its faces, when produced, terminate on thoſe of the counter-guards, about 10 toiſes from the ſhoulders. Ten toiſes, however, are cut off from the faces of the ravelin, for the flanks which are parallel to its capital.

The ditch before the ravelin is 10 toiſes broad, the covert-way five, the ſemi-gorges of the places of arms 12 each, the faces 17 each, and the glacis is 20 toiſes broad.

The conſtruction of Mr. Vauban's third method, according to the plan of New Briſach, is applied to an octagon, of which the exterior ſide is equal to 180 toiſes, and is made inwards. The perpendicular to the exterior ſide is, as in his firſt method, equal to 30 toiſes. The faces of the counter-guards are each of them equal to 60 toiſes. The flanks are found by ſetting off 22 toiſes, in arcs deſcribed from the oppoſite ſhoulders, as centres, and with the diſtance between as radius. A right line drawn through the extremities of the flanks, parallel to the exterior ſide, to meet the capitals of the counter-guards, determines both the inſide of the tenailles, and the ſaliant angles of the tower-baſtion.

And if another right line be drawn parallel to this, at the diſtance of nine toiſes from it, the points, where it meets or interſects the capitals of the counter-guards, will be centres of the towers; from which points, if ſeven toiſes be ſet off each way for their demi-gorges, the poſitions of their flanks, which are perpendicular to the ſaid line, will be determined. For each of theſe flanks, five toiſes are ſet off outwards, and four from the ſaid line. And the line joining the inſide of the flanks at the end of four toiſes completes the towers.

The ditch is ſix toiſes broad before the ſaliant angles of the towers, and its counterſcarp meets the line joining theſe angles, within ten toiſes of the extremities of the flanks of the counter-guards.

The great ditch before the counter-guards is 15 toiſes broad, and its counterſcarp is parallel to the faces. The capital of the ravelin is 55 toiſes in length, and that of the redoubt within it, is equal to 23 toiſes. The faces of the ravelin are drawn towards thoſe of the counter-guards, within 15 toiſes from the ſhoulders, and thoſe of the redoubt are parallel to theſe. Twelve toiſes are cut off from each face of the ravelin, and ſix from each of the redoubts by the flanks, which are parallel to its capital. The ditch before the ravelin is twelve toiſes wide, and that before the redoubt is ſix. The covert-way and glacis are the ſame as in his ſecond method. The profiles alſo are nearly the ſame in both. This method, indeed, differs but little from his ſecond, except in two ſmall flanks, of about four toiſes each, which in this he makes in each curtain, that are not in the other. The parapets of his counter-guards, on both ſides of the ſaliant angles for the diſtance of about twenty feet, are raiſed four feet higher than the reſt, to prevent theſe works from being annoyed by ricochet-batteries.

In Mr. Vauban's firſt method of military conſtruction, it may not be amiſs to give a table of the principal parts thereof, for drawing the maſter-line by, as alſo an ichnographical one of the principal dimenſions of the body of the place, tenailles, ravelin, covert-way, traverſes, and places of arms, as publiſhed with his approbation (for he never publiſhed any thing himſelf reſpecting it.)

TABLE for the Conſtruction.

	Forts.						Little Fortification.				Mean.		Great.	
Side of Figure, or Polygon.	80	90	100	110	120	130	140	150	160	170	180	190	200	260
Perpendiculars.	10	11	12½	14	15	16	20	21	23	25	30	31	25	22
Faces of Baſtions.	22	25	28	30	33	35	40	42	45	47	50	53	55	60
Capitals of Ravelins.	25	28	30	35	38	40	45	50	50	52	55	55	60	50

And the following is an ichnographical table of the thickneſſes, &c. of the works compoſing the body of the place, &c.

Toiſes.

Of the Body of the Place.
- Thickneſs of the rampart at its baſe - - - - - 11
- Thickneſs of the parapet at its baſe - - - - 3
- The breadth of the ditch - - 20

Toiſes.

Of the Tenaille.
- Its diſtance from the orillon of the baſtion - - - - 3
- Thickneſs of its rampart in the face and flank at the baſe - - 7
- Thickneſs of the rampart of its curtain at the baſe - - - 5
- Thickneſs of its parapet at the baſe - - - - 3

Thickneſs

is repreſented with a diadem, adorned with rays: though even after Conſtantine, when the diadem was become the uſual ornament of the Auguſti, it was not always given to the Cæſars. Indeed, we ſee it on ſome of the medals of Julian, while only Cæſar; though it is pretty certain, he did not wear it until he became Auguſtus. Du-Cange will not aſſert, that Conſtantine firſt took the diadem; but only, that he firſt made it into a kind of caſk, or cloſe crown, as is ſeen in ſome of his medals, and thoſe of his ſucceſſors.

DIADEM, in *Heraldry*, is applied to certain circles or rims, ſerving to bind or encloſe the crowns of ſovereign princes; and to bear the globe, and croſs, or the fleurs de-lis, for their creſt.

The crowns of ſovereigns differ in this, that ſome are bound with a greater, and ſome with a leſs, number of diadems.

Prelates likewiſe appear to have anciently worn a ſort of diadem; thus Baronius writes, that St. James the apoſtle wore a gold plate on his forehead, as a mark of his epiſcopal dignity.

In blazoning, the bandage about the heads of Moors, on ſhields, is ſometimes alſo called diadem. The term *diademed* is applied to the imperial eagle, the two heads of which are ſurrounded with an annulet or circle, which is a token of greater dignity than to be *crowned*, as the eagles of other princes are.

DIADES ATHENÆ, in *Ancient Geography*. See DIA.

DIADOCHUS, in *Natural Hiſtory*, the name given by the ancients to a gem, approaching to the nature of the beryl, or aqua-marina, probably a pale ſapphire; for they had no peculiar generical name for that gem, but called the beautiful deep coloured ones only ſky-blue beryls, berylli aeroides. The writers of the middle age have given ſtrange accounts of the magical virtues of this ſtone, ſuch as its calling up ſpirits, and many other the like things, on being thrown into water: they ſaid, however, that if it happened by any accident to touch a dead body it loſt all its virtue.

DIADOCOPOTIS, in *Ancient Geography*, a town of Aſia, in the Perſide. Steph. Byz.

DIADROME, from διὰ and δρόμος, *curſus*, is ſometimes uſed for the vibration, motion, or ſwing of a pendulum.

DIÆRESIS, in *Grammar*, is a figure whereby a diphthong is divided into two ſyllables: as aulæ into aulai, pictæ into pictai, aquæ into aquai.

DIÆRESIS is alſo uſed, in a general ſenſe, for any diviſion of one ſyllable into two: as in that verſe of Tibullus, "Stamina non ulli diſſoliinda deo," for diſſolvenda.

This is uſually noted by two points placed over a letter, to ſhew that it is to be ſounded by itſelf, and not joined with any other ſo as to make it a diphthong: thus *aëra*, by the points over the *e*, is diſtinguiſhed from *æra*.

It is alſo a kind of metaplaſm, or addition to a word, by dividing one ſyllable into two: as aulae, by a diæreſis, is a word of three ſyllables, inſtead of aulæ. See TMESIS.

DIÆRESIS, in *Surgery*, the operation of dividing and repairing parts, whoſe union and continuity were an obſtacle to the cure; or which were joined and conglutinated contrary to the order of nature.

The word, in its original Greek, διαιρεσις, ſignifies diviſion.

There are five ways of performing the diæreſis, *viz.* by cutting, pricking, tearing, drawing, and burning.

DIÆTETÆ, Διαιτηται, from διαιταω, *I arbitrate*, among the Athenians, were of two ſorts, the cleroti and dialacterii. The former were a kind of public arbitrators, choſen by lot, to determine all cauſes exceeding ten drachms within their own tribe. Their office was annual, at the expiration of which they were obliged to give up their accounts; and if it was proved, that they refuſed to give judgment, or to have been corrupted, they were puniſhed with infamy. Their ſentence, however, was not final, an appeal lying from it to the ſuperior courts.

The dialacterii, on the contrary, were private arbitrators, from whoſe ſentence there lay no appeal; and accordingly they always took an oath to adminiſter juſtice, without partiality, which the cleroti did not. Potter's Archæol. Græc. lib. i. cap. 22. tom. i. p. 122, ſeq.

DIAFERI, in *Geography*, a town of Perſia, in the province of Chorafan; 135 miles N. of Herat.

DIAGEBRES, in *Ancient Geography*, a people of the iſland of Sardinia, according to Strabo.

DIAGLAUCIUM, a name given by the old writers on *Medicine* to a ſort of collyrium, in which the juice of the glaucium, or yellow poppy, was a principal ingredient. It was uſed for beginning lippitudes and ophthalmies.

DIAGLYPHICE, from διαγλυφω, *I engrave*, the art of engraving, cutting, or otherwiſe working, hollow or concave figures, in metals; ſuch as ſeals, intaglios, matrices for coins or medals, &c. See SCULPTURE.

DIAGNOSIS, in *Medicine*, from διὰ and γινώσκω, *I know*, the diſtinction of the nature of one diſeaſe from that of another, reſembling it, by means of a collected view of the ſymptoms; whence

DIAGNOSTIC SYMPTOMS, are the leading ſymptoms, or thoſe which are moſt characteriſtic of any particular form or ſeat of diſeaſe. Thus cough, difficulty of breathing, pain in the cheſt, and fever, are the diagnoſtic ſymptoms of pleuriſy. If any one of theſe is abſent, the remaining three are not ſufficient to denote inflammation of the cheſt. From the various combinations and degrees of the ſymptoms of diſeaſe, it is obvious that the knowledge of diagnoſtics is one of the moſt important and difficult branches of the ſcience of medicine; and it is the poſſeſſion of this knowledge by which the judicious phyſician riſes ſo far ſuperior to the empiric.

DIAGONAL, in *Geometry*, a right line drawn acroſs a parallelogram, or other quadrilateral figure, from the vertex of one angle to that of another.

Such is the line P N (*Plate* VI. *Geometry*, *fig.* 75.) drawn from the angle P to N.

Some authors call it diameter, and others the diametral of the figure.

It is demonſtrated, 1. That every diagonal divides a parallelogram into two equal parts; for the oppoſite ſides, O P, N Q. and O N, P Q, being parallel (*fig.* 75.) and the alternate angles Q N P, O P N, and Q P N, P N O being reſpectively equal, and the ſide N P, common to the equiangular triangles O P N, P N Q, theſe triangles are equal. 2. Two diagonals drawn in any parallelogram, biſect each other, for the triangles O M P, N M Q, being equiangular, and having N Q = O P, will have N M = M P, and O M = M Q. 3. The diagonal of a ſquare is incommenſurable with one of its ſides.

Add, 4. A very noble theorem in elementary geometry, firſt demonſtrated by Mr. Lagny, in the Memoirs de l'Academie Royale des Sciences, an. 1706, is that the ſum of the ſquares of the two diagonals of every parallelogram is equal to the ſum of the ſquares of the four ſides.

It is evident at firſt ſight, that the famed 47th propoſition of Euclid, ſo richly worth the hecatomb it coſt the author, is only a particular caſe of this propoſition: for if the parallelogram be right-angled, it follows of courſe, that the two diagonals are equal; and of conſequence, the ſquare of a diagonal, or, which is the ſame thing, that the ſquare of the hypothenuſe of a right angle, is equal to the ſquares of the two ſides. If a parallelogram be oblique-angled, and of conſequence, the two diagonals unequal, as is the more uſual caſe, the propoſition becomes of more extenſive uſe.

The demonſtration, in oblique-angled parallelograms, is thus:

thus: ſuppoſe the oblique-angled parallelogram A B C D (*fig.* 76) whereof B D is the greater diagonal, and A C the leſſer: from the point A, of the obtuſe angle D A B, let fall a perpendicular A E, to the ſide C D; and from the p int B another perpendicular B F to the ſide D C. Then are the triangles A D E, B C F, equal, and ſimilar, as A D is equal to B C, and the angles A D E, B C F, as well as A E D, B F C, are alſo equal; conſequently, D E is equal to C F. Now by Euclid, prop. 13. lib. ii. in the obtuſe-angled triangle B D C, the ſquare of the ſide B D is equal to the ſum of the ſquares of B C and C D, together with double the rectangle of C F by C D; and by the 13th, lib. ii. in the triangle D A C, the ſquare of the ſide A C is equal to the ſum of the ſquares of A D, and C D, abating double the rectangle of the ſame, C D, by D E, equal to C F. Conſequently, the former exceſs preciſely compenſating this defect, the ſum of the ſquares of the two diagonals is equal to the ſum of the ſquares of the four ſides. *Q. E. D.*

Hence, in every rhombus, or lozenge, knowing one ſide and a diagonal; the other diagonal will likewiſe be known: for, as the four ſides are equal, ſubtracting the ſquare of the given diagonal from quadruple the ſquare of the given ſide, the remainder is the ſquare of the diagonal required.

The propoſition is likewiſe of great uſe in the theory of compound motions; for, in an oblique-angled parallelogram, the greater diagonal being the ſubtenſe of an obtuſe, and the leſſer of an acute angle, which is the complement of the former, the greater will be the greater, and the leſs the leſs, as the obtuſe angle is the greater: ſo that if the obtuſe angle be conceived to increaſe till it be infinitely great, with regard to the acute one; or, which amounts to the ſame thing, if the two contiguous ſides of the parallelogram be extended directly, end to end, in a right line, the great diagonal becomes the ſum of the two ſides, and the leſſer one, nothing. Now, two contiguous ſides of a parallelogram being known, together with the angle they include, it is eaſy to find the ſubtenſe of that angle, *i. e.* one of the diagonals of the parallelogram, in numbers; which done, Mr. de Lagny's propoſition gives the other. Which ſecond diagonal, thus found, is the line that would be deſcribed by a body impelled at the ſame time by two forces, which ſhould have the ſame ratio to each other as the contiguous ſides have, and act in thoſe two directions; which diagonal the body would deſcribe in the ſame time, as it would have deſcribed either of the contiguous ſides in, if only impelled by the force correſponding thereto. This is one of the great uſes of the propoſition; for the ratio of two forces, and the angle they make, being given, it is frequently neceſſary to determine in numbers, the line a body, impelled by two forces, would deſcribe in a certain time. See COMPOSITION *of Motion*, and DYNAMICS. It was diſcovered by Ptolemy, that the rectangle of the two diagonals of any quadrilateral inſcribed in a circle, is equal to the ſum of the two rectangles contained under the oppoſite ſides: for the demonſtration of this property, ſee CIRCLE; art. 15.

All the ſides of a rectilinear figure, as A B, B C, C D, D E, E A (*fig.* 77.) and the angles O, and Y, being given to find the diagonals. In the triangle A B E, the ſides A B, and A E, being given, and the angle O, the angle A is eaſily found by trigonometry; and, from this, the diagonal B E. And, after the like manner, the triangle B C D is reſolved, and the diagonal B D found.

Since ichnographies, or plans, are beſt taken, by having all the ſides and diagonals, the uſe of this problem, in planimetry, is of ſome importance; eſpecially to ſuch as are willing to have their work accurate, though at the expence of calculation.

DIAGONAL *Motion.* Application of two, and three forces, in different planes, to produce every diverſity of rectilinear and curvilinear motion by the agency of machinery.

In moſt machines commonly uſed, the motions are either rotatory or reciprocating. Even the latter motion is ſeldom uſed, unleſs where the deſired effect cannot be produced by the rotatory movement. In fitting machines to ſuperſede, or diminiſh the neceſſity of human labour, mechanics have, as much as poſſible, ſtudied to reduce the reciprocating to the rotatory motion, wherever it appeared practicable. The cylindrical cards of an engine for carding wool or cotton, the barrel organ, and many other machines, are convincing proofs of this; and the reaſon of this preference is very obvious to every perſon at all converſant with the theory or practice of mechanics. In every reciprocating motion, the direction is ſo frequently reverſed, that the inertia, or vis inertiæ, as it is commonly called, muſt always produce a very conſiderable effect upon the momentum of the machine, and tend very much to impede its motion and diminiſh its power. Perhaps, after all the improvements for which mankind are indebted to Mr. Watt, in the conſtruction of ſteam-engines, this is ſtill the principal deſideratum, in that moſt uſeful and valuable machine. In rotatory motions, on the contrary, the movement being uniformly round a centre, the inertia, ſo far from impeding, tends always rather to increaſe the momentum, and conſequently, the power of the engine. Hence, where reciprocating motions are abſolutely neceſſary, the rotatory motion is generally combined with them, and fly or balance-wheels added to counteract the inequalities of power, and velocity produced by the inertia, while the direction of the motion is changed. But the rotatory movement is too limited in its operation to produce the infinite combination of motions of which machinery is ſuſceptible, and the reciprocating motions generally employed are moſt frequently confined to one direction. In the adaptation of machinery for the diminution or ſuperſeſſion of labour, thoſe machines are firſt conſtructed, where the mechanical powers may be applied in great force. Hence, in infant ſtates, cranes, water-mills, and ſuch engines are ſooner ſought for than clocks, watches, and other mechanical contrivances, more particularly ſuited to a refined ſtate of ſociety.

The motions which may be given to any piece of machinery are infinite, and the lines of direction in which the particular parts of the machine move, may be changed as often as the artiſt is inclined to do ſo. The following remarks, which are the reſults of a very long train of practical, and ultimately ſucceſsful experiments, may be of ſome uſe in directing the attention of mechanics to the conſtruction of a ſpecies of machinery, hitherto not generally known, or uſed in Britain; and only applied by thoſe foreigners who have practiſed it to purpoſes of mere ſpeculative and unproductive curioſity. The purpoſe for which the experiments were made, was to enable one perſon to work any given number of needles, for making flowers and other ornaments upon cloths, of various kinds, by the proceſs called tambouring. It is, however, equally ſuitable to any other art or manufacture where diverſified motion is required.

The theorem upon which the principle is founded, is thus expreſſed in the 1ſt and 2d corollaries to the 5th law of motion, as given in Mr. Motte's tranſlation of the Principia of ſir Iſaac Newton. "Corollary 1ſt. A body, by two forces conjoined, will deſcribe the diagonal of a parallelogram in the ſame time that it would deſcribe the ſides by theſe two forces apart. Corollary 2d. And hence is explained the compoſition of any one direct force out of any two oblique forces; and, on the contrary, the reſolution

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of any one direct force into any two oblique forces; which compoſition and reſolution are abundantly confirmed from mechanics. Upon this principle, that eminent philoſopher demonſtrated the elliptical orbits deſcribed by the planets round the ſun, and the ſubject has ſince been moſt amply inveſtigated and carried much farther by Monſ. La Place.

To apply the principle to the conſtruction of any machine which requires the line of motion to be frequently, or inceſſantly changed, it is only neceſſary to uſe either two or three moving powers acting at the ſame time upon the body to be moved in different planes. For the ſake of convenience it will, in general, be found moſt advantageous that theſe planes ſhould be at right angles to each other. Conſequently, if two forces are employed, they will be in the direction of two ſides of a ſquare or parallelogram; and if three are neceſſary, they will be in the direction of three ſides of a cube, each ſide being at right angles to either of the others. The firſt of theſe is repreſented by *fig.* 12 *Plate* V. *Miſcellany*. If two forces be applied at the ſame time to move a body at B, and act upon it in the directions of the lines B C, B A, and if theſe moving powers produce equal velocity, the body at B will be moved by their joint application in the direction of the diagonal line B E, forming an angle of 45° with each of the lines B A, B C. If the force moving in the direction B C gives double the velocity of that which moves in the direction B A, the line, B D, will be deſcribed forming an angle of 36° 34′ with B C, and one of 63° 26′ with B A nearly, the latter being the complement of the former. From this it will be evident, that by varying the velocity given by the moving powers, every angle contained in the quadrant of a circle will be produced as may be required.

To effect this practically, and apply rotatory motions to produce ſuch lines of direction on the body moved, whether direct or reciprocating, two wheels, moving upon the ſame or different axes, are all that is required. Let it be ſuppoſed, that one of the two forces, moving at right angles to each other, is in a horizontal, and the other in a vertical direction. The firſt of theſe motions will be produced by the rotatory motion of the wheel, A, (*fig.* 13.) upon its axis B, and the horizontal motion will be communicated to the body C, which preſſes againſt the circumference or rim of the wheel by the action of the weight E, ſuſpended by a cord connected with C, and paſſing over the pulley D. The vertical motion is communicated in the ſame manner, by the rotation of the wheel, A, upon its axis, B, (*fig.* 14.) to the ſame body, C, by means of the lever, F, moving upon its fulcrum G, or any other ſimilar mechanical contrivance. If the wheels are placed upon the ſame axis, the combined application of their powers will be ſeen by inſpecting *fig.* 15. In *fig.* 14, the lever, F, is placed below the vertical wheel, in *fig.* 15. it is above, and acted upon by means of a cord, wire, or other connection, between the wheel, A, and the body C, upon which it acts. Theſe figures being profile elevations, and the wheel which gives the vertical motion being upon the ſame axis with that which produces the horizontal, muſt be ſuppoſed to be behind and concealed by it. *Fig.* 16, ſhews the axis in front, and the wheels in ſection.

The operation of theſe wheels, to produce either uniform, or diverſified motion, depends entirely upon the ſhapes into which their circumferences or rims are formed, and a knowledge of the manner of performing this operation, is the moſt important part of the buſineſs of the engineer, or mechanic, who plans them. Recurring to *fig.* 12, let it be ſuppoſed that in one revolution of the axis which carries the two wheels, the body acted upon is required to move from B to E, and again to return to B, deſcribing in both caſes the diagonal line B E. In this caſe the whole line of motion, forming an angle of 45° with the lines of each of the moving powers, their momenta muſt be equal. If the motion may, or ought to be, communicated at intervals, the wheels ſhould be conſtructed as a ſeries of concentric circles. In this way the wheel, A, (*fig.* 13.) is repreſented. It is divided into 12 equal parts, of which 1 and 12 are upon the ſame circle, or equally diſtant from the centre. From 1 to 6 the concentric circles approach towards the centre, the radius of each in ſucceſſion being leſs than that of the one preceding. From 7 to 12 the radii again increaſe to produce the returning motion upon the body C. Let C be a ſquare frame of any ſtout ſubſtance, ſo placed, or ſuſpended, as to move freely, either in a horizontal or vertical direction, and let a piece of paper or cloth be ſtretched upon it. Let there be alſo a fixed inſtrument placed at right angles to the plane of the frame (as a pencil), the point being in contact with the paper or cloth. Then, if the wheel, A, revolves upon its axis towards the body C, when the intermediate friction-wheel, H, is preſſing againſt the diviſion 1, the point will be at I, and when the diviſion 6 is in contact with the friction-wheel, the point will be at L, from whence, by the revolution of the other ſemi-circumference of the wheel from 7 to 12, it will be again at I. As repreſented in the figure the point would be half way between I and L, for the friction-wheel preſſes the diviſion 3. By theſe means the horizontal motion is effected. The wheel which gives the vertical motion to the ſame body would, by a revolution in the ſame way, bring the point from I to M, (*fig.* 14.), and again return it to I. Such would be the effect of each of the wheels acting ſeparately; but if their action is combined, the diagonal line, I K, will be produced by the preſſure of the point, and the motion of the frame C. It will be evident, that were the frame, C, ſtationary, and the point moved in the ſame direction by the action of the two wheels, the ſame effect would be produced; or the horizontal motion might be communicated to the one body, and the vertical to the other. The application of the moving power, therefore, is only a matter of practical conveniency, which may vary in different machines, and which, as it does not at all affect the general principle, muſt be left to the diſcretion of the engineer, and regulated by him as particular circumſtances may render expedient. The combined motion is repreſented, as already noticed in *fig.* 15, the vertical wheel being there concealed by the horizontal.

In theſe figures, the diviſions are equal, becauſe the angle is 45°, and the motion would only be communicated to the body C, at the inſtant when the friction-wheel, H, comes in contact with each diviſion. But if inceſſant motion be required, the deviation muſt be conſtant, and then the wheel will act like inclined planes applied to a circle.

In the machinery to which theſe experiments were applied, a great diverſity of figures was required, and theſe figures were often very minute. As the approaching to, or receding from, the centre of each wheel required to be done with greater accuracy than could be expected from the hand of any workman, an engine was contrived, ſimilar, in ſome reſpects, to that of Mr. Ramſden, for dividing mathematical inſtruments, and which ſhall afterwards be deſcribed.

If, inſtead of the line B E, it is required to deſcribe the line B D, it will be neceſſary that the deſcents and aſcents, which produce the vertical motion, ſhould be leſs than thoſe which give the horizontal; and by the common principles of right-angled trigonometry, theſe will be to each other in the ratio which the baſe line B C, bears to the perpendicular line C D, theſe being the ſines of the oppoſite angles. In the ſame way, every angle of the quadrant of a circle

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ought to be calculated, and applied by the engineer to the effect which he intends to produce. The length, intended to be given at every interval, in the machinery conſtructed, was $\frac{1}{32}$d, or .03125 of an inch. In the dividing and cutting-engine for the wheels, this was repreſented by the number 18, being the revolutions of a handle which effected the diviſions upon the rim of the wheel. When a horizontal motion was required, the wheel producing the vertical motion was made circular, ſo as to produce no effect upon the body to be moved. If vertical, the ſame was done with the horizontal wheel; and when oblique, a deviation from the circle was given to each, proportional to the angle of obliquity from a horizontal ſtraight line. Thus, the horizontal motion repreſented the baſe; the vertical motion the perpendicular; and the combined oblique motion the hypothenuſe of a right-angled triangle. As each of theſe muſt be made equal to $\frac{1}{32}$d of an inch, repreſented by the number 18, it became neceſſary to aſcertain the ratio which the hypothenuſe, whoſe meaſure was 18, bore to the baſe and perpendicular for every degree of a quadrant from 0° to 90°. Minutes and ſeconds were not reckoned, as being unneceſſary, and the neareſt degree, above or below, was taken. The table, calculated by the common trigonometrical analogies, making the hypothenuſe radius was as follows:

Table I. ſhewing the length of the baſe and perpendicular of any right-angled triangle, the meaſure of the hypothenuſe being 18, and calculated for every degree, from 0° to 90°.

	Baſe.	Perp.			Baſe.	Perp.	
0°	18.0	0.0	90°	23	16.6	7.0	67
1	18.0	0.3	89	24	16.5	7.3	66
2	17.9	0.6	88	25	16.3	7.6	65
3	17.9	0.9	87	26	16.2	7.9	64
4	17.9	1.2	86	27	16.0	8.2	63
5	17.9	1.5	85	28	15.9	8.4	62
6	17.9	1.8	84	29	15.7	8.7	61
7	17.9	2.2	83	30	15.6	9.0	60
8	17.8	2.5	82	31	15.4	9.3	59
9	17.8	2.8	81	32	15.3	9.5	58
10	17.7	3.1	80	33	15.1	9.8	57
11	17.7	3.4	79	34	14.9	10.1	56
12	17.6	3.8	78	35	14.7	10.3	55
13	17.5	4.1	77	36	14 6	10.6	54
14	17.5	4.4	76	37	14.4	10.8	53
15	17.4	4.7	75	38	14.2	11.1	52
16	17.3	5.0	74	39	14.0	11.3	51
17	17.2	5.3	73	40	13.8	11.6	50
18	17.1	5.6	72	41	13.6	11.8	49
19	17.0	5.9	71	42	13.4	12.0	48
20	16.9	6.2	70	43	13.2	12.3	47
21	16 8	6.5	69	44	13.0	12.5	46
22	16.7	6.7	68	45	12.7	12.7	45
	Perp.	Baſe.			Perp.	Baſe.	

The above table, calculated to every degree, from 0° to 90°, is adapted for cutting the rims of wheels for producing diagonal motion, to the 5760th part of an inch, by means of the engine afterwards deſcribed. The angles above 45° are the complements of thoſe below, as in common logarithmic tables.

Fig. 17, ſhews the angles of obliquity for every 10°. The baſe line, or horizontal motion, there becomes the co-ſine, and the perpendicular, or vertical motion, the ſine of the angles at the centre A of the quadrant BC. The triangles are repreſented by the radi, the baſe, and the perpendiculars drawn from the diviſions of the quadrant to the baſe, and numbered from 1 to 8.

The general principle being thus reduced to the common application of right-angled trigonometry, it may now be proper to deſcribe the cutting-engine, which is, probably, the only one of the kind in Britain, and of which repreſentations will be found in *Plate* VI.

Dividing and Cutting Engine.

This engine, as formerly noticed, is, in ſome reſpect, ſimilar to Mr. Ramſden's dividing engine. It alſo combines with this the properties of the common engine uſed by clock-makers for cutting the teeth of their wheels, excepting that, as conſtructed, it is not adapted for cutting oblique wheels, although the apparatus uſed for this purpoſe might very eaſily be added to it, if required. The engine made was entirely confined to the purpoſe of ſhaping the rims of ſuch wheels as have been already noticed, and never was applied to the purpoſes for which the common cutting engine is uſed. In *Plate* VI. *fig.* 18, is a ground, or horizontal plan, of every part of the engine which can be ſeen, when viewed from above, excepting ſome of the higher parts, which are omitted, for the ſake of ſhewing more diſtinctly the parts under them. The parts omitted in *fig.* 18, appear very plainly in the profile elevation, *fig.* 19. The length of the engine is four feet, and its breadth three feet, although theſe dimenſions ought, of courſe, to be varied, according to the diameters of the wheels required to be cut, by any engine conſtructed for a ſimilar purpoſe. The diameters of the wheels cut by this engine were 18 inches at the moſt remote point from the centres.

Like the common engine, this cuts by the revolution of a circular cutter upon its own axis; and as the cutters were thick (generally $\frac{1}{2}$ or $\frac{5}{8}$ths of an inch) the motion was taken from a ſhaft driven by the ſteam-engine, which alſo drove the reſt of the machinery. In ſmaller wheels, and where leſs power is required, the motion may be given by turning a winch applied to one end of the axis. The framing is of hard wood, four inches ſquare, and the joints faſtened by ſcrews and nuts. The upper part of this framing is repreſented at ABCD. To this upper part are ſcrewed four pieces of iron, G, G, G, G, which ſerve as ſupporters and guides for the iron frame EE; ſo that the frame may ſlide eaſily between them in a longitudinal direction. To one end of the wooden frame is ſcrewed a ſtrong piece of iron H, in which is a round hole to ſerve as a buſh for the neck of the ſcrew, which, paſſing through the iron frame at I, has its other end ſupported by another fixture to the wood work at K. The end of the large ſcrew is counterſunk to receive the point of a ſmaller ſcrew paſſing through the fixture at K, which may be ſcrewed up, when neceſſary, to keep the ſhoulder of the large ſcrew cloſe to the buſh, H, in which it revolves. When the ſcrew is turned round from right to left, the iron frame, working upon the ſcrew at I, will be puſhed forward between the guides; and when the motion of the ſcrew is reverſed, it will be again drawn back. Upon the end of the ſcrew is fixed a large wheel, L, which is worked by a worm or ſpiral ſcrew below, a ſmall part of which only can be ſeen at M, in *fig.* 18, but which appears very plainly in the profile elevation of the engine, *fig.* 19, and the perſpective view, *fig.* 20. The worm is fixed upon an iron axis, ſtretching acroſs the engine ſupported at either end by buſhes ſcrewed to the wood, and turned by the winch, or handle, N. Upon the axis is another ſmaller wheel, repreſented at N, the uſe of which ſhall be explained,

when

when the ratio of motion comes to be deſcribed. Upon the frame, E E, are two upright pieces of iron, F, F, through which paſs two centre ſcrews to ſerve as pivots, for another iron frame, O O, placed directly above the former. Acroſs this frame paſſes the axis of the cutter P, the ends of the axis alſo revolving upon centre ſcrews or pivots. Acroſs the engine, at a convenient diſtance, is fixed a ſtrong beam, Q, reſting upon the lower ſide rails of the wood, and ſecured by a ſtrong bolt at each end. Through the middle of this beam another centre ſcrew paſſes perpendicularly, the head being below, and the point above. Upon this is placed one end of the axis of the wheel or wheels to be cut, the axis being perpendicular, and the wheels horizontal, as repreſented at R. The apparatus by which the other end of the axis is ſecured, cannot be repreſented in the ground plan, *fig.* 18, but will be plainly ſeen in *figs.* 19 and 20.

By referring now to the profile elevation, *fig.* 19, the ſhapes and adaptation of all the parts already deſcribed will be perhaps more fully underſtood, the ſame letter always denoting the ſame part in both figures, as will appear by a very brief recapitulation.

A B C D, the wooden frame.
E, iron ſliding frame.
F, ſtandard for ſupporting the upper frame.
G, G, guides for the ſliding frame.
H, buſh for the ſcrew (partially hid, and therefore omitted in *fig.* 19.)
I, female ſcrew in the ſliding frame, (hid in *fig.* 19.)
K, fixture for the point of the ſcrew (hid in *fig.* 19.)
L, large wheel upon the axis of the ſcrew.
M, worm which works the large wheel.
N, handle of the axis of the worm (hid in *fig.* 19.)
O, upper frame placed in centres.
P, cutter and axis.
Q, Croſs beam for ſupporting the wheel to be cut.

The following parts, wholly, or partially concealed in the ground plan, *fig.* 18, will appear in the elevation, *fig.* 19.

T is a ſcrew paſſing through the front croſs bar of the upper frame; which, by coming in contact with the front croſs bar of the ſliding frame, acts as a ſtop to prevent the upper frame from being unneceſſarily depreſſed, after the cutter has paſſed through the part of the wheel, R, which it is to form. U is a ſtandard raiſed from the upper ſide rail of the wooden frame to carry a croſs-piece, V, through which a centre ſcrew paſſes to ſecure the upper end of the axis of the wheel R. W is a bearer placed upon any convenient part of the croſs-piece, V, to carry a lever, X, at the extremity of which a weight is ſuſpended, which, by overbalancing the upper-frame, raiſes it after it has been depreſſed by means of the connecting wire Y. The frame is depreſſed by preſſing down the lever Z, with the operator's foot, and this lever is connected with the frame by another wire between them. In *fig.* 19, the upright ſtandard, U, is repreſented by two lines, as if tranſparent, to ſhew the way in which the vertical axis of the wheel, R, is ſecured at the top.

Fig. 20, is a perſpective view of all that can be ſeen of the engine at the point of view where it is taken, excepting the top bearer, W, lever, X, connecting wires Y, and lever, Z, which being very plainly repreſented in *fig.* 19, are here omitted, to prevent confuſion from too many parts being crowded together upon ſo ſmall a ſcale. The point of ſight is at S, oppoſite to which, if the ſpectator will place his eye at the diſtance of $8\frac{1}{2}$ inches, he will have a correct view of the engine as it ſtands when at work. The ſame letters of reference are placed at each part of the engine which are in ſight, as in the two former figures.

If this engine is to be wrought by the application of any moving power, a faſt and looſe pulley may be placed on the axis of the cutter P, and the motion communicated from any ſhaft or drum, which moves at a proper velocity. If moved by the operator's hand, only one end of the axis is to be centered, and the other, paſſing through a buſh in the frame, is to be turned by means of a winch or handle. In conſtructing an engine of this kind, great pains muſt be taken that every part be very ſtrong and truly executed; for where the diviſions are ſo minute, the ſlighteſt vibration of any part will produce errors, which will render its operation totally uncertain. When uſing the engine, it is equally neceſſary that the cutter ſhould be always ſharp, and that too much preſſure ſhould not be applied by the foot during the operation. In ſome of the firſt trials made, a conſiderable deviation from the calculation was diſcovered after the wheels were cut. In conſequence of this, the engine was carefully re-examined, and the utmoſt pains taken that every part ſhould be both firm and correct. The experiment was then repeated, but ſtill a deviation took place, though ſometimes to a greater, and ſometimes to a leſs extent. After ſome fruitleſs attempts to correct this, the true cauſe was at length diſcovered. By the friction occaſioned by the preſſure and velocity of the motion of the cutter, both it, and the braſs rim to which it was applied, ſoon became prodigiouſly heated; and it then occurred, that the expanſion produced by the heat, both in the braſs and ſteel, muſt operate to a conſiderable degree upon diviſions ſo minute. To aſcertain how far this was the caſe, a wheel was rapidly cut, without paying any regard to the heating either of the braſs or the cutter. Both were then allowed to cool, and the cutter again applied gently to the different diviſions, the engine being ſhifted exactly as before, when thoſe diviſions which had been cut hot were found ſenſibly too deep. The wheel was then recut, or rather pared gently, for the deviations were not ſo great as ſenſibly to heat either the cutter or the rim in removing them, and upon trial the wheel ſo cut, was found exactly to produce the effect which had been expected to reſult from the calculation. Afterwards the wheels, after being cut, were always pared when cool, and the ſame error never occurred again.

The range of this engine is as follows: The ſcrew which moves the ſliding frame backwards and forwards was ſingle-threaded, and contained four threads in the inch. The large wheel, fixed upon the axis of the ſcrew, contained 144 teeth; and the worm, or ſcroll, being alſo ſingle-threaded, moved only one tooth at every revolution. It required, therefore, 144 revolutions of the ſcroll to produce one revolution of the ſcrew, and one revolution of the ſcrew moved the ſliding frame, and conſequently the cutter, $\frac{1}{4}$ of an inch; and as 144×4 is $= 576$, every revolution of the ſcroll moved the cutter only $\frac{1}{576}$th part of an inch. This was generally found ſufficient for common practice, but as it might ſometimes be neceſſary to be ſtill more minute, another ſmall wheel was fixed upon the ſame axis as the ſcroll, and divided into 10 equal parts, at each of which was formed a ſmall notch, and a ſlight ſpring, preſſing the circumference, ſerved as an index. Thus the tenth part of a revolution could be obtained, and conſequently the inch of motion of the cutter divided into 5760 equal parts. It is evident that the diviſion might be rendered more minute, almoſt *ad infinitum*; but this ſeemed to be fully as far as could be deſirable for any practical pur-

poſe, or as any machine executed by human ſkill could be expected to perform with accuracy.

The engine is wrought exactly as that of the clock-maker; excepting that the operator, between every cutting, ſhifts the ſituation of the cutter, by turning the ſcroll the number of times required.

To conſtruct wheels for producing diagonal rectilinear motion by this engine, and the table already given.

If a diagonal line, of one inch in length, and forming an angle of 24° with the baſe or horizontal line be required, by one-half revolution of the two wheels; and that the ſame line ſhould be again deſcribed in a contrary direction, by the revolution of the other half.

As every ſhift is ſuppoſed to be $\frac{1}{32}$d part of an inch, the ſemi-circumference of the wheel muſt be divided into 32 equal parts, or the whole into 64, and radii drawn from the circumference towards the centre. Then, to cut the horizontal wheel, (*fig.* 13 *Plate* V.) conſult the table, when againſt the angle 24° will be found, in the column marked Baſe at the top, 16.5. Beginning then at the diviſion marked 1, cut it as near to the circumference as convenient. Proceed to 2, and turn the ſcroll $16\frac{1}{2}$ turns; to advance the cutter ſo as to cut the wheel deeper, repeat the ſame operation upon 3, and ſo on ſucceſſively, ſtill advancing the cutter towards the centre of the wheel $16\frac{1}{2}$ turns of the ſcroll at each diviſion, until you arrive at 32, when the horizontal part of the line will be compleat. Cut 33 on the ſame circle as 32, and then turning the ſcroll the contrary way $16\frac{1}{2}$ turns at each diviſion, until you arrive at 64, the wheel will be compleat, and 64 will be on the ſame circle as 1.

To cut the wheel which gives the vertical motion.—Obſerve, after the wheel is divided, as before, into 64 equal parts, that the diviſion numbered 1 muſt be at right angles to that upon the horizontal wheel, becauſe the point of motion is under the centre, (*figs.* 14 and 15. *Plate* V.) and that of the cutter on a level with it. Again conſulting the table, againſt 24°, in the column marked Perp. is 7.3. Cut as before the firſt diviſion, as near to the rim as convenient, and advance the cutter $7\frac{3}{10}$ turns at each diviſion to 32. Bring it back the ſame number of turns to 64, and the wheels will be ready for work. When the wheels are applied to the body to be moved, every revolution will then deſcribe a ſtraight line, forming an angle of 24° with the plane of the horizon, and re-deſcribe the ſame line returning to the point from whence it ſet out. Any other angle will be produced preciſely in the ſame way, by uſing the numbers in the table for the turns of the ſcroll. When the angle exceeds 45°, what was formerly the baſe becomes the perpendicular, and *vice verſâ*, as marked at the bottom of the reſpective columns, and as in common trigonometry.

Of Curvilinear Motion.

The mere production of diagonal ſtraight lines would be too limited for the ornamental varieties to which machinery of this deſcription ought to be applicable. The late Mr. Hogarth has pronounced a curve to be the line of beauty, and the taſte of moſt nations, the Chineſe perhaps excepted, ſeems ſtrongly to juſtify his aſſertion. In machinery of this deſcription, the deviation of the line deſcribed from one angle to another may be made ſo frequent and minute, as to deſcribe the circle, the ellipſe, the parabola, or any other curve, regular or irregular, with a very great degree of accuracy. In deſcribing circles, or circular curves, the plan adopted was to conſider them as inſcribed polygons, of a number of ſides proportionate to the circumference of the circle required. The inſcribed polygon (*fig.* 17. *Plate* V.) although only containing 9 ſides in the quadrant, or 36 in the whole circle, does not deviate very far: and had each of theſe ſpaces in the circumference been again divided into 10, or even into 5 equal parts, the deviation of the polygon from the circle would have been totally imperceptible to any human eye.

To aſſiſt in calculating the circles which formed the curved lines, it was neceſſary to aſcertain the diameters, from which the meaſure of the circumferences being found by the common geometrical analogy, the number of diviſions in the wheels could be alſo found. It is evident that every ſide of an inſcribed polygon, with the two radii, forms an iſoſceles triangle; and that therefore the acute angle at the centre of the circle being found, the other two angles, which are equal to each other, may alſo be found, by ſubtracting the angle at the centre from 180°, and dividing the remainder by 2. The following rules were therefore reſorted to upon this principle, and as the meaſure was $\frac{1}{32}$d of an inch, that fraction was made the ſtandard of unity, and all the ſubſequent calculations made in thirty-ſecond parts.

Rules.—1. Divide 90°, being the meaſure of the quadrant of a circle, by the number of ſides of a polygon inſcribed in that quadrant, or by the fourth part of the ſides which compleat the whole inſcribed polygon. The quotient will give the meaſure of the acute angle at the centre.

2. The acute angle being found by the preceding rule, is to be ſubtracted from 180°, and the remainder, divided by 2, will give each of the angles at the circumference which are equal, and conſequently the angle which one of them makes with the baſe or horizontal line will be found.

3. As all the triangles are ſimilar, the angles of all at the circumference are equal. And as by the twenty-ninth propoſition of the firſt book of Euclid's Elements, alternate angles are equal to each other, the meaſure of the acute angle being ſucceſſively ſubtracted from each of the other angles, will give every angle of the polygon progreſſively, or add the acute angle at the centre for the next centre angle, and ſubtract it for the angle at the circumference.

Referring again to *fig.* 17. *Plate* V., the firſt angle B A 1 is one of 10°. By the firſt of the above rules, when 90° is divided by 9, (the number of polygonic ſides in the quadrant) the quotient gives 10°. By the ſecond rule 180° − 10° = 170°, and 170° ÷ 2 = 85°. The meaſure of the angle A B 1 is therefore 85°. Again, the angle, B A 2, is 20°, and the angle, A 1 2, is equal to the angle A B 1, and conſequently 85°; but the angles, A B 1, and A 1 *a*, being alternate angles, are equal to each other. Conſequently, 85° − 10° = 75°, the meaſure of the angle *a* 1 2. In the ſame way all the other angles will be found, and when found, the table already given will ſhew the turns of the ſcroll required to cut the baſe and perpendicular lines neceſſary to produce a diagonal or hypothenuſe line equal to 18, *viz.* baſe 1.5, and perpendicular 17.9. If a different meaſure is wanted, it may be got by common proportion. For, if the hypothenuſe is to be 15, then as 18 : 15 :: 1.5 : 1.25, for the baſe; and as 18 : 15 :: 17.9 : 14.805, for the perpendicular.

The following table gives the diameters and circumferences of a ſeries of circles repreſented by polygons, from a diameter of $\frac{6}{32}$d of an inch, to one of $\frac{64}{32}$d, or two inches. The firſt column contains the meaſure of the diameter; the ſecond, that of the circumference; the third, the whole number of ſides of an inſcribed polygon; and the fourth, the number of ſides contained in a quadrant of the circle.

TABLE II.

Diameter.	Circum.	Neareſt Polygon.	Quadrant.
6	19	20	5
8	25	24	6
10	31	32	8
12	38	36	9
14	44	44	11
16	50	52	13
18	57	60	15
20	63	64	16
22	69	72	18
24	75	76	19
26	82	84	21
28	88	88	22
30	94	96	24
32	100	100	25
36	113	116	29
40	126	128	32
44	138	140	35
48	152	152	38
52	163	164	41
56	176	176	44
60	188	188	47
64	201	204	51

In the annexed table, the polygon has been in general taken above the meaſure of the circumference, but the deviation is very ſmall, and cannot affect any practical calculation.

The number of ſides being found by this table, that which follows will give the angle which each ſide forms with a horizontal ſtraight line, omitting minutes and ſeconds, and taking the neareſt degree. If greater minuteneſs be required, which will be ſeldom, if ever, neceſſary, the calculation may be carried out even to decimals of a ſecond, by the rules already given. The firſt column contains the ſides in the whole circle, and the ſecond, thoſe in the quadrant, correſponding to table II. The remaining columns, numbered from 1 to 26, give the degrees in the ſucceſſive angles. By the firſt angle is always underſtood that neareſt to the horizontal diameter of the circle, as A B 1, *fig.* 17. *Plate* V. up to a polygon of 100 ſides, the whole angles in the quadrant are given; above that, they are only carried to the octant, or to 45°. It will, however, be obſerved, that the angles omitted are the exact complements of thoſe given, the extreme angles forming together 90°, and ſo of the others converging towards the middle. Thus, in the laſt line, where 51 angles are required to complete the quadrant, 26 only are given, and the 26th is the mean angle, or 45°. The firſt angle is 89°, whoſe complement being 1°, that is the meaſure of the 51ſt. The ſecond being 87°, its complement of 3° gives the 50th, and ſo of all the others.

TABLE III.

Polygon.	Quadrant.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
20	5	81°	63°	45°	27°	9°																					
24	6	83	68	53	37	22	7°																				
32	8	84	73	62	51	39	28	17°	6°																		
36	9	85	75	65	55	45	35	25	15	5°																	
44	11	86	78	70	62	54	45	36	28	20	12°	4°															
52	13	86	79	72	65	58	51	45	39	32	25	18	11°	4°													
60	15	87	81	75	69	63	57	51	45	39	33	27	21	15	9°	3°											
64	16	87	81	76	70	65	59	53	48	42	37	31	25	20	14	9	3°										
72	18	87	82	77	72	67	62	57	52	47	43	38	33	28	23	18	13	8°	3°								
76	19	88	83	78	73	69	64	59	54	49	45	41	36	31	26	21	17	12	7	2°							
84	21	88	84	80	75	71	67	62	58	54	49	45	41	36	32	28	23	19	15	10	6°	2°					
88	22	88	84	80	76	72	68	64	60	56	52	47	43	38	34	30	26	22	18	14	10	6	2°				
96	24	88	84	80	77	73	69	66	62	58	54	50	47	43	40	36	32	28	24	21	17	13	10	6°	2°		
100	25	88	84	81	77	73	70	66	62	59	55	51	48	45	42	39	35	31	28	24	20	17	13	9	6	2°	
116	29	88	85	82	79	76	73	70	67	64	61	58	55	52	49	45											
128	32	89	86	83	80	78	75	72	69	67	64	61	58	55	52	49	46										
140	35	89	86	84	81	78	75	73	70	68	65	62	60	57	54	52	49	47	45								
152	38	89	86	84	81	79	76	74	71	69	67	65	62	60	57	55	52	50	48	46							
164	41	89	87	85	83	80	78	76	74	71	69	67	65	62	60	58	56	53	51	49	47	45					
176	44	89	87	85	83	81	79	77	75	72	70	68	66	64	62	60	58	56	54	52	50	48	46				
188	47	89	87	85	83	81	79	77	76	74	72	70	68	66	64	62	60	59	57	55	53	51	49	47	45		
204	51	89	87	85	83	82	80	78	76	75	73	71	69	68	66	64	63	61	59	57	56	54	52	50	48	47°	45°

A ſingle example will probably be ſufficient to elucidate the uſe of all the three tables, after the previous deſcriptions. Let it be required to form a circle by means of machinery, the diameter of which ſhall be half an inch. As $\frac{1}{32}$ is the meaſure of unity, the diameter will be repreſented by 16 in table II. By inſpecting the table it will appear, that the circumference is 50, the neareſt polygon 52, and the ſides contained in one quadrant 13.

By table III. we find, againſt the numbers quoted, for the

1ſt	-	Angle	-	86°
2d	-	ditto	-	79
3d	-	Angle	-	72°
4th	-	ditto	-	65
5th	-	ditto	-	58
6th	-	ditto	-	51
7th	-	ditto	-	45
8th	-	ditto	-	39
9th	-	ditto	-	32
10th	-	ditto	-	25
11th	-	ditto	-	18
12th	-	ditto	-	11
13th	-	ditto	-	4

Let

Let us then ſuppoſe, that in deſcribing this circle, we commence our operation at the horizontal diameter, and at the right hand, as at B in *fig.* 17. *Plate* V.

Let us alſo ſuppoſe, that the frame which carries the ſtuff upon which the circle is to be deſcribed, is moveable both in a horizontal and vertical direction, as in *figs.* 13, 14, and 15. The calculation will then ſtand as follows:

1ſt Quadrant.

	Diviſion.			Baſe.		Perpendicular.
1ſt	Angle	86°	Riſe	1.2	Sink	17·9
2d	——	79	—	3·4	—	17·7
3d	——	72	—	5.6	—	17.1
4th	——	65	—	7.6	—	16.3
5th	——	58	—	9 5	—	15·3
6th	——	51	—	11.3	—	14.0
7th	——	45	—	12.7	—	12.7
8th	——	39	—	14.0	—	11.3
9th	——	32	—	15·3	—	9·5
10th	——	25	—	16.3	—	7.6
11th	——	18	—	17.1	—	5.6
12th	——	11	—	17·7	—	3·4
13th	——	4	—	17·9	—	1.2

2d Quadrant.

	Diviſion.			Baſe.		Perpendicular.
1ſt	Angle	4°	Riſe	17.9	Riſe	1.2
2d	——	11	—	17.7	—	3·4
3d	——	18	—	17.1	—	5.6
4th	——	25	—	16.3	—	7.6
5th	——	32	—	15·3	—	9·5
6th	——	39	—	14.0	—	11.3
7th	——	45	—	12.7	—	12.7
8th	——	51	—	11.3	—	14.0
9th	——	58	—	9·5	—	15·3
10th	——	65	—	7.6	—	16.3
11th	——	72	—	5.6	—	17.1
12th	——	79	—	3·4	—	17·7
13th	——	86	—	1.2	—	17·9

3d Quadrant.

	Diviſion.			Baſe.		Perpendicular.
1ſt	Angle	86°	Sink	1.2	Riſe	17·9
2d	——	79	—	3·4	—	17·7
3d	——	72	—	5.6	—	17.1
4th	——	65	—	7.6	—	16.3
5th	——	58	—	9·5	—	15·3
6th	——	51	—	11.3	—	14.0
7th	——	45	—	12.7	—	12.7
8th	——	39	—	14.0	—	11.3
9th	——	32	—	15·3	—	9·5
10th	——	25	—	16.3	—	7.6
11th	——	18	—	17.1	—	5.6
12th	——	11	—	17·7	—	3·4
13th	——	4	—	17·9	—	1.2

4th Quadrant.

	Diviſion.			Baſe.		Perpendicular.
1ſt	Angle	4°	Sink	17.9	Sink	1.2
2d	——	11	—	17.7	—	3 4
3d	——	18	—	17.1	—	5.6
4th	——	25	—	16.3	—	7.6
5th	——	32	—	15·3	—	9·5
6th	——	39	—	14.0	—	11.3
7th	——	45	—	12.7	—	12.7
8th	——	51	—	11,3	—	14.0
9th	——	58	—	9·5	—	15·3
10th	——	65	—	7.6	—	16.3
11th	——	72°	Sink	5.6	Sink	17.1
12th	——	79	—	3·4	—	17·7
13th	——	86	—	1.2	—	17·9

which compleats the circle.

In the above calculation, the word *riſe* is uſed when the rim of the wheel is to recede from the centre, and the word *ſink*, when it is to approach it. In the firſt quadrant of the circle, or polygon, as the point is taken from the right-hand, the frame muſt be moved by the horizontal wheel towards the right. Had the frame been ſtationary, and the tracer required to move, the motion would, of courſe, have been inverted. The riſing motion is, therefore, given to the horizontal wheel, until the frame has come into contact with the other end of the ſemidiameter, at the laſt diviſion of the ſecond quadrant.

In the ſame way, the vertical wheel muſt ſink the frame to raiſe the tracer; and this is done during the firſt quadrant, when it has arrived at what may be called the vertex. It then riſes for a whole ſemi-circle to the laſt diviſion of the third quadrant, when it again ſinks to compleat the circle. The angles of all the quadrants are the ſame, but alternately inverted. Their application to the dividing and cutting engine is taken from table I. By ſimilar means, a circle of any radius or diameter may be deſcribed, and conſequently any arc or curve of a circle. The whole of each wheel, in the inſtance given, muſt be divided into 52 equal parts, both for the horizontal and vertical motion. It will ſeldom be neceſſary to form curved lines, which are not portions of circles, where mere ornament is to be conſulted; but if it ſhould, it is evident that the ellipſe, the parabola, and the hyperbola, may be reduced to a ſeries of triangles in the ſame way as the circle, and the wheels cut accordingly, to form any of theſe geometrical figures, or any portion of either.

A few examples of the application of this kind of machinery, to produce various kinds of figures, compoſed of ſtraight, or curved lines, or of a combination of both, may ſerve further to illuſtrate the ſubject; and for theſe the reader will be pleaſed to conſult *Plate* VII.

When ſuch curves only as will produce a pleaſing effect to the eye are required, they may, almoſt always, be approximated very nearly to arcs of circles of various radii, as in the example, *fig.* 21. The three leaves of this flower conſiſt entirely of arcs of circles, the centres of which are pointed out by the letters of reference; and the angles ſubtending the arcs are repreſented by dotted lines. The middle leaf of the flower, it will appear, is formed by four circular curves, the centres of which are reſpectively at A, B, C, and D. In the ſame way, five curves, whoſe centres are at H, I, B, K, and L, form the left hand leaf; and three curves centered at G, E, and F, the right-hand leaf; the whole flower containing 12 curves.

It may now be proper to inveſtigate the conſtruction of two wheels, adapted to form this flower, the means of reducing it to the tables, and applying the cutter.

Let the tracing of the lines be commenced with the middle leaf, beginning at 5. The firſt arc will then be from 5 to 4, the centre of which is at A. By a common diagonal ſcale of 400 parts to the inch, the radius, from A to 5, meaſures about 334 of theſe parts, aud the diameter, of courſe, 668. This number, divided by 12.5, will reduce the meaſure to 32d parts, to adapt it for the engine. This will be found to be 53.44, and the fraction may be omitted, ſo that 53 will be the meaſure of the diameter of the arc. By table II., the neareſt approximation to this is 52, and the circumference of the whole circle 165. The arc meaſures 78°,

namely,

namely, 25° from 5 to a horizontal line drawn through the centre A, and 53° from the ſame line to 4. Therefore, as 360° : 165 :: 78° : 35,75 being the number of polygonic ſides contained in the arc. This, by the neareſt integral number, may be taken at 36 ſides. By table III. the neareſt number for the whole circle is 164; and as the arc contains 78°, or 36 of theſe ſides, the angle at the commencement, 25° under the horizontal line will be found by the following proportion. As 78° : 36 :: 25° : 11.5384, or, in even numbers, 12. The ſides under the horizontal line are therefore nearly 12, and thoſe above will be 24, to compleat 36. For the firſt ſide therefore, take from table II. the 12th angle oppoſite to 164; then the 11th, and ſo on, until you have got to the 1ſt angle, which is the neareſt to the horizontal line. This gives the meaſure and angles of the 12 ſides below. Taking the ſame angles from 1 to 24 incluſive, and beginning at 1, will give the 24 ſides above, and theſe compleat the arc. This arc will then ſtand thus:

		Horizontal.		Perpendicular.
1ſt	Angle below 65°	Riſe 7.6	Sink	16.3
2d	—— 67	— 7.0	—	16.6
3d	—— 69	— 6.5	—	16.8
4th	—— 71	— 5.9	—	17.0
5th	—— 74	— 5.0	—	17.3
6th	—— 76	— 4.4	—	17.5
7th	—— 78	— 3.8	—	17.6
8th	—— 80	— 3.1	—	17.7
9th	—— 83	— 2.2	—	17.9
10th	—— 85	— 1.5	—	17.9
11th	—— 87	— 0.9	—	17.9
12th	—— 89	— 0.3	—	18.0
		Horizontal.		Perpendicular.
1ſt	Angle above 89°	Sink 0.3	Sink	18.0
2d	—— 87	— 0.9	—	17.9
3d	—— 85	— 1.5	—	17.9
4th	—— 83	— 2.2	—	17.9
5th	—— 80	— 3.1	—	17.7
6th	—— 78	— 3.8	—	17.6
7th	—— 76	— 4.4	—	17.5
8th	—— 74	— 5.0	—	17.3
9th	—— 71	— 5.9	—	17.0
10th	—— 69	— 6.5	—	16.8
11th	—— 67	— 7.0	—	16.6
12th	—— 65	— 7.6	—	16.3
13th	—— 62	— 8.4	—	15.9
14th	—— 60	— 9.0	—	15.6
15th	—— 58	— 9.5	—	15.3
16th	—— 56	— 10.1	—	14.9
17th	—— 53	— 10.8	—	14.4
18th	—— 51	— 11.3	—	14.0
19th	—— 49	— 11.8	—	13.6
20th	—— 47	— 12.3	—	13.2
21ſt	—— 45	— 12.7	—	12.7
22d	—— 43	— 13.2	—	12.3
23d	—— 41	— 13.6	—	11.8
24th	—— 39	— 14.0	—	11.3

The firſt arc being compleated, we proceed to trace the 2d from 4 to 3, containing an angle of 76°; *viz.* 48° below and 28° above the horizontal line, drawn through the centre B. This arc being of the ſame radius as the former, the number of polygonic ſides in the whole circle will alſo be 164; and as the arc contains 76°, the ſides contained in it may be taken at 35. Of theſe, 22 will be included in the 48 degrees below the horizontal line, and 13 in the 28° above. As formerly, therefore, commence with the 22d column, and proceed ſucceſſively to the firſt, for the 22 angles below, and then, beginning again at the 1ſt, go on to the 13th for the angles above. The angles will then be 43, 45, 47, 49, 51, 53, 56, 58, 60, 62, 65, 67, 69, 71, 74, 76, 78, 80, 83, 85, 87, 89 degrees below; and 89, 87, 85, 83, 80, 78, 76, 74, 71, 69, 67, 65, 62 degrees above, which compleats the arc. The numbers for cutting may then be taken, as before, from table I. The arc, from 3 to 1, whoſe centre is at C, may next be calculated in the ſame manner, and that, from 1 to 2, whoſe centre is at D, which compleats the middle leaf.

The arcs of the whole flower, and their reſpective centres and angles, are as follow.

Arc.		Centre.	Diameter in 32d Parts.	Circumfer. in 32d Parts.	Angles below.	Angles above.	Whole Angles.	Polyg. Sides in the Circle.	Polyg. Sides in the Arc.	Sides below.	Sides above.	Complement. Angle.	1ſt Angle.
Middle Leaf.	5 to 4	A	53	165	25°	53°	78°	164	36	12	24		65°
	4 — 3	B	53	165	48	28	76	164	35	22	13		43
	3 — 1	C	32	102	69	33	102	100	28	19	9		59
	1 — 2	D	64	203	66	51	117	204	65	36	29		27
Left-hand Leaf.	9 — 10	H	60	190	0	47	47	188	24	0	24	52°	39
	10 — 11	I	60	190	90	85	175	188	91	47	44		1
	11 — 12	B	53	165	53	68	91	164	42	25	17		53
	12 — 13	K	56	178	0	55	55	176	27	0	27	19	18
	13 — 14	L	48	152	63	0	63	152	34	34	0	6	33
Right-hand Leaf.	5 — 8	G	60	190	6	180	186	188	97	3	94	6	85
	7 — 6	E	44	140	0	109	109	140	42	0	42	36	36
	6 — 5	F	44	140	75	0	75	140	29	29	0	22	68

The

The whole number of ſides contained in the 12 arcs, of which the flower conſiſts, will be found by adding the numbers in the 9th column, containing the polygonic ſides in each arc, to amount to 550. This, therefore, is the number of equal parts into which each wheel is to be divided, previous to the cutting. If the machine will contain wheels of ſufficient diameters, all this will be moſt eaſily effected by two wheels; but when circumſtances do not admit of this, two or more wheels may be uſed for each of the motions; each of theſe wheels forming a certain portion of the figure by its revolution. In this caſe, the machinery communicating the motion from the wheels to the body which is to be acted upon, muſt be ſo conſtructed, as to be ſpeedily and eaſily moved from one wheel, and placed in contact with the others ſucceſſively. This may be effected by a dextrous engineer in a great variety of ways, and the ſuperiority of any one plan over others, muſt depend ſo much upon particular circumſtances, ariſing both from the conſtruction of the machine, and from the ſpecial purpoſe for which it is deſigned, that it would be equally difficult and fruitleſs here, to ſpecify preciſe modes of doing this.

In the 4th, 8th, 9th, 10th, 11th, and 12th arcs laid down in the preceding calculation, no part of the arc croſſes a horizontal line drawn through the centre, the whole being either above or below. As the table, No. 3, is calculated for a whole quadrant, it is, in this caſe, proper to meaſure the complementary angle between the horizontal line, and the line which ſubtends the arc, and to calculate the number of polygonic ſides contained both in it and in the arc. The number in the complementary angle is then the diſtance of the commencement of the arc from the horizontal line, and, of courſe, ſhews by the table the firſt angle of the arc. When an arc approaches towards the horizontal line, the ſucceeding angles muſt be taken from right to left, and when it recedes from it, from left to right.

When the arc does not croſs the horizontal line, the complementary angles will be found in the 12th column.

In the machinery conſtructed for the purpoſe of tambouring, upon theſe principles, the figures were moſt frequently ſmall, and the rows placed diagonally, ſo as to form a kind of diamond. A ſpecimen of this application of the wheels will be found in *fig.* 22. In this figure, eight flowers, exactly ſimilar to each other, are repreſented; excepting only, that the two flowers in the ſecond, or middle row, are inclined in a contrary direction to thoſe in the firſt and third rows; that is to ſay, that where the one row points towards the right hand, the next points towards the left; and the ſame is the caſe in every alternate row, however numerous they may be. It is unneceſſary to enter much into detail about the means of effecting this, for the whole difference is comprehended in the horizontal motion, and the calculation of both flowers is exactly the ſame. In cutting the wheels, it is only neceſſary to reverſe the motion of the ſcrew which regulates the cutter, and to ſubſtitute the word *riſe*, for *ſink*, and *vice verſâ*, according to the explanation already given. The mode of placing every row between that next to it, is effected alſo by the horizontal wheel. One row is included in the circumference of the ſemi-diameter of the wheel, and the circumference of the other ſemi-diameter is reduced as much nigher to the centre, as the diſtance of one of the vertical lines in the plate is from the next line.

Another plan was ſometimes uſed. The wheels were cut exactly of the ſame comparative diameters, and the centering or boſoming of the alternate rows was produced, by uſing two intermediate friction-wheels between the moving-wheels and frame acted upon. This was found very correct, for the two friction-wheels which were alternately uſed, each being employed for its reſpective row, were turned of different diameters. But as time was loſt in engaging the one and diſengaging the other at every row, the former plan was at laſt preferred and adopted.

The formation, therefore, of one flower includes that of all the reſt; for the formation of the remaining figures is effected merely by the diſpoſition of a greater number of points or tracers. In the inſtance for which theſe experiments and calculations were firſt made, a row of needles, or rather hooks, were placed in a frame in a horizontal poſition, and the cloth being ſtretched vertically oppoſite to their reſpective points, was ſhifted by the agency of the two wheels. Behind was another horizontal apparatus, for ſupplying the threads neceſſary to the operation. When it was neceſſary, therefore, to ſhift, it was found eaſier to ſhift the vertical frame containing the cloth, than the frames both before and behind. When ſimilar machinery is employed to move a ſingle point, or tracer, it is perhaps better to communicate the motion to the point, and to leave the ſurface acted on ſtationary.

In the middle figure of the uppermoſt line, the angles are drawn to the centres, as in *fig.* 21. They conſiſt of four arcs, or ſegments of circles, as follow:

Arc 1 to 2	Centre	*b*	Diameter	$\frac{20}{3\frac{1}{2}}$	Arc	95°
3 to 4	- -	*a*	- -	$\frac{20}{3\frac{1}{2}}$	-	225
5 to 6	- -	*d*	- -	$\frac{16}{3\frac{1}{2}}$	-	56
7 to 5	- -	*c*	- -	$\frac{16}{3\frac{1}{2}}$	-	90

The dotted lines drawn upon the figure, ſerve both to aſcertain the reſpective diſtances of the flowers, to ſhew the angles ſubtending the arcs, and alſo the complementary angles.

The angle *b a d* ſubtends the arc 1 to 4, which contains 225°.

The angle 2 *b* 1, the arc 1 to 2 of 95°
The angle 5 *c* 6, the arc 5—6 of 56
The angle *a d* 5, the arc 7—5 of 90

Two ſmall arcs remain to join the points of the leaves. They may be taken as ſemicircles, the diameters of which are each $\frac{8}{3\frac{1}{2}}$. The firſt upon the upper leaf commences at 45°; the ſecond on the lower leaf at 0°. Each, of courſe, is 180°, or two quadrants. Every other part neceſſary will be found by meaſurement, or by referenee to the tables, as in the former caſe, and thus any figure may be produced.

In *figs.* 23 and 24, are given ſpecimens of the application of theſe wheels to produce *writing*, as in the automata, which are exhibited as matters of curioſity. The firſt requires only two wheels; the ſecond three wheels, for the purpoſe of making the faint and bold lines. In theſe, the tracer, reſembling that conducted by the human hand, may either be ſuppoſed to move, and the tablet to be ſtationary and horizontal, as in common writing, or the table perpendicular and the pen horizontal.

It is not within the compaſs of this deſcription to enter into any examination of the proportions of the various letters of the alphabet, as uſed in that kind of hand-writing moſt approved in Britain. This belongs more properly to the analyſis of the art of penmanſhip, than to an eſſay or treatiſe on the production of diverſified motion by the agency of machinery. In general, however, it may be proper, ſhortly, to explain how the letters given as ſpecimens are conſtructed, and their application to the moving wheels, without at all entering into any diſcuſſion whether theſe are proper forms; for, from the very nature of the machinery, and the deſcriptions already given, it will be evident, that any other form might be produced with equal eaſe, and that Hebrew, Greek, or Arabic characters may be effected as well as thoſe uſed in Britain. The conſtruction of the letter O is as follows; and this alſo comprehends part of the letters *a*, *c*, *d*, *e*, *g*, and *q*. The letter O is repreſented by an ellipſe, the greater diameter of which is an inch, or in the

the integers formerly uſed, 32. The leſſer diameter has been taken at 18.4. The inclination of the greater diameter paſſing through the foci, has been placed at an angle of 65° with the baſe line.

Theſe being premiſed, it becomes neceſſary to calculate the triangles which will form a near approximation to the curvature of an ellipſe of this deſcription, and of the angle of obliquity formed by the hypothenuſe of each triangle with the baſe line. In order to this, nine triangles have been conſtructed, forming a kind of polygon of 36 ſides. The lengths, reſpectively, of nine portions, both of the greater and leſſer ſemidiameters of the ellipſe, have alſo been calculated, and from theſe, the angles of obliquity formed by each ſucceſſive hypothenuſe with the baſe lines, have been trigonometrically aſcertained, as alſo the lengths of the reſpective hypothenuſes, and, of conſequence, of very near approximation to the circumferential curve of the ellipſe.

The manner in which theſe calculations have been done is as follows:

Let the half of the greater diameter = 16
And the half of the leſſer = 9.2

As the ellipſe is conſtructed by ſetting off lines upon both diameters, let theſe be done at every 10°, and drawing lines through the points thus found, a ſeries of nine triangles will be formed in each quarter of the ellipſe, the baſes and perpendiculars of which will be reſpectively as follow, (32d parts being ſtill conſidered as integers, and the fractions as decimals.) The greater ſemidiameter is here conſidered as the perpendicular, and the leſſer as the baſe.

Triangle.	Baſe.	Perpendicular.	Hypoth.	Acute angle with the baſe line.
1	.14375	2.80	2.804	87°
2	.4025	2.65	2.693	81
3	.69	2.55	2.64	75
4	.92	2.3	2.48	68
5	1.12125	1.95	2.3	58
6	1.3225	1.6	2.081	50
7	1.46625	1.2	1.907	39
8	1.52375	.7	1.656	25
9	1.61	.25	1.598	9
Total	9.2	16.00	20.159	

Fig. 17*. *Plate* V. is a quarter of an ellipſe of theſe proportions. The ſcale is five times the ſize of that calculated upon, integers being there taken as 8th parts, inſtead of 32d parts. The line A B is the leſſer diameter or baſe line, B C the greater diameter, and the lines from A to C the hypothenuſes of the triangles which form the approximation to the elliptic curve.

From theſe reſults it will appear, that the quarter of the elliptic curve meaſures 20.159 in 32d parts. But as there are only nine triangles in the polygonic figure, in each quarter, it has been thought beſt to allow 21 ſides for the quarter, or 84 for the ellipſe. Dividing therefore the quarter into 21 parts, the following diviſion of the angles will be very near the truth. Were nearer approximation, however, neceſſary, the calculation might be brought ſtill nigher by ſetting off the ſemidiameters in 21 diviſions by the line of ſines, and calculating each upon the preceding plan.

1ſt	Side	Angle with baſe line	89°
2d	do.		87
3d	do.		85
4th	do.		83
5th	do.		80
6th	do.		77
7th	do.		74
8th	Side	Angle with baſe line	72°
9th	do.		70
10th	do.		65
11th	do.		60
12th	do.		56
13th	do.		52
14th	do.		50
15th	do.		45
16th	do.		37
17th	do.		30
18th	do.		25
19th	do.		17
20th	do.		9
21ſt	do.		4

Thus the calculation would ſtand, were the ellipſe placed upright, and the leſſer diameter the ſame with the baſe line. But as it is aſſumed that the ellipſe muſt be inclined until the greater diameter will form an angle of 65° with the baſe, the complement of that angle, or 25°, muſt be ſubtracted from each of the angles. The 18th angle will then be 0°; the 19th, 8°, under the baſe; the 20th, 16°; and the 21ſt, 21°. The angles being thus found, the firſt table will give the rules for cutting as uſual.

The only other example relating to penmanſhip, or the conſtruction of writing automata, which it appears neceſſary or proper to trouble the readers of this article with, is the letter *i*; for the curvilinear part of this ſeems, in combination with the *o*, to form almoſt every letter of the manuſcript alphabet; *a*, *d*, *m*, *n*, and moſt others will be found very ſimilar, and a practical way of conſtructing the reſt will afterwards be inveſtigated. Of a great part of theſe letters, much is compoſed of ſtraight lines of different lengths; but all, by the aſſumption, form angles of 65° with the baſe, and of courſe all the ſtraight lines, or ſtraight parts of lines, muſt be cut to that angle, the only difference being their reſpective lengths, which may eaſily be meaſured. It only remains, therefore, to calculate the curvilinear parts, which are all ſimilar, and therefore one calculation will anſwer for the whole. In the word *man*, which has been taken for an example, the curves at the top and bottom of the letters *m* and *n* are preciſely the ſame; the remaining parts of theſe letters are rectilinear. The ſame is the caſe with that part of the letter *a*, which is formed by adding an *i* to the elliptical part, or *o*. The oblique lines, being equal to the larger diameter of the ellipſe, are alſo expreſſed by 32. The dotted lines, which bound and interſect the writing acroſs the plate, will ſerve to ſhew how the centres of the circular arcs which form the curves have been taken: theſe lines are diſtinguiſhed by the numbers 1, 2, 3, 4, and 5. The rectilinear oblique lines are placed between the croſs lines 2 and 4. The curves conſiſt of two arcs; the arc, *c d*, being a ſemicircle of a ſmall diameter, the centre of which is at *f*. The dotted line, *c f d*, is the diameter, and is parallel to the leſſer diameter of the ellipſe. The remaining curve, *d e*, is a ſmall arc of a large circle, the centre of which is at *g*. The arc, *h i*, is taken from the centre *k*. All the other ſimilar arcs are taken with equal radii from points in the parallel ſtraight lines at the top and bottom of the figure. It ſeems unneceſſary to repeat in detail the particular angles which form theſe arcs, for they will be found preciſely in the ſame way as the arcs formerly deſcribed.

From the above it is evident, that motion in the ſame plane may be diverſified to unlimited extent, by the joint application of two forces; and it has been the object of theſe deſcriptions to point out means of effecting this with great preciſion. The addition of a third power, acting in a line at right angles to this plane, renders the diverſity of motion

motion abſolutely unlimited, and is merely an extenſion of the former principle.

Application of Three Forces.

As already ſhewn, the application of two forces, if uniform, will produce the diagonal of a ſquare or parallelogram. If three are applied in the directions of the three planes of a cube, the dotted line A B in the tranſparent cube, (*fig.* 12. *Plate* V.) will be produced, provided all the moving powers act with equal velocity upon the body moved. The firſt force acting in the direction of the line A B, and the ſecond in that of the line B C, would produce a motion from A to C, but by the addition of the third power, moving in the direction of the perſpective line C E, at right angles to the two former, the body again diverges from the line produced by the two firſt powers, and will arrive at E.

Three wheels, which produce motion in theſe different ſtraight lines, muſt therefore effect every poſſible direction of motion, and the third wheel is to be cut preciſely upon the ſame principles as the former two.

As the writing and drawing automata are entirely machines conſtructed upon principles ſimilar to the foregoing, a ſhort account of the nature of a plan by which ſuch a machine may be made, may both ſerve to illuſtrate this, and to direct the attention of mechanics, who have hitherto confined the application of their talents to the planning and conſtruction of uniform and rotatory motion, to a ſubject ſuſceptible of endleſs variety, and which may ſurely be beneficially applied to many uſeful and elegant purpoſes of arts and manufactures.

As this is merely an illuſtration of a general principle, invented and drawn by the author of this article for the purpoſe, it may, and probably will, not be found to correſpond with thoſe conſtructed by others; but if the general principle is aſcertained to be correct, it will be of ſervice in demonſtrating to ingenious mechanics how ſuch operations may be performed. Three motions being neceſſary to produce the effect required, let the ſpectator be ſuppoſed to be placed immediately behind the automaton which is to write or draw a certain given figure, by the agency of three wheels, ſuch as thoſe already deſcribed. The automaton will be conſidered as a mere piece of framing, ſhaped in the outſide to repreſent a human figure. The moved parts are his right arm, above and below the joint at the elbow, the part from the elbow to the points of the fingers being ſolid, and the pen, or pencil, with which he writes, ſcrewed or fitted into the hand. Before him let there be a cubical box, repreſenting the table upon which he writes, and fitted to contain the machinery by which the right arm is to be moved. The ſeat, body, head, and left arm, may alſo be conſidered as hollow framing, within which the motion may be communicated. The tablet being placed horizontally before him upon the box or table, the motions required will be as follow: The tracing of the lines upon the tablet will be effected by the combination of two motions at right angles to each other, and theſe may be given by conſtructing within that part which repreſents the ſhoulder of the figure, an apparatus reſembling what is called by mechanics a *univerſal joint*. The third motion at right angles to the plane of the tablet, will ſerve to elevate or depreſs the point of the pen or pencil, in order to produce bold or faint lines, as may be requiſite, and to lift the pencil entirely from the tablet when a blank or ſpace is to be left, or when the hand of the automaton is to be ſhifted from one place to another. The direction of the firſt force may be ſuppoſed to be ſuch as would produce a motion from the top to the bottom of the tablet or paper, as theſe words are generally underſtood when applied to writings or books. The ſecond motion ought to give a direction from left to right, which will be, of courſe, at right angles to the former, and both may be reverſed at pleaſure by the ſhape of the wheels. The third motion will lift the hand and pencil from the tablet, to produce the bold and faint lines, and to diſengage it when neceſſary.

Figs. 25 and 26. *Plate* VII. are repreſentations of ſuch a figure. *Fig.* 25, is an elevation of the automaton, as ſeen behind, and the moving and moved parts are as follow. The framing is repreſented by the figure diſtinguiſhed by the letters A, A, A, A. The firſt motion from the top to the bottom of the tablet is effected by the wheel, B, revolving upon the axis G. This wheel gives motion to the lever, E, reſting againſt the wheel upon a level with the centre, and neareſt to the ſpectator's eye. When the axis revolves upon its centre, the wheel, by communicating motion to the lever E, which is connected by a joint with the ſmall horizontal axis fitted in the frame H, continues the motion to the lever F, repreſenting the bone of a human arm from the ſhoulder to the elbow. This again gives motion to the lever, which repreſents the bones below the elbow, and conſequently to the pencil by which the writing is made. Thus the firſt motion, from top to bottom, is produced. The ſecond motion, from left to right, is done by the wheel, C, upon the ſame axis. By the revolution of the axis, this wheel acts upon the lever, I, which moves the frame, H, and the lever, F, in the direction required. The lever, I, reſts upon the upper part of the circumference of the wheel, C. The third motion, for raiſing or ſinking the pencil, is derived from the wheel, D, which, acting upon the levers connected at the joint, K, move the perpendicular lever, L, connected with the part of the right arm below the elbow. This connection will be ſeen more plainly in *fig.* 26, which is a profile ſection of the ſame machine. The lever, L, is here connected with that which paſſes through the lower part of the arm, and which is marked by the letter M. The box which repreſents the table is diſtinguiſhed by N, and the ſeat by O, in both figures. The machinery thus conſtructed may be concealed by any covering which gives it the appearance of a human figure, as in the outline ſketch which ſurrounds it. The levers may be kept in contact with the wheels either by weights or ſprings, as may be found moſt convenient. The whole may be moved by a ſpring, as in a common watch or time-piece, and the velocity of the motion regulated by a balance-wheel, pendulum, or ſimilar mechanical agent. In theſe ſketches all that part of the machinery which is common to other rotatory movements, is omitted; and as it is merely meant to give the reader an idea of the general principle of the whole, is confined within the compaſs of the automaton. When a great number of movements is required, it is plain that many more wheels may be added, and for this there is ſufficient room within the boxes which repreſent the table and the ſeat. The joints which are diſtinguiſhed by the letters, H, I, and K, are only ſingle, to allow a motion from left to right, and *vice verſâ*; and the perpendicular levers paſs through a croſs bar P, with notches to ſerve as guides. Theſe guides confine the levers, I and K, in every direction. That which guides the lever, E, being ſo placed as to allow a motion at right angles to the others, muſt be conſtructed ſo as not to confine the motion of the lever from the front to the back of the machine, but to prevent the lever from diverging from the wheel. This is ſhewn at P, in both figures.

From the deſcriptions given, it is preſumed that readers, converſant with the ſtudy of the theory and practice of mechanics,

chanics, will be able to apply them to many purpoſes of ingenious and uſeful practice. This article ſhall therefore be concluded by a few miſcellaneous remarks.

For the many uſes to which this kind of machinery may be adapted, it will ſeldom be found convenient that levers, which are the moſt eaſy means of communicating motion in many inſtances, ſhould be of equal length at both ſides of the fulcrum. It will, therefore, be neceſſary to meaſure each end, and to calculate, by common proportion, the ratio by which to adapt the diviſions of the wheels to the length of each arm from the centre or fulcrum. The lever, E, (*fig.* 26.) is an inſtance of this, for as its length from the joint to the extremity is more than that of the lever, F, to which it gives motion, the diviſions of the wheel, D, muſt be deeper than the others in the proportion by which the lever, E, exceeds the lever F.

It will alſo be apparent, that when the frame, H, moves upon its joint, the end of the lever, E, will be elevated or depreſſed, and thrown off the horizontal radius of the wheel B. As the range of motion is ſuppoſed to be ſmall, this may be ſufficiently counteracted by the intervention of a friction wheel between the lever, and the wheel B, or by many other plans.

In conſtructing the joints, it will alſo be neceſſary to pay very minute attention, that they may be well fitted, for a very ſmall deviation ſo near to the centre, will produce a great aberration where the lever touches the wheel. This may be corrected by guides of that deſcription, which are generally called *bridles* by mechanics. All the machinery conſtructed, for the ſake of curioſity and exhibition, depend entirely upon the principles already laid down. In ſome inſtances, it may be found more convenient to have the wheels faced like contrat wheels, and the cutting in that direction. In this caſe, the engine, already deſcribed, will work with ſufficient accuracy, by placing the rim of the wheel under the centre of the cutter, and adding another ſcrew, wheel, and ſcroll below, to ſtop the cutter when at a ſufficient depth. Or, if the axis of the wheels can be placed horizontally with the rim which is to be cut upon the ſame level with the cutter, the effect will be the ſame.

For the many purpoſes to which this machinery may be adapted, it is impoſſible to give preciſe rules. Every practical engineer, or mechanic, will know, that much muſt depend upon the knowledge and experience of the director. The directions given are the reſults of much practical experience, and the ingenious mechanic may apply them according to his own judgment and diſcretion.

Diagonal *Scale*. See Plotting *Scale*, and Scale.

DIAGORAS, in *Biography*, a follower of Democritus, was a native of the iſland of Melos; and having been ſold as a captive in his youth, he was redeemed by Democritus, and trained up in the ſtudy of philoſophy. He alſo cultivated polite learning, and diſtinguiſhed himſelf in the art of lyric poetry. However, his entire rejection of religion incurred the reproach of ſome of his contemporaries, and has tranſmitted his name to poſterity with infamy: and though Clemens Alexandrinus, and others, have endeavoured to vindicate his character by alleging that his only intention was to ridicule heathen ſuperſtitions, yet the general voice of antiquity has charged him with being the advocate of atheiſtical principles. As he belonged to the ſchool of Democritus, in which no other principles in nature beſides atoms and a vacuum were admitted, it is eaſy to conceive that he would reject the whole doctrine of a deity, as inconſiſtent with the ſyſtem which he had embraced. Indeed, ancient writers expreſsly aſſert, that when he ſaw a perjured perſon eſcape puniſhment, he publicly avowed his diſbelief of Providence, and from that time he deſpiſed and ridiculed the gods, and all religious ceremonies. He proceeded ſo far as to lay open the ſacred myſteries, and to diſſuade the people from ſubmitting to the rites of initiation. By theſe inſults which he offered to religion, he excited the hatred of the Athenians; and when he refuſed to obey a ſummons to appear in the courts of judicature, they iſſued a decree, which was inſcribed on a brazen column, propoſing the reward of a talent to any one who ſhould kill him, or two talents to any one who ſhould bring him alive before the judges. This happened in the 91ſt olympiad, B. C. 416. From that time Diagoras became a fugitive in Attica, and at laſt fled to Corinth, where he died. It is ſaid, that being on board a ſhip during a ſtorm, the terrified ſailors began to accuſe themſelves for having received into their ſhip a man ſo infamous for his impiety; upon which Diagoras pointed out to them other veſſels, which were near them on the ſea in equal danger, and aſked them whether they thought that each of theſe ſhips alſo carried a Diagoras; and that afterwards, when a friend, in order to convince him that the gods are not indifferent to human affairs, deſired him to obſerve how many conſecrated tablets were hung up in the temples in grateful acknowledgment of the eſcapes from the dangers of the ſea, he ſaid, in reply, "True; but here are no tablets of thoſe who have ſuffered ſhipwreck, and periſhed in the ſea." Theſe tales, however, are ſuſpected to be mere inventions; for ſimilar ſtories have been told of Diogenes, the Cynic, and others. Brucker's Hiſt. of Philoſ. by Enfield, vol. i.

DIAGRAM, from διαγραφω, *I deſcribe*, in *Geometry*, &c. a ſcheme for the explanation, or demonſtration, of any figure, or the properties thereto belonging.

Diagram, in the *Ancient Greek Muſic*, preſented to the eye the whole extent of a ſyſtem; which the moderns expreſs by *Gamut*, *Scale*, *Compaſs*; which ſee.

DIAGRAMMA, in *Ichthyology*, a ſpecies of *Perca*, which ſee.

DIAGRYDIUM, in *Pharmacy*, is ſcammony prepared for medicinal uſe. Scammony is a very powerful draſtic purgative, which is ſeldom given by itſelf, but always divided by triture with ſugar, gum arabic, or other mild ſubſtances, or with the gentler purgatives. The preparations which went under the term diagrydium in the older Pharmacopœias, but are now diſuſed, conſiſted of ſcammony, not merely mixed by triture with other ſubſtances, but prepared with more pains.

The *Diagrydium Sulphuratum* conſiſts of ſcammony in fine powder ſpread thinly on a paper full of pin holes, and held over the vapour of burning ſulphur, with frequent ſtirring, to prevent the ſcammony from ſcorching or clotting together. It was ſuppoſed to be dulcified, and its operation on the human body to be rendered milder and ſafer by this expoſure to the ſulphureous acid vapour. This preparation is now totally diſuſed.

The *Diagrydium cum Liqueritia* is thus prepared, according to the Pharmacopœia Helvetica: Boil two ounces of liquorice-root with three pints of water, till about half a pint is conſumed: then rub in a mortar ſix ounces of ſcammony in fine powder, with this liquorice decoction, and pour off the milky liquor from the blackiſh ſediment which remains. Evaporate this liquor with a heat not exceeding that of boiling water, firſt to the conſiſtence of an extract, then dry it further, till it becomes hard and pulverulent.

By this preparation the ſcammony loſes much of its nauſeous taſte, and its acrimony, but retains a very powerful purgative quality, when in the doſe of from five to twenty grains,

grains, and the liquorice gives it an agreeable taſte, which children do not refuſe.

This preparation, or a ſimilar one, in which the watery emulſion of ſcammony is employed, might, as we believe, be often employed with advantage, in preference to the compound powders, in which the ſcammony is ſimply rubbed with other ingredients. It is, however, entirely diſuſed in this country.

DIAH, or DIAT, a name given by the Arabs to the puniſhment of retaliation. By the Mahometan law, a brother, or the next relation of a murdered perſon, ought to take part againſt the murderer, and demand his blood in reparation for that which he has ſhed. Before the time of Mahomet, the Arabs had a cuſtom of putting a freeman of their priſoners to death, in lieu of every ſlave they loſt in battle, and a man for every woman that was killed. But Mahomet regulated the laws of repriſal; directing in the Alcoran, by the diat, that a freeman ſhould be required for a freeman, and a ſlave for a ſlave. The Turks, probably in conſequence of this law, formerly maſſacred almoſt all their priſoners of war, but they now content themſelves with enſlaving and ſelling them.

DIAHEXAPLA, from διὰ and ἑξαπλόος *ſix fold*, among *Farriers*, a drink made for horſes, denominated from the ſix ingredients it conſiſts of, *viz.* birth-wort, gentian root, juniper-berries, bay-berries, myrrh, and ivory-ſhavings. It is eſteemed a good ſtomachic, and cures bites of venomous beaſts, colds, conſumptions, &c.

DIAION, in the *Ancient Writers of Medicine*, the name of a compoſition made into the form of troches, of which violet-flowers were one of the principal ingredients. The compoſition is deſcribed at large by Myrepſus.

DIAL, or SUN-DIAL, an inſtrument ſerving to meaſure time by means of the ſhadow of the ſun.

The word is formed from *dies*, day, becauſe indicating the hour of the day. See HOUR.

The ancients alſo call it ſciathericum, from its doing it by the ſhadow.

DIAL is more accurately defined a draught, or deſcription, of certain lines on a plane, or ſurface of a body given, ſo contrived as that the ſhadow of a ſtyle, or ray of the ſun paſſed through a hole therein, ſhall touch certain points at certain hours.

The antiquity of dials is beyond doubt. Some attribute their invention to Anaximander, or his diſciple Anaximenes Mileſius, who flouriſhed in the ſixth century, B. C.: and others to Thales. Vitruvius mentions one made by the ancient Chaldee hiſtorian Beroſus, on a reclining plane, almoſt parallel to the equinoctial. Ariſtarchus Samius invented the hemiſpherical dial. And there were at the ſame time ſome ſpherical ones, with a needle for a gnomon. The diſcus of Ariſtarchus was an horizontal dial, with its limb raiſed up all around to prevent the ſhadow ſtretching too far.

But it was late before the Romans became acquainted with dials. The firſt ſun-dial at Rome was ſet up by Papirius Curſor, the Roman general, about the year of the city 461, B. C. 293; before which time, ſays Pliny, there is no mention of any account of time but by the ſun's riſing and ſetting: this firſt dial was ſet up at or near the temple of Quirinus, but it was imperfect; about thirty years after, as Pliny informs us, on the authority of Varro, M. Valerius Meſſala being conſul, brought from Catania in Sicily another dial, which he ſet up on a pillar near the roſtrum; but for want of its being made for that latitude, it could not point out the hours with exactneſs. They, however, made uſe of it ninety-nine years; till the cenſor Marcius Philippus ſet up another more accurate, and conſtructed for the latitude of Rome, near that of Valerius, In that interval dials became common at Rome, as appears from a fragment of Plautus, preſerved by Aulus Gellius, It is an hungry paraſite that ſpeaks.

"Ut illum dii perdant, qui primus *horas* reperit,
Quique adeo primus hîc ſtatuit ſolarium,
Qui mihi comminuit miſero articulatim *diem!*
Nam me puero uterus hic erat ſolarium,
Multò omnium iſtorum optumum et veriſſimum,
Ubi iſte monebat eſſe, niſi cum nihil erat.
Nunc etiam quod eſt, non eſt, niſi ſoli lubet.
Itaque adeo jam oppletum eſt oppidum ſolariis,
Major pars populi aridi reptant fame."

However, as a ſun-dial did not ſerve in cloudy weather, Scipio Naſica, five years after, remedied this defect, by introducing a method of dividing the night as well as the day into hours, by means of a water-machine, or *clepſydra* (which ſee); called by Pliny an *horologium*.

But there ſeem to have been dials among the Jews much earlier than any of theſe. Witneſs the dial of Ahaz, who began to reign four hundred years before Alexander, and within twelve years of the building of Rome, 741 years B. C.: mentioned by Iſaiah, chap. xxxviii. ver. 8.

The ancient Bramins ſeem to have been acquainted with this inſtrument, and to have applied it to aſtronomical purpoſes. The Chineſe and Egyptians were alſo acquainted with it at a very early period. Learned men have generally aſcribed the invention of it to the Babylonians, from whom the Jews derived it before the time of Ahaz. Herodotus traces the knowledge of the art of dialling among the Greeks to the ſame ſource.

The diverſity of ſun-dials ariſes from the different ſituation of the planes, and the different figure of the ſurfaces whereon they are deſcribed; whence they become denominated equinoctial, horizontal, vertical, polar, direct, erect, declining, inclining, reclining, cylindrical, &c. For the general principles of their conſtruction, ſee DIALLING. See alſo *Gnomonic* PROJECTION.

Dials are ſometimes diſtinguiſhed into primary and ſecondary.

DIALS, *primary*, are thoſe either drawn on the plane of the horizon, called horizontal dials; or, perpendicular thereto, on the planes either of the meridian, or prime vertical, called vertical dials: to which number are alſo uſually added, thoſe drawn on the polar and equinoctial planes, though neither horizontal, nor vertical.

DIAL, *equinoctial*, is that deſcribed on an equinoctial plane, or a plane repreſenting that of the equinoctial.

A plane oblique to the horizon, either hangs over towards it, and makes an acute angle with the plane of the horizon, or it falls off backwards from it, and makes an obtuſe angle therewith. This latter is called a reclining plane; which, if it recline back at an angle equal to the complement of the latitude of the place, then it lies in the plane of the equinoctial; and a dial drawn thereon, is denominated an equinoctial dial.

Equinoctial dials are uſually diſtinguiſhed into upper, which look towards the zenith; and lower, which reſpect the nadir.

Now, as the ſun only illumines the upper ſurface of an equinoctial plane, while he is in our hemiſphere, or on the northern ſide of the equator, an upper equinoctial dial will only ſhew the hour, during the ſpring and ſummer ſeaſon.

And again, as the ſun only illumines the lower ſurface of an equinoctial plane, while he is in the ſouthern hemiſphere,

or on the other ſide of the equator; a lower equinoctial dial will only ſhew the hour in autumn and winter.

To have an equinoctial dial, therefore, that ſhall ſerve all the year round, the upper and lower muſt be joined together; that is, it muſt be drawn on each ſide of the plane.

And, ſince the ſun ſhines on one ſide or on the other of an equinoctial plane the whole day, ſuch a dial will ſhew all the hours of an artificial day.

To deſcribe an equinoctial DIAL *geometrically*.—The equinoctial is the firſt, eaſieſt, and moſt natural, of all dials; but the neceſſity of drawing it double, prevents its being much in uſe. However, as its ſtructure ſhews the reaſon of the other kinds, and as it even furniſhes a good mechanical method of drawing all the other kinds of dials, it ſhall be here laid down.

Firſt, then, to deſcribe an upper equinoctial dial: from a centre C (*Plate* I. *Dialling fig.* 4.) deſcribe a circle A B D E, and by two diameters A D, and B E, interſecting each other at right angles, divide it into quadrants A B, B D, D E, and E A. Subdivide each quadrant into ſix equal parts, by the right-lines C I, C II, C III, &c. which lines will be hour lines. Through the centre C drive a ſtyle, or pin, perpendicular to the plane A B D E.

The dial thus deſcribed being raiſed ſo as to be in the plane of the equator, the line C XII, in the plane of the meridian, and the point A looking towards the ſouth, the ſhadow of the ſtyle will ſhew the hours both of the forenoon and afternoon.

For horary circles include arcs of the equator of fifteen degrees each; conſequently, the plane A B D E being ſuppoſed in the plane of the equator, the horary circles will likewiſe include arcs of 15 degrees of the circle A B D E. Wherefore, ſince the angles XII C XI, XI C X, X C IX, &c. are each here ſuppoſed 15 degrees, the lines C XII, C XI, C X, C IX, &c. are interſections of horary circles with the plane of the equinoctial.

Again, ſince the ſtyle paſſing through the centre C repreſents the axis of the world; its diſtance from the centre of the earth being inconſiderable, and it being the common diameter of the horary circles, its ſhadow will cover the hour-line C XII, when the ſun is in the meridian, or circle of 12 o'clock; C XI, when in the circle of 11 o'clock; C X, when in the circle of 10 o'clock, &c.

Secondly, to deſcribe a lower equinoctial dial: the method is the ſame as that for the upper dial, already deſcribed; except that no hour-lines are to be drawn beyond that of ſix o'clock.

Thirdly, to deſcribe an univerſal equinoctial dial: join two metal, or ivory planes, A B C D, and C D E F, (*fig.* 5.) ſo as to be moveable at the joint. On the upper ſurface of the plane A B C D, deſcribe an upper equinoctial dial, and upon the lower a lower, as already directed; and through the centre I drive a ſtyle. In the plane D E F C cut a box, and put a magnetic needle G therein; fit on the ſame plane a braſs quadrant nicely graduated, and paſſing through a hole cut in the plane A B C D. Now, ſince this may be ſo placed, by means of the needle, as that the line I 12 ſhall be in the plane of the meridian; and, by means of the quadrant, may be ſo raiſed, as that the angle B C F ſhall be equal to the elevation of the equator; it will ſerve as a dial in any part of the world. When the ſun is in the equator, theſe dials can be of no uſe.

The beſt univerſal dial is that of Mr. Pardie, of which the following deſcription is given by Mr. Ferguſon. This dial conſiſts of three principal parts; the firſt is called the horizontal plane A (*fig.* 6.) becauſe in practice it muſt be parallel to the horizon; in this plane is fixed an upright pin, which enters into the edge of the ſecond part B D, called the meridional plane, which is made of two pieces, the loweſt whereof, B, is called the quadrant, becauſe it contains a quarter of a circle divided into 90 degrees; in which part, near B, the pin enters. The other piece is a ſemicircle D, adjuſted to the quadrant, and turning in it by a groove, for raiſing or depreſſing the diameter E F of the ſemicircle, which diameter is called the axis of the inſtrument. The third piece is a circle G, divided on both ſides into 24 equal parts, which are the hours. This circle is put on the meridional plane, ſo that the axis E F may be perpendicular to the circle; and the point C be the common centre of the circle, ſemi-circle, and quadrant. The ſtraight edge of the ſemicircle is chamfered on both ſides to a ſharp edge, which paſſes through the centre of the circle. On one ſide of the chamfered part, the firſt ſix months of the year are laid down, according to the ſun's declination for their reſpective days, and on the other ſide the laſt ſix months. And againſt the days on which the ſun enters the ſigns, there are ſtraight lines drawn upon the ſemicircle, with the characters of the ſigns marked upon them. There is a black line drawn along the middle of the upright edge of the quadrant, over which hangs a thread H, with its plummet I, for levelling the inſtrument. From the 23d of September to the 20th of March, the upper ſurface of the circle muſt touch both the centre C of the ſemicircle, and the line of ♈ and ♎; and from the 20th of March to the 23d of September, the lower ſurface of the circle muſt touch that centre and line. In order to find the time of the day by this dial, it muſt be ſet on a level place in ſun-ſhine, and adjuſted by the levelling ſcrews *k* and *l*, till the plumb-line hangs over the black line upon the edge of the quadrant, and parallel to the ſaid edge; then move the ſemicircle in the quadrant, till the line of ♈ and ♎ (where the circle touches) comes to the latitude of the place in the quadrant; and turn the whole meridional plane B D, with its circle G, upon the horizontal plane A, till the edge of the ſhadow of the circle falls preciſely on the day of the month in the ſemicircle; and then the meridional plane will be due north and ſouth, the axis E F will be parallel to the axis of the world, and will caſt a ſhadow upon the true time of the day, among the hours in the circle, which is now in the plane of the equinoctial. The upper ſurface of the circle will ſerve from the 20th of March to the 23d of September; and the lower for the reſt of the year.

The months and ſigns are laid down on the ſemicircle in the following method. Draw the right line A C B (*fig.* 7.) equal to the diameter of the ſemicircle A D B, and croſs it in the middle at right angles with a line E C D, equal in length to A D B; then E C will be the radius of the circle F C G, which is the ſame as that of the ſemicircle. Upon E, as a centre, deſcribe the circle F C G, on which ſet off the arcs C *b* and C *i*, each equal to $23\frac{1}{2}$ degrees, and graduate them accordingly, for the ſun's declination. Then, laying the edge of a ruler over the centre E, and alſo over the ſun's declination for every fifth day of each month, as found in tables of declination, mark the points on the diameter A B of the ſemicircle from *a* to *g*, which are cut by the ruler; and here place the days of the months, anſwering to the ſun's declination. Set one foot of the compaſſes in C, and extending the other to *a* or *g*, deſcribe the ſemicircle *a b c d e f g*; divide this into ſix equal parts, and through the points of diviſion draw right lines parallel to C D, for the beginning of the ſines (of which one-half are on one ſide of the ſemicircle, and the other half

on the other) and ſet the characters of the ſigns to their proper lines. Ferguſon's Lectures, &c. Lect. 10.

DIAL, *Horizontal*, is that deſcribed on a horizontal plane, or a plane parallel to the horizon.

Since the ſun may illuminate an horizontal plane at all times of the year, while he is above the horizon; an horizontal dial may ſhew all the hours of the artificial day throughout the year: ſo that a more perfect dial than this kind cannot be required.

To deſcribe an horizontal DIAL *geometrically*.—Draw a meridian line A B (*fig.* 8.) on the given immoveable plane; or aſſume it at pleaſure, on a moveable one. See MERIDIAN *line*.

From a point taken at pleaſure, as C, erect a perpendicular C D, and make the angle C A D equal to the elevation of the pole. In D make another angle C D E, equal likewiſe to the elevation of the pole, and draw the right line D E, meeting A B in E. Then make E B equal to E D, and from the centre B, with the radius E B, deſcribe a quadrant, E B F, which divide into ſix equal parts. Through E draw the right line G H, cutting A B at right angles. From the centre B, through the ſeveral ſubdiviſions of the quadrant E F, draw right lines B *a*, B *b*, B *c*, B *d*, B H, meeting the line G H, in the points *a*, *b*, *c*, *d*, H. From E, upon the right line E G, ſet off the intervals E *a*, E *b*, &c. *viz.* E *a*, from E to *e*, E *b*, from E to *f*, E *c* from E to *g*, &c. from the centre A deſcribe a little circle, and applying a little ruler to A, and the little points of diviſion *a*, *b*, *c*, *d*, H, and *e*, *f*, *g*, *h*, G, draw the lines A XI, A X, A IX, A VIII, A VII, and A I, A II, A III, A IV, A V. Through A draw a right line VI, VI, perpendicular to A B. Continue the right line A VII, beyond the little circle to VII, A VIII to VIII, A V to V, and A IV to IV. Round the whole ſcheme draw a ſquare, circle, or oval figure. And laſtly, in A fix an index, making an angle D A C, with the meridian A B, equal to the elevation of the pole; or in C erect a perpendicular ſtyle equal to C D; or at A E fix a triangular plate A D E perpendicular to the plane of the dial. In this caſe, the lines, A XI, A X, A IX, &c. are the hour-lines of the forenoon; and A I, A II, A III, &c. thoſe of the afternoon; and the ſhadows of any of the gnomons, or ſtyles abovementioned, at the ſeveral hours, will fall on the reſpective hour-lines.

To deſcribe an horizontal DIAL *trigonometrically*.—In large dials, where the utmoſt accuracy is required, geometrical lines are beſt ſet aſide; and in lieu thereof, the lines of the dial are to be determined by trigonometrical calculation. M. Clapies, in the Memoires de l'Academie Royal des Sciences, anno 1707, has done the world good ſervice in this reſpect; having rendered the calculation of the hour-lines, which before had been operoſe enough, exceedingly eaſy and expeditious: his canons, or analogies, we ſhall lay down under the reſpective kinds of dials. And, firſt, for an horizontal dial; the elevation of the pole of the place being given to find the angles which the hour-lines make with the meridian in the centre of the dial.

The analogy, or canon, is this: as the whole ſine or radius is to the ſine of the elevation of the pole of the place, ſo is the tangent of the ſun's diſtance from the meridian, for the hour required, to the tangent of the angle required: that is, as the ſide AC (*fig.* 9.) is to DC, ſo is the tangent of FDC to the tangent FC, of the angle FAC. See TANGENT, &c.

To deſcribe an horizontal DIAL *by the terreſtrial globe*.—Let a common globe of twelve inches diameter, upon which are uſually drawn twenty-four meridian ſemi-circles, be elevated to the latitude of any given place, and turned about until any one of theſe meridians cuts the horizon in the north point, where the hour of XII is ſuppoſed to be marked; the reſt of the meridians will cut the horizon at the reſpective diſtances of all the other hours from XII. Let theſe points of diſtance be marked on the horizon, the globe be removed, and a flat board or plate, even with the ſurface of the horizon, put into its place, then ſtraight lines drawn from the centre of the board to theſe points will be the hour-lines of an horizontal dial for that latitude; and the gnomon will be in the ſituation of the axis of the globe, or make an angle with the plane of the dial equal to the latitude of the place. If the globe be elevated to the complement of the latitude of the given place, and you proceed as above, you will have a direct ſouth dial: obſerving, that the gnomon makes an angle with the dial plane equal to the co-latitude of the place, and that the hours on the dial muſt be ſet the contrary way to that on the horizontal. If the globe has more than twenty-four meridian ſemi-circles, the proceſs is ſomewhat different. Elevate the pole to the latitude $51°\frac{1}{2}$ N. *e. gr.* of London, and bring the firſt meridian, or that of London on the Engliſh globe, to the north: ſet the hour-index to the uppermoſt XII on the horary circle; then turn the globe weſtward, till the index points ſucceſſively to I, II, III, IV, V, and VI in the afternoon; or until 15, 30, 45, 60, 75, and 90 degrees of the equator paſs under the brazen meridian; and the firſt meridian will mark the following degrees on the horizon from the north towards the eaſt, *viz.* $11\frac{2}{3}$, $24\frac{1}{4}$, $38\frac{1}{12}$, $53\frac{1}{2}$, $71\frac{1}{15}$, and 90; which are the reſpective diſtances of the above hours from XII on the plane of the horizon.

In order to transfer theſe and the reſt of the hours to an horizontal plane, draw the parallel right lines *a c* and *b d* (*fig* 10.) upon that plane, at a diſtance equal to the thickneſs of the gnomon; and the ſpace between them will be the meridian or twelve o'clock line of the dial. At right angles to this meridian, draw *g h*, and on *a* and *b* as centres, with the ſame radius of any length, deſcribe the quadrants *g e*, and *f h*, and graduate them. The centre of the plane C, and the centres of theſe quadrants *a* and *b* are at a little diſtance from each other, in order to enlarge the hour diſtances about noon. Lay a ruler on the centre *b*, and on the ſeveral diſtances already found, *viz.* $11\frac{2}{3}$, $24\frac{1}{4}$, &c. in the quadrant *f h*, and draw the reſpective afternoon hour-lines to I, II, &c. As the ſun riſes about four in the morning, on the longeſt days in London, continue the hour-lines of III and V in the afternoon through the centre *b* to the oppoſite ſide of the dial. Then lay the ruler on the centre *a*, through the ſame diſtances, reſpectively in the quadrant *e g*, draw the forenoon hour-lines of XI, X, &c. and as the ſun does not ſet before eight in the evening on the longeſt days, continue the hour-lines of VII and VIII through the centre *a*, to the other ſide. Through $51\frac{1}{2}$ degrees of either quadrant from its centre draw the right line *a g*, which will be the hypotheneuſe or axis of the gnomon *a g i*; and from *g* let fall a perpendicular to the meridian *a i*; and a plate ſimilar to the triangle *a g i*, ſet up between *a c* and *b d*, will have its hypothenuſe *a g* parallel to the axis of the world, when the dial is truly ſet, and will caſt a ſhadow on the hour of the day. A line of cords will ſuperſede the neceſſity of graduating the quadrants. An erect ſouth dial (*Plate* II. *fig.* 15.) is conſtructed in the ſame manner, obſerving the rule already given with reſpect to the elevation of the pole, and of the gnomon, and the poſition of the hours. Ferguſon's Lect. lect. 10.

To deſcribe an horizontal DIAL *mechanically, by the dialling ſcales*.—Draw a double meridian line *a b*, *c d*, (*fig.* 11.) on the horizontal plane, and croſs it at right angles by the ſix o'clock

o'clock line *f e*; take the latitude of the place with the compaſſes, in the ſcale of latitudes, and ſet that extent from *c* to *e*, and from *a* to *f*, on the ſix o'clock line; then taking the whole ſix hours between the points of the compaſſes in the ſcale of hours; with that extent ſet one foot in the point *e*, and let the other foot fall where it will upon the meridian line *c d*, and at *d*. Do the ſame from *f* to *b*, and draw the right lines *e d* and *f b*, each of which will be equal in length to the whole ſcale of hours. When this is done, ſet one foot of the compaſſes in the beginning of the ſcale at XII, and extending the other to each hour on the ſcale, lay off theſe extents from *d* to *e* for the afternoon hours, and from *b* to *f* for thoſe of the forenoon; and thus the lines *d e* and *b f* will be divided in the ſame manner as the hour ſcale is divided, at 1, 2, 3, 4, 5, and 6; on which the quarters may alſo be laid down, if required. Then, laying a ruler on the point *c*, draw the firſt five hours in the afternoon from that point through the dots at the numeral figures 1, 2, 3, 4, 5, on the line *d e*, and continue the lines of IIII and V through the centre *c* to the other ſide of the dial for the like hours of the morning; then lay the ruler on the point *a*, and draw the laſt five hours in the forenoon through the dots 5, 4, 3, 2, 1, on the line *f b*; and continue the hour-lines of VII and VIII through the centre *a*, to the other ſide, for the like hours of the evening; ſet the hours to the reſpective lines, and make the gnomon in the manner already directed for the horizontal dial.

An erect ſouth dial may be made by taking the co-latitude of the place from the ſcale of latitudes, and proceeding in all reſpects for the hour-lines, as in the horizontal dial; only reverſing the hours, as in *fig.* 15. and making the angle of the ſtyle's height equal to the co-latitude.

An horizontal dial may be eaſily deſcribed with only a line of cords, or a graduated quadrant of a circle. With any opening of the compaſſes, as Z L, (*fig.* 12.) deſcribe the two ſemicircles L F *k* and L Q *k*, on the centres Z and *z*, where the ſix o'clock hour line croſſes the double meridian line, and divide each ſemicircle into twelve equal parts, beginning at L; then connect the diviſions, which are equidiſtant from L, by the parallel lines K M, I N, H O, G P, and F Q. Draw V Z for the hypothenuſe of the ſtyle, making the angle V Z E equal to the latitude of the place; and continue the line V Z to R. Draw the line R *r* parallel to the ſix o'clock line, and ſet off the diſtance *a* K from Z to Y, the diſtance *b* I from Z to X, *c* H from Z to W, *d* G from *z* to T, and *e* F from Z to S. Then draw the lines S *s*, T *t*, W *w*, X *x*, and Y *y* each parallel to R *r*. Set off the diſtance *y* Y from *a* to 11, and from *f* to 1; the diſtance *x* X, from *b* to 10, and from *g* to 2; *w* W from *c* to 9, and from *h* to 3; *t* T from *d* to 8, and from *i* to 4; *s* S from *e* to 7, and from *n* to 5. Then laying a ruler to the centre *z*, draw the forenoon hour-lines through the points 11, 10, 9, 8, 7: and laying it to the centre *z*, draw the afternoon lines through the points 1, 2, 3, 4, 5; continuing the forenoon lines of VII and VIII through Z, to the oppoſite ſide of the dial, for the like afternoon hours; and the afternoon lines IIII and V through *z* for the like morning hours. Set the hours to the lines, and erect the ſtyle, and the dial is complete. A ſouth dial may be conſtructed in the ſame manner, by drawing the line V Z to make an angle with the meridian Z L equal to the co-latitude of the place, &c. reverſing the hours, as in *fig.* 15. Ferguſon ubi ſupra.

DIAL, *Vertical*, is that drawn on the plane of a vertical circle. See VERTICAL.

Of theſe there are ſeveral varieties according to the vertical pitched upon. The verticals chiefly uſed, are the prime vertical, and the meridian; from which reſpectively ariſe, ſouth, north, eaſt and weſt dials.

Dials which reſpect the cardinal points of the horizon, are particularly called direct dials. See DIRECT.

If any other vertical be choſen, the dial is ſaid to decline. Farther, if the circle, whoſe plane is uſed, be perpendicular to the horizon, as is ſuppoſed to be the caſe in all thoſe now mentioned, the dials are particularly denominated erect. *E. gr.* erect ſouth, erect north, &c.

Otherwiſe the plane, being obliqûe to the horizon, they are ſaid either to incline or recline.

DIAL, *South*, or, more particularly an *erect direct ſouth* DIAL, is that deſcribed on the ſurface of the prime vertical circle looking towards the ſouth.

Since the ſun then illumines the plane of the prime vertical looking to the ſouth, when, in its progreſs, he paſſes from the prime vertical to the meridian, or returns back, from this to that; in which he is employed ſix hours before, and ſix after noon; a ſouth dial ſhews the hours from ſix in the morning to ſix at night

DIAL, *To draw a vertical ſouth*.—On the plane of the prime vertical looking ſouthwards, draw a meridian line A B (*fig.* 13.) and taking the interval A C, at pleaſure, for the magnitude of the future dial, in C erect a perpendicular, of an indefinite length C D, and making an angle C A D equal to the elevation of the equator; draw a right line A D, meeting the perpendicular C D in D. Then in the point D make the angle C D E likewiſe equal to the elevation of the equator, and draw the right line D E cutting the meridian in E. Through E draw the right line G H, cutting the meridian A B at right angles. Take E B equal to E D, and with this radius deſcribe a quadrant E F. The reſt is performed as in an horizontal dial, except that the hours of the afternoon are to be written on the right hand, and thoſe of the forenoon on the left; as may be conceived from the figure. Laſtly, in the point A fix an oblique ſtyle, in an angle equal to the elevation of the equator; or in C erect a perpendicular ſtyle, equal to C D; or, laſtly, a triangular plate A D E, upon A E, ſo as to be perpendicular to the plane of the dial.

Then will the ſhadow of any of theſe indexes touch the ſeveral hour-lines, at their reſpective hours.

DIAL, *North*, or *erect direct north* DIAL, is that deſcribed on the ſurface of the prime vertical looking northward.

Since the ſun only illumines this ſurface while he advances from the eaſt to the prime vertical, and proceeds from the ſame vertical to the weſt; and ſince he is in the prime vertical at ſix o'clock in the morning, and at ſix in the evening; a north dial ſhews the hours before ſix in the morning, and thoſe after ſix in the evening. And hence, as in autumn and winter-time, the ſun does not riſe before ſix, and ſets before ſix in the evening, a north dial is of no uſe all that time; but this being joined with a ſouth dial, ſupplies the defects thereof.

DIAL, *To deſcribe a vertical north*. Draw a meridian line E B, (*Plate* II. *fig.* 14.) and from A deſcribe a little circle at pleaſure. At A make the angle D A C equal to the elevation of the equator, and from the point C, taken at pleaſure, erect a perpendicular C D, meeting A D in D. Make another angle, C D E, likewiſe equal to the elevation of the equator, and draw likewiſe a line D E, meeting A E in E; then take I B equal to E D, and through I draw G H; cutting A B at right angles; and from the centre B, with the radius I B, deſcribe a quadrant, which divide into ſix equal parts: through the two extreme diviſions draw lines from the centre B, *viz.* B *h*, and B G, meeting G H in *h* and G, and make I *d* equal to I *h*, and I H equal

to

to I G; then applying a ruler to A and *h*, and G, and again to A and *d*, and H, draw the right lines A V, A IV, A VII, and A VIII. Laſtly, in A fix an oblique index A D, making an angle D A E, with a meridian line in the plane of the meridian, equal to the elevation of the equator; or the perpendicular index in C, equal to C D; or, inſtead of an index, a triangular plate E D A, on the meridian line E A, perpendicular to the plane of the dial.

Then will A IV, A V, A VI, be the hours of the forenoon; and A VI, A VII, and A VIII, thoſe of the afternoon; and accordingly will be pointed out by the ſhadow of the ſeveral indexes. Or thus, in a ſouth dial (*fig.* 13.) if the hour lines IV and V, as alſo VII and VIII, be continued beyond the line VI A VI; and the triangle A D E turned about its pole A, till A E fall directly on A XII produced; it is evident, a north dial is hereby had, only obſerving what has been ſaid about writing the hours.

To draw a vertical north or *ſouth* DIAL *trigonometrically.*

Theſe only differ from the horizontal dial, in that the angle C A B is equal to the complement of the elevation of the pole of the place; ſo that the ſame analogy ſerves as for the horizontal one; only making the ſecond term the complement of the elevation of the pole of the place.

For the method of deſcribing this dial by a globe, and by *dialling ſcales*, ſee *Horizontal* DIAL.

DIAL, *Eaſt*, or *erect direct eaſt* DIAL, is that drawn on the plane of the meridian, looking to the eaſt.

Since the ſun only illumines the plane of the meridian looking eaſtward, before noon, an eaſt dial can only ſhew the hours till twelve o'clock.

DIAL, *To deſcribe an eaſt.* On the eaſtern ſide of the plane of the meridian draw a right line A B (*Plate* II. *fig.* 16.) parallel to the horizon, and to this join A K, making with it an angle K A B, equal to the elevation of the equator: then, with the radius D E, deſcribe a circle, and through the centre D draw E C perpendicular to A K, by which means the circle will be divided into four quadrants. Each of theſe quadrants ſubdivide into ſix equal parts. And from the centre D through the ſeveral diviſions draw the right lines D IV, D V, D VI, D VII, D VIII, D IX, D X, D XI. Laſtly, in D erect a ſtyle equal to the radius D E, perpendicular to the plane; or, on two little pieces perpendicularly fixed in E C, and equal to the ſame radius D E, fit an iron rod, parallel to E C.

Thus will each index at the ſeveral hours project a ſhadow to the reſpective hour-lines IV IV, V V, VI VI, &c.

DIAL, *Weſt*, or *erect direct weſt* DIAL, is that deſcribed on the weſtern ſide of the meridian.

As the ſun only illumines that ſide of the plane of the meridian looking to the weſt after noon, a weſt dial can only ſhew the hours from noon to night.

This, therefore, joined with an eaſt dial, ſhews all hours of the day.

DIAL, *To draw a weſt.* The conſtruction is perfectly the ſame as that of an eaſt dial, only that its ſituation is inverted, and the hours are written accordingly.

DIAL, *Polar*, is that deſcribed on a plane paſſing through the poles of the world, and the eaſt and weſt points of the horizon. It is of two kinds, the firſt looking up towards the zenith, and called upper; the latter down to the nadir, called lower.

The polar dial, therefore, is inclined to the horizon in an angle equal to the elevation of the pole.

Since the polar plane P O Q S (*fig.* 17.) paſſes through the eaſt and weſt points O and S, a quadrant of the equator is intercepted between it and the meridian; conſequently the upper ſurface is illumined by the ſun from ſix in the morning to ſix at night; and the lower from the ſun's riſe to ſix in the morning, and from ſix in the evening to ſun-ſet. A lower polar dial, therefore, ſhews the hour of the morning from ſun-riſe to ſix o'clock, and that of the evening, from ſix to ſun-ſet; and an upper, the hours from ſix in the morning to ſix in the evening.

DIAL, *To draw an upper polar.* Draw a right line A B (*fig.* 18.) parallel to the horizon; and if the plane be immoveable, find the meridian line C E. Divide C E into two equal parts, and through C draw a right line F G parallel to A B. Then from the centre D, with the interval D E, deſcribe a quadrant, which divide into ſix equal parts; and from the ſame centre D, through the ſeveral points of diviſion, draw right lines, D I, D II, D III, D IV, D V, and the intervals E I, E II, E III, E IV, E V, ſet off the contrary way, *viz.* E XI, X, IX, VIII, and VII. From the points V, IV, III, II, I, &c. raiſe perpendiculars meeting the line F G in the correſpondent points. Laſtly, in D erect a perpendicular ſtyle equal to D E, or on two equal pieces, E and C, fix a croſs iron rod.

Then will XII XII, I I, II II, III III, &c. be hour-lines, to be pointed out at the proper times by the ſhadow of the indices.

DIAL, *an upper polar*, only differs in ſituation, and the manner of writing the hours, from eaſt and weſt dials, joined together in the line of ſix o'clock.

DIAL, *a lower polar*, is had by putting out the hours of the forenoon, IX, X, and XI, and thoſe of the afternoon, I, II, and III, with the noon-hour XII, itſelf; and only leaving the hours VII and VIII of the morning, and IV and V in the evening.

To make three DIALS *on three different planes, ſo that they may all ſhew the time of the day by one gnomon.*—On the flat board A B C (*fig.* 19.) deſcribe an horizontal dial, with its gnomon, F G H, the edge of the ſhadow of which ſhews the time of the day. To this horizontal board join the upright board E D C, touching the edge G H of the gnomon: then making the top of the gnomon at G the centre of the vertical ſouth dial, deſcribe it on the board E D C. Beſides, on a circular plate I K deſcribe an equinoctial dial, and by a ſlit *c d* in the XII o'clock line, from the edge to the centre, put it on the gnomon F G, as far as the ſlit will admit. The ſame gnomon will ſhew the ſame hour on each of thoſe dials.

To draw all the primary DIALS *on the ſame block or poſt.*—1. Let the plane A B C D, (*fig.* 20.) in the proper poſition of the block, be ſuppoſed horizontal; and thereon deſcribe a horizontal dial. See *Horizontal* DIAL.

2. Draw the right lines E M and F L parallel to D C, which, accordingly, in the proper poſition of the block, will be parallel to the horizon: then let the plane B N M C make an angle with E M, equal to the elevation of the pole C M E; and thereon deſcribe an upper polar dial.

3. Let the oppoſite plane, A D E, make with E M an angle D E M, equal to the elevation of the equator; and on this draw an upper equinoctial dial.

4. Let the plane, K L H I, make with F L an angle H L F, equal to the elevation of the equator; and on this inſcribe a lower equinoctial dial.

5. Let the oppoſite plane, F G, make with F L an angle G F L, equal to the elevation of the pole; and here draw a lower polar dial.

6. Let the plane M N K L, and the oppoſite one E F, be perpendicular to F L; and on that draw a ſouth dial, and on this a north dial.

7. On the plane E M L F deſcribe a weſt dial; and on the oppoſite plane an eaſt dial.

If,

If, then, the block be ſo placed, as that the plane M N K L looks to the ſouth, and the plane of the meridian biſect it in the line of 12 o'clock in the horizontal dial A B C D, and ſouth dial M N K L, all the hours of the day will be indicated by ſeveral planes at once.

DIALS, *Secondary*, are all thoſe drawn on the planes of other circles, beſides the horizon, prime vertical, equinoctial, and polar circles; or thoſe which either decline, incline, recline, or deincline.

DIALS, *Declining*, are erect or vertical dials, which decline from any of the cardinal points; or they are ſuch as cut either the plane of the prime vertical, or of the horizon, at oblique angles.

The uſe of declining dials is very frequent; as the walls of houſes, whereon dials are uſually drawn, commonly deviate from the cardinal points.

Of declining dials there are ſeveral kinds, which are denominated from the cardinal points; which they ſeem moſt to reſpect, but from which they have a real declination: decliners from the ſouth and from the north, as a ſouth-eaſt decliner, a ſouth-weſt decliner, a north-eaſt decliner, and a north-weſt decliner, and even decliners from the zenith.

To draw a vertical declining DIAL *trigonometrically.*

1. The declination of the plane, and the elevation of the pole of the place, being given; to find the angle formed in the centre of the dial, by the meridian and ſubſtyle.

Canon. As the whole ſine is to the tangent of the complement of the height of the pole of the place G F (*fig.* 21.) ſo is the ſine of the angle of the declination of the plane G F D, to the tangent G D, of the angle required G A D.

2. The declination of the plane being given, and the elevation of the pole of the place, to find the angle formed in the centre of a vertical declining dial, by the ſubſtyle and axis.

Canon. As the whole ſine is to the ſine of the complement of the elevation of the pole G F; ſo is the ſine of the complement of the declination of the plane D G F, to the ſide D F, the ſine of the angle D A B required.

3. The declination of the plane, and the elevation of the pole, given; to find the difference of longitudes, that is, the arc of the equator, comprehended between the meridian of the place and the meridian of the plane.

Canon. As the whole ſine is to the ſine of the height of the pole of the place, ſo is the tangent of the complement of the declination of the plane, to the tangent of the complement of the difference of longitudes.

4. The angle of the difference of longitudes, and that of the axis with the ſubſtyle, being given; to find the angles formed in the centre of a vertical declining dial, between the ſubſtyle and hour-lines.

This problem admits of three caſes; for the hour-lines, whoſe angles are ſought, may be either, 1. Between the meridian and ſubſtyle; or, 2. Beyond the ſubſtyle; or, 3. On that ſide of the meridian where the ſubſtyle is not. In the two firſt caſes, the difference is to be taken between the ſun's diſtance from the meridian that hour, and the angle of the difference of longitudes found by the laſt problem; and in the third caſe, the ſum of thoſe two angles is to be taken, and the following canon uſed.

Canon. As the whole ſine is to the ſine of the angle between the axis and ſubſtyle, ſo is the tangent of the difference of the ſun's diſtance from the meridian, and the difference of longitudes, or of the ſum of thoſe two angles, to the tangent of the angle required.

5. The angle formed by the ſubſtyle, with the hour-lines, and that of the ſubſtyle with the meridian, given; to find the angles formed between the meridian and hour-lines in the centre of vertical declining dials.

1. The angles of the hour-lines between the meridian and ſubſtyle are found by ſubtracting the angle formed by the ſubſtyle with the hour-line from the angle formed by the ſubſtyle with the meridian.

2. The angles beyond the ſubſtyle, and on the ſide oppoſite to that of the meridian, are found by adding thoſe two angles.

3. Thoſe on the other ſide of the meridian are found by taking their difference.

To deſcribe a vertical DIAL, *declining from the ſouth to the eaſt* or *weſt geometrically.*—Find the declination of the plane, as already taught, under the article DECLINATOR. Then draw upon a paper an horizontal dial, ſuppoſing the line of contingency of the horizontal with the equinoctial plane to be G H (*fig.* 22.) through the point E, wherein the meridian line A E cuts the ſame, draw a right line I K, making with G H an angle H E K, equal to the declination of the given plane. Thus, as G H repreſents the interſection of the prime vertical with the horizon, I K will be the interſection of the declining plane and the horizon; whence we alſo conceive, that the part I E muſt be raiſed above G E, in caſe the given plane decline to the weſt; or it muſt be depreſſed below the ſame G E, in caſe it decline to the eaſt. Draw a right line parallel to the horizon on the given plane, or wall, to anſwer to I K; and aſſuming a point therein anſwering to E, ſet off from the right line I K on the paper the ſeveral horary diſtances E 1, E 2, E 3, &c. Then from the point E erect a perpendicular E C, equal to the diſtance of the centre of the horizontal dial, from its line of contingency. Draw lines thence to the ſeveral points of the hour-lines E 1, E 2, E 3, &c. let fall a perpendicular A D, from the centre of the horizontal dial A, to the line of contingency I K, and transfer the diſtance E D, from the point E upon the wall: then will C D be the ſubſtylar line.

Wherefore, joining A D and D C at right angles, the hypothenuſe A C will be an oblique index, to be faſtened on the wall in the point C, according to the angle D C A.

To conſtruct a vertical DIAL, *declining from the ſouth towards the eaſt or weſt, by the globe.*—Elevate the pole to the latitude of the place, and ſcrew the quadrant of altitude to the zenith. If the dial declines towards the eaſt, count the degrees of declination in the horizon from the eaſt point towards the north, and bring the lower end of the quadrant to that degree of declination, at which the reckoning ends. Then bring any meridian (*e. gr.* the firſt meridian) directly under the graduated edge of the upper part of the brazen meridian, and ſet the hour index to XII at noon. Turn the globe eaſtward on its axis, the quadrant of altitude being kept to the degree of declination in the horizon, and obſerve the degrees cut by the firſt meridian in the quadrant of altitude, counted from the zenith, as the hour index comes to XI, X, IX, &c. in the forenoon; and the degrees, then cut in the quadrant by the firſt meridian, are the reſpective diſtances of the forenoon hours from XII on the plane of the dial. For the afternoon hours, turn the quadrant of altitude round the zenith till it comes to the degree in the horizon oppoſite to that where it was placed before, or as far from the weſt point towards the ſouth as it was at firſt from the eaſt towards the north; and turn the globe weſtward on its axis, till the firſt meridian comes to the brazen meridian, and the hour index to XII; then turning the globe weſtward to the afternoon hours I, II, III, &c. the firſt meridian will cut the quadrant of altitude in the reſpective number of degrees from the zenith, that each of theſe hours is from XII on the dial; and the limit of this dial will be determined by the hour-

index,

index, when the firſt meridian goes off the quadrant at the horizon, both in the forenoon and afternoon. Lay down theſe hour-diſtances on the dial plane, either by dividing a ſemicircle into two quadrants, beginning at the hour line of XII, or by the line of cords, as directed under *horizontal* DIAL. As the ſubſtyle makes an angle with the meridian line in this kind of dials, falling among the forenoon hour-lines in an eaſt decliner, and among thoſe in the afternoon in a dial declining towards the weſt, its diſtance may be found in the former, by counting the degrees of the declination of the dial in the horizon from the eaſt point towards the north, and bringing the lower end of the quadrant of altitude to that degree of declination where the reckoning ends; then turn the globe till the firſt meridian cuts the horizon in the like number of degrees, counted from the ſouth point toward the eaſt; and the quadrant and firſt meridian will croſs one another at right angles, and the number of degrees of the quadrant, intercepted between the firſt meridian and the zenith, is equal to the diſtance of the ſubſtyle line from the 12 o'clock line; and the number of degrees of the firſt meridian, which are intercepted between the quadrant and the north pole, is equal to the elevation of the ſtyle above the plane of the dial. If the dial declines weſtward from the ſouth, count that declination from the eaſt point of the horizon towards the ſouth, and bring the quadrant of altitude to the degree in the horizon at which the reckoning ends; both for finding the forenoon hours, and diſtance of the ſubſtyle from the meridian; and for the afternoon hours bring the quadrant to the oppoſite degree in the horizon, as far from the weſt towards the north; and then proceed as above. The north dial declining eaſt or weſt by the ſame number of degrees may be eaſily had from the former, by only extending the hour-lines, ſtyle, and ſubſtyle, quite through the centre; for thus the ſouth-eaſt decliner will produce the north-weſt decliner, and the ſouth-weſt decliner the north-eaſt decliner. Ferguſon, lib. cit.

To draw a vertical DIAL, *declining from the north towards the eaſt and weſt.*—Take the declination of the planes, as already taught; then, as north dials are only ſouth dials inverted, draw a vertical dial declining from the ſouth, and invert it in ſuch a manner, as that the centre C looks to the horizon, and the point E to the zenith; and the hours on the right hand ſet off towards the left, and contrary-wiſe, omitting all hour-lines, which in ſuch a plane cannot be ſhewn.

For the practice, the beſt way is, after drawing a ſouth decliner upon paper, to prick the ſeveral points thereof through with a pin; then applying the face of the paper to the wall, the back ſide thereof will ſhew you all the points neceſſary for the north declining dial.

DIALS, *Inclined*, are thoſe drawn on planes not erect, but inclining, or leaning forward towards the ſouth, or ſouthern ſide of the horizon, in an angle, either greater or leſs than the equinoctial plane.

Such an inclined plane may be conceived by ſuppoſing one part of the plane of the equator lifted up towards the zenith, and the other depreſſed towards the nadir; and thus to revolve upon a line drawn from the eaſt to the weſt point of the horizon.

DIAL, *To draw an inclined.* 1. The inclination of the plane as DC (*fig.* 23.) being found by a declinator, as taught under DECLINATOR; if it fall between the equinoctial plane C E, and the vertical one C B, in ſuch manner as that the angle of inclination D C A is greater than the elevation of the equator E C A; on the upper ſide draw a north dial, and on the lower a ſouth dial, to an elevation of the equator, which is equal to the aggregate of the elevation of the equator of the given place, and the complement of the inclination to a quadrant.

2. If the inclined plane C F fall between the horizontal one C A, and the equinoctial C E, ſo as that the angle of inclination F C A, is leſs than the elevation of the equator E C A, deſcribe an horizontal dial to an elevation of the pole, equal to the aggregate of the elevation of the pole of the given place, and the inclination of the plane. Dials, thus inclined, are drawn after the ſame manner as primary dials; except, that the index in the former caſe muſt be fitted under the angle A D C; and in the latter, under the angle D F C; and that the diſtance of the centre of the dial from the line of contingency, in the former caſe, is D C, and in the latter F C.

DIALS, *Reclining*, are thoſe drawn on planes not erect, but reclined, or leaning backwards from the zenith towards the north, in an angle greater or leſs than the polar plane. A reclined plane may be conceived by ſuppoſing one part of the polar plane raiſed towards the zenith, and the other depreſſed towards the nadir; and thus revolving about a line drawn from eaſt to weſt. To find the reclination of a plane, ſee RECLINATION.

DIAL, *To draw a reclining.* 1. If the reclined plane H C fall between the vertical plane B C, and the polar plane I C, ſo as that the angle of reclination B C H is leſs than the diſtance of the pole from the zenith B C I, deſcribe two vertical ſouth and north dials to an elevation of the equator equal to the difference between the elevation of the equator of the given place, and the angle of reclination. 2. If the reclined plane, as K C, fall between the polar plane I C, and the horizontal one C L, ſo as that the angle of reclination B C K is greater than the diſtance of the pole from the zenith I C B, deſcribe an horizontal dial thereon to an elevation of the pole, equal to the difference between the angle of reclination, and the elevation of the equator of the given place.

To draw inclining and reclining DIALS *trigonometrically.*—The inclination and reclination of the plane, and the elevation of the pole, being known, to find the angles made in the centre of an inclining or reclining dial, by the meridian and hour lines.

Such dial is properly an horizontal dial, for a latitude equal to the particular elevation of the pole on the plane of the dial. Its angles, therefore, are found by the canon laid down for horizontal dials.

As to the elevation of the pole on the dial plane, it is thus found: the plane being inclined, either its inclination is greater than the elevation of the pole of the place, or leſs; or it is equal thereto. In the two firſt caſes, for upper ſouth, or lower north dials, the particular elevation of the pole on the plane is had by taking the difference between the elevation of the pole of the place, and the inclination of the plane; and in the latter caſe, the dial is a polar dial, wherein the hour-lines will be parallel, by reaſon that the plane being placed on the axis of the world, neither of the poles can be repreſented thereon.

For upper north, and lower ſouth dials. 1. If the inclination be greater than the complement of the elevation, the complement of the inclination muſt be added to the complement of the elevation. 2. If it be leſs, the inclination muſt be added to the elevation. 3. If it be equal, the dial will be an equinoctial dial, wherein the angles at the centre will be equal to the ſun's diſtance from the meridian.

DIALS, *Deinclined*, are thoſe which both decline and incline, or recline. See DECLINERS.

The uſe of inclined, reclined, and eſpecially deinclined

dials, is very rare; the geometrical and trigonometrical conſtruction of theſe laſt, therefore, as being ſomewhat intricate, we here chooſe to omit, and refer ſuch as may have a fancy for ſuch a dial, to an univerſal mechanical method of drawing all kinds of dials here ſubjoined

An eaſy method of deſcribing a DIAL *on any kind of plane, by means of an equinoctial* DIAL, *or circle* —Suppoſe, *e. gr.* a dial required on an horizontal plane: if the plane be immoveable as A B D C (*Plate* II. *fig.* 24.) find a meridian line G F; or, if moveable, aſſume the meridian at pleaſure. Then, by means of the triangle E K F, whoſe baſe is applied on the meridian line, raiſe the equinoctial dial H, till the index G I becomes parallel to the axis of the world (which is had if the angle K E F be equal to the elevation of the pole), and the 12 o'clock line on the dial hang over the meridian line of the plane, or the baſe of the triangle. If then, in the night-time, a lighted candle be ſucceſſively applied to the axis G I, ſo as the ſhadow of the index, or ſtyle G I, fall upon one hour-line after another; the ſame ſhade will mark out the ſeveral hour-lines on the plane A B C D.

Noting the points, therefore, on the ſhadow, draw lines through them to G; then an index being fixed in G, according to the angle I G F, its ſhadow will point out the ſeveral hours by the light of the ſun.

If a dial were required on a vertical plane, having raiſed the equinoctial circle, as above directed, puſh forward the index G I, till the tip thereof, I, touch the plane.

If the plane be inclined to the horizon, the elevation of the pole ſhould be formed on the ſame; and the angle of the triangle K E F ſhould be made equal thereto.

See a new method of conſtructing ſun-dials, for any given latitude, without the aſſiſtance of dialling ſcales, or logarithmic calculations, by Mr. Ferguſon, in the Phil. Tranſ. vol. lvii. for 1767, art. 36, and in his Select Exerciſes, p. 95.

Note. Beſide the ſeveral ſpecies of dials above-mentioned, with are ſaid to be with centres, there are others, called dials without centres. See CENTER *of a Dial.*

DIALS *without centres*, are thoſe whoſe hour-lines do really converge, but ſo ſlowly, that the centre towards which they converge cannot be expreſſed in the given plane.

DIALS, *Horizontal, without centres*, are to be made for places, the elevation of whoſe pole is either very ſmall, or very great.

DIALS, *Vertical, without centres*, are for places, the elevation of whoſe pole is very great.

DIALS, *For the furniture of.* See FURNITURE.

DIAL, *Quadrantal.* See *Horodictical* QUADRANT.

DIAL, *Reflecting.* See REFLECTING *Dial.*

DIAL, *Cylindric*, is repreſented in *Plate* III. *fig.* 27. This dial may be delineated on paper, and then paſted round a cylinder of wood, and it will ſhew the time of the day, the ſun's place in the ecliptic, and his altitude at any time of obſervation. Draw the right line *a* A B (*fig.* 28.) parallel to the top of the paper, and with any opening of the compaſſes on the centre *a* deſcribe the quadrant A E, and graduate it. Draw the right line A C at right angles to *a* A B, and touching the quadrant A E at the point A. From the centre *a* draw right lines through as many degrees of the quadrant as are equal to the ſun's altitude at noon, on the longeſt day of the year, at the place for which the dial is to ſerve; which altitude at London is nearly 62 degrees; continue theſe right lines till they meet the tangent line A C; and from the points of concourſe, draw ſtraight lines acroſs the paper, parallel to the firſt right line A B, and theſe will be the parallels of the ſun's altitude in whole degrees, from ſun-riſe to ſun-ſet, on all the days of the year. Theſe parallels of altitude muſt be drawn out to the right line B D, which muſt be parallel to A C, and as far from it as is equal to the intended circumference of the cylinder on which the paper is to be paſted. Divide the ſpace between the right lines A C and B D, at top and bottom, into twelve equal parts, for the twelve ſigns of the ecliptic; and from one mark to the oppoſite one, draw right lines parallel to A C and B D; and place the characters of the twelve ſigns in the twelve ſpaces at the bottom, beginning with ♑ Capricorn, and ending with ♓ Piſces. Theſe ſpaces ſhould likewiſe be divided by parallel lines into halves and quarters. At the top of the dial make a ſcale of the months and days of the year, ſo that the days may ſtand over the ſun's place, found in an Ephemeris, for each of them in the ſigns of the ecliptic. Compute the ſun's altitude for every hour, in the latitude of your place, or take it from a table, when he is in the beginning, middle, and end of each ſign of the ecliptic; and in the upright parallel lines, at the beginning and middle of each ſign, make marks for theſe altitudes among the horizontal parallels, reckoning downward in the order of the numeral figures at the right-hand, anſwering to the like diviſions of the quadrant at the left. Through theſe marks draw the curve hour-lines, and ſet the hours to them, as in the figure, reckoning the forenoon hours downward, and the afternoon hours upward. The ſun's altitude may alſo be taken and laid down for the half hours and quarters. Then cut off the paper at the left-hand on which the quadrant was drawn, cloſe by the right line A C, and all the paper at the right-hand, cloſe by the right line B D, and cut it alſo cloſe by the top and bottom horizontal lines, and it will be fit for paſting round the cylinder. This cylinder, (*fig.* 27.) is hollow for holding the ſtyle D E, when it is not uſed. The ſtyle muſt ſtand out, perpendicular to the ſide of the cylinder, juſt over the right line A B, (*fig.* 28.) where the parallels of altitude begin, and its length, or diſtance of the point *e* from the cylinder, muſt be equal to the radius *a* A of the quadrant A E (*fig.* 28.) When this dial is uſed, the horizontal foot B C is placed on a level table, or hung by the ring F, where the ſun ſhines, and the horizontal top A D, which is made moveable, is turned till the ſtyle ſtands juſt over the day of the month. Then the cylinder is turned round, till the ſhadow of the ſtyle falls upon it, parallel to the upright lines which divide the ſigns; or till the ſhadow is parallel to a ſuppoſed axis in the middle of the cylinder; and then the point, or loweſt end of the ſhadow, will fall upon the time of the day, as it is before or after noon, among the curve hour-lines, and will ſhew the ſun's altitude at that time among the croſs parallels of altitude, encompaſſing round the cylinder; and it will alſo ſhew in what ſign of the ecliptic the ſun is at that time, and the degree may be nearly eſtimated by the eye. Ferguſon.

When the ſun is in the equinoctial, and has no declination, his altitude may be eaſily found by the following proportion. As radius is to the coſine of the latitude, ſo is the coſine of the hour from noon to the ſine of the altitude: but if he has north or ſouth declination, ſay, as radius is to the ſine of the declination, ſo is the ſine of the latitude to the ſine of the ſun's altitude at ſix o'clock. For the ſun's altitude at other hours the two following proportions muſt be uſed, *viz.* 1. As the coſine of the hour from the meridian to radius, ſo is the tangent of the latitude to the tangent of a fourth arc, from which the declination is to be ſubtracted, when north, and to which it is to be added, when ſouth, for a fifth arc. The ſupplement of the ſun's declination, added to the fourth arc, muſt be uſed for this fifth arc, when they exceed a quadrant, in finding the altitudes before and after ſix.

2. As the ſine of the fourth arc is to the coſine of the fifth arc, ſo is the ſine of the latitude of the place to the ſign of the altitude for the given hour and declination.

The altitude in the middle of the ſign may either be had by taking the arithmetic mean between the next greateſt and leaſt, or by computation in the manner above directed. Leybourn's Dialling, Tract vi. p. 23, &c.

To find the altitude by the globe, ſee GLOBE.

DIAL, *Portable on a card*, is repreſented in *fig.* 29. and may be eaſily conſtructed. Draw the occult line AB (*fig.* 30.) parallel to the top of the card, and croſs it at right angles with the ſix o'clock line ECD: then upon C, as a centre, with the radius CA, deſcribe the ſemicircle AEL, and divide it into twelve equal parts, beginning at A, as A *r*, A *s*, &c. and from theſe points of diviſion draw the hour-lines *r*, *s*, *t*, *u*, *v*, *w*, and *x*, all parallel to the ſix o'clock line EC. If each part of the ſemicircle be ſubdivided into four equal parts, they will give the half hour lines and quarters, as in *fig.* 29. Draw the right lines ASD *o*, making the angle SAB equal to the latitude of the place. Upon the centre A deſcribe the arc RST, and ſet off upon it the arcs SR and ST, each equal to $23\frac{1}{2}$ degrees, for the ſun's greateſt declination, and divide them into $23\frac{1}{2}$ equal parts, as in *fig.* 29. Through the interſection D of the lines ECD and AD *o* draw the right line FDG at right angles to AD *o*. Lay a ruler to the points A and R, and draw the line ARF through $23\frac{1}{2}$ degrees of ſouth declination in the arc SR; and then laying the ruler to the points A and T, draw the line ATG through $23\frac{1}{2}$ degrees of north declination in the arc ST; ſo ſhall the lines ARF and ATG cut the line FDG in the proper length for the ſcale of months. Upon the centre D, with the radius DF, deſcribe the ſemicircle F *o* G, which divide into ſix equal parts F *m*, *m n*, *n o*, &c. and from theſe points of diviſion draw the right lines *m h*, *n i*, *p k*, and *q l*, each parallel to *o* D. Then ſetting one foot of the compaſſes in the point F, extend the other to A, and deſcribe the arc A *z* H for the tropic of ♑; with the ſame extent, ſetting one foot in G, deſcribe the arc AEO for the tropic of ♋. Next ſetting one foot in the point *h*, and extending the other to A, deſcribe the arc ACI for the beginnings of the ſigns ♒ and ♐; and with the ſame extent, ſetting one foot in the point *l*, deſcribe the arc AN for the beginnings of the ſigns ♊ and ♌. Set one foot in the point *i*, and having extended the other to A, deſcribe the arc AK for the beginnings of the ſigns ♓ and ♍; and with the ſame extent ſet one foot in *k*, and deſcribe the arc AM for the beginnings of the ſigns ♉ and ♎. Then ſetting one foot in the point D, and extending the other to A; deſcribe the curve AL for the beginnings of ♈ and ♑; and the ſigns will be finiſhed. This done, lay a ruler from the point A over the ſun's declination in the arc RST, found by a table, for every fifth day of the year; and where the ruler cuts the line FDG, make marks, and place the days of the months right againſt theſe marks, as in *fig.* 29. Laſtly, draw the ſhadow line PQ parallel to the occult line AB; make the gnomon, and ſet the hours to their reſpective lines, as *fig.* 29. and the dial will be finiſhed.

The lines *a d*, *a b*, and *b c*, of the gnomon, muſt be cut quite through the card; and as the end *a b* of the gnomon is raiſed occaſionally above the plane of the dial, it turns upon the uncut line *c d* as on an hinge. The dotted line AB muſt be ſlit quite through the card, and the thread C muſt be put through the ſlit, and have a knot tied behind, to keep it from being eaſily drawn out. On the other end of this thread is a ſmall plummet D, and on the middle of it a ſmall bead for ſhewing the hour of the day.

To rectify this dial; ſet the thread in the ſlit right againſt the day of the month, and ſtretch the thread from the day of the month over the angular point, where the curve lines meet at XII; then ſhift the bead to that point on the thread; and the dial will be rectified.

To find the hour of the day; raiſe the gnomon, and hold the edge of the dial next the gnomon towards the ſun, ſo that the uppermoſt edge of the ſhadow of the gnomon may juſt cover the ſhadow-line; and the bead then playing freely on the face of the dial, by the weight of the plummet, will ſhew the time of the day among the hour-lines, in the forenoon or afternoon.

To find the time of ſun-riſing and ſetting; move the thread among the hour-lines, until it either covers ſome one of them, or lies parallel betwixt any two; and then it will cut the time of ſun-riſing among the forenoon hours, and of ſun-ſetting among the afternoon hours for that day of the year to which the thread is ſet in the ſcale of months.

To find the ſun's declination; ſtretch the thread from the day of the month over the angular point at XII, and it will cut the ſun's declination, as it is north or ſouth, for that day, in the proper ſcale.

To find on what day the ſun enters the ſigns; when the bead, as above rectified, moves along any of the curve lines which have the ſigns of the zodiac marked upon them, the ſun enters thoſe ſigns on the days pointed out by the thread in the ſcale of months.

DIAL, *Univerſal, on a plain croſs*, is repreſented by *fig.* 31, and is moveable on a joint, C, for elevating it to any given latitude on the quadrant C *o* 90, as it ſtands upon the horizontal board A. The arms of the croſs ſtand at right angles to the middle part; and the top of it, from *a* to *n*, is of equal length with any of the arms *n e* or *m k*.

This dial is rectified, by ſetting the middle line *t u* to the latitude of the place on the quadrant, the board A level, and the point N northward by the needle; thus, the plane of the croſs will be parallel to the plane of the equator. Then from III o'clock in the morning till VI, the upper edge, *k l*, of the arm, *i o*, will caſt a ſhadow on the time of the day on the ſide of the arm *e m*; from VI till IX, the lower edge, *i*, of the arm, *i o*, will caſt a ſhadow on the hours, on the ſide *o q*. From IX in the morning to XII at noon, the edge, *a b*, of the top part, *a n*, will caſt a ſhadow on the hours on the arm *n e f*; from XII to III in the afternoon, the edge *c d* of the top part will caſt a ſhadow on the hours of the arm *k l m*; from III to VI in the evening, the edge *g h* will caſt a ſhadow on the hours on the part *p q*; and from VI till IX, the ſhadow of the edge, *e f*, will ſhew the time on the top part *a n*. The breadth of each part, *a b*, *e f*, &c. muſt be ſo great, as never to let the ſhadow fall quite without the part or arm on which the hours are marked, when the ſun is at his greateſt declination from the equator.

To determine the breadth of the ſides of the arms which contain the hours, ſo as to be in juſt proportion to their length; make an angle, ABC, (*fig.* 32.) of $23\frac{1}{2}$ degrees, which is equal to the ſun's greateſt declination; and ſuppoſe the length of each arm, from the ſide of the long middle part, and alſo the length of the top part above the arms, to be equal to B *d*. Then, as the edges of the ſhadow, from each of the arms, will be parallel to B *e*, making an angle of $23\frac{1}{2}$ degrees with the ſide B *d*, of the arm, when the ſun's declination is $23\frac{1}{2}^{\circ}$: it is plain, that if the length of the arm be B *d*, the leaſt breadth that it can have, to keep the edge B *e* of the ſhadow, B *e g d*, from going off the ſide of the arm, *d e*, before it comes to the end of it, *e d*, muſt be equal to *e d* or *d* B. But, in order to keep the ſhadow within the quarter diviſions of the hours, when

it comes near the end of the arm, the breadth of it ſhould be ſtill greater, ſo as to be almoſt doubled, on account of the diſtance between the tips of the arms.

The hours may be placed on the arms, by laying down the croſs, *abcd* (*fig.* 33.) on a ſheet of paper; and with a black lead pencil, held cloſe to it, drawing its ſhape and ſize on the paper. Then take the length *ae* in the compaſſes, and with one foot in the corner *a*, deſcribe with the other the quadrant *ef*. Divide this arc into ſix equal parts, and through the points of diviſion draw right lines *ag*, *ah*, &c. continuing three of them to the arm *ce*, which are all that can fall upon it; and they will meet the arm in thoſe points through which the lines that divide the hours from each other, as in *fig.* 31, are to be drawn right acroſs it. Divide each arm, for the three hours contained in it, in the ſame manner; and ſet the hours to their proper places, on the ſides of the arms as they are marked in *fig.* 33. Each of the hour ſpaces ſhould be divided into four equal parts, for the half hours and quarters, in the quadrant *ef*; and right lines ſhould be drawn through theſe diviſion-marks in the quadrant, to the arms of the croſs, in order to determine the places thereon, where the ſubdiviſions of the hours muſt be marked.

This is a very ſimple kind of univerſal dial; it is eaſily made, and has a pretty uncommon appearance in a garden. Ferguſon.

Dials, *Refracted*, are ſuch as ſhew the hour by means of ſome refracting tranſparent fluid.

If a pin or ſtick be ſet up, or any point be aſſigned in a concave bowl or diſh for the centre of the dial, let an horizontal dial be applied over the ſame, aſſigning the meridian line on the edges of the bowl, and marking out the reſt of the hour-lines alſo on the edges of the bowl; take away the horizontal dial, and elevate a ſtring or thread from the end of the ſaid pin over the meridian line, as much as is the latitude or elevation of the pole of the place: then, by bringing the thread to caſt a ſhadow on any hour point formerly marked out on the edges of the bowl, by a candle or the like, that ſhade in the bowl is the true hour-line; and if the bowl be full of water, &c. when this is done, it will never ſhew the true hour by the ſhadow of the top of the pin but when it is filled again with the ſame liquor.

Dial, *Ring*, is a kind of dial, uſually ſmall and portable, conſiſting of a braſs ring or rim, ſeldom exceeding two inches in diameter, and one-third of an inch in breadth. In a point of this rim there is a hole, through which the ſunbeams being received, make a lucid ſpeck on the concavity of the oppoſite ſemicircle, which gives the hour of the day in the diviſions marked therein.

Theſe diviſions are made by deſcribing a circle, (*Plate* IV. *fig.* 34.) to repreſent the ring, and drawing an horizontal chord E F; with this as radius deſcribe the quadrant F D, and graduate it; and through the ſeveral degrees which mark the ſun's altitude for every hour at the time of the equinox, draw lines from E to the oppoſite part of the circle, and there ſet the correſponding figures. Thus the XII o'clock line will paſs through 38° 38′, the co-latitude of the place; and the XI and I line through 36° 56′; the X and II through 32° 36′; the IX and III through 26° 5′; the VIII and IV through 18° 8′; and the VII and V through 9° 17′. This may be eaſily calculated by the globe.

But it only holds good about the times of the equinox. To have the dial perform throughout the whole year, the hole is made moveable, and ſigns of the zodiac, or the days of the month, are marked on the convex ſide of the ring, by taking, *e.g.* E T and E *t* (*fig.* 34) on each ſide of E equal to double the ſun's declination when he enters any particular ſign, as Taurus or Piſces; and there marking the character of the ſaid ſign, or correſponding month, and ſo for all the others; and by means of theſe the dial is rectified for the time. It is evident, from a view of the figure, that E XII ♉ is = F E XI I = the altitude of the ſun in the equinox; but T XII E is equal to the ſun's declination in Taurus, becauſe it is an angle in the circumference ſtanding upon an arc, which is double the declination; and therefore T XII ♉ is equal to the meridian altitude when the ſun enters Taurus; and a ray paſſing through the hole at T will mark the XII o'clock hour of that day; but this dial will not point out the other hours exactly: becauſe T III *d* exceeds E III *d*, the equinoctial hour by the angle of declination; and ſo of the reſt. Some have contrived to remedy this inconvenience, by making the concave ſurface of the ring wider, and deſcribing upon it ſeven circles, the middle one to repreſent the equinoctial, and the extremes the tropics; and in theſe circles they have marked the forenoon and afternoon hours from a table of altitudes.

To uſe it, put the moveable hole to the day of the month, or the degree of the zodiac the ſun is in; then ſuſpending it by the little ring, turn it towards the ſun, till his rays, as before, point out the hour among the diviſions on the inſide.

Univerſal or *aſtronomical Ring*-Dial, is a ring-dial, which ſerves to find the hour of the day in any part of the earth; whereas the former is confined to a certain latitude. Its figure ſee repreſented in *Plate* IV. *fig.* 35.

It conſiſts of two rings or flat circles, from two to ſix inches in diameter, and their breadth, &c. proportionable. The outward ring, A, repreſents the meridian of any place you are at, and contains two diviſions of 90° each, diametrically oppoſite to one another, ſerving the one from the equator to the north, the other to the ſouth pole. The inner ring repreſents the equator, and turns exactly within the outer, by means of two pivots in each ring at the hour XII.

Acroſs the two circles goes a thin reglet or bridge, with a curſor C, that ſlides along the middle of the bridge. In the curſor is a little hole for the ſun to ſhine through. The middle of this bridge is conceived as the axis of the world, and the extremities as the poles; and on the one ſide are drawn the ſigns of the zodiac, and on the other the days of the month. On the edge of the meridian ſlides a piece, to which is fitted a ring to ſuſpend the inſtrument by.

In this dial, the diviſions on the axis are the tangents of the angles of the ſun's declination, adapted to the ſemidiameter of the equator as radius, and placed on either ſide of the centre: but inſtead of laying them down from a line of tangents, a ſcale of equal parts may be made, whereof 1000 ſhould anſwer exactly to the length of the ſemi-axis, from the centre to the inſide of the equinoctial ring; and then 434 of theſe parts may be laid down toward each end from the centre, which would limit all diviſions on the axis, becauſe 434 is the natural tangent of 23° 29′. And thus, by a nonius fixed to the ſliding-piece, and taking the ſun's declination from an ephemeris, and the tangent of that declination from the table of natural tangents, the ſlider might be always ſet true within two minutes of a degree. And this ſcale of 434 equal parts might be placed right againſt the $23\frac{1}{2}°$ of the ſun's declination, on the axis, inſtead of the ſun's place, which is there of little uſe. For then the ſlider might be ſet in the uſual way, to the day of the month, for common uſe; but to the natural tangent of the declination, when great accuracy is required.

Uſe of the Univerſal Ring-Dial.—Place the line *a* (on

ſideration, the court are of opinion that the matter ſuggeſted is not a good and ſufficient ground to ſtop the proceedings below. Thus careful has the law been, in compelling the inferior courts to do ample and ſpeedy juſtice; in preventing them from tranſgreſſing their due bounds; and in allowing them the undiſturbed cognizance of ſuch cauſes as by right, founded on the uſage of the kingdom or act of parliament, do properly belong to their juriſdiction. Blackſt. Com. vol. iii.

CONSUMMATE ESTATE. See TENANT *by curteſy*.

CONSUMMATION, the end, period, or completion, of any work.—Thus, we ſay, the conſummation of all things: meaning the end of the world. By the incarnation, all the prophecies are to be conſummated.

Conſummation of marriage denotes the laſt act of marriage, which makes its accompliſhment.

CONSUMPTION, in *Medicine*, popularly named a *decline*, is a generic term, occaſionally applied to different diſeaſes, the moſt obvious ſymptoms of which are a gradual decline of the ſtrength and functions of the body, and a diminution of its bulk, in conſequence of the decreaſe or conſumption, as it were, of the fat and muſcular parts. From whatever cauſe, therefore, the nutrition of the body is impeded, conſumption will be the conſequence. The nutrition of the body may be impeded either by ſome great internal diſeaſe, which diſturbs the functions, eſpecially that of digeſtion; or by deficiency of nutriment; or by great evacuations or diſcharges of blood, or fluids ſecreted from the blood. Theſe conſiderations have led noſologiſts to treat of conſumption under three diviſions or genera, with the titles of *Phthiſis*, *Tabes*, and *Atrophia*: the two firſt being produced by internal organic diſeaſes; the laſt by the deficiency, or the abſtraction, or corruption, of nutritious matter.

1. *Phthiſis*, Φθίσις, ſignifying *conſumption* in general, is confined to that ſpecies which originates from diſeaſe of the lungs: this form of conſumption being the moſt frequent and fatal. It is defined "emaciation, with hectic fever, cough, and commonly with purulent expectoration." The emaciation is occaſioned by the diſturbance in the function of digeſtion, which the daily fever produces; by the impediment to the function of reſpiration, which the diſeaſed lungs are unable to carry on; and by the great diſcharges by expectoration, ſweating, or diarrhœa, which latter frequently alternate with each other.

2. *Tabes*, which, in the Latin language, is ſynonymous with *phthiſis* in the Greek, has been arbitrarily reſtricted by noſologiſts to that form of conſumption, which is not accompanied by cough. It is defined, "emaciation, with hectic fever." Any local diſeaſe of long continuance, ſuch as abſceſſes, ulcers, &c. which excites a hectic fever, may become the origin of a *tabes*. But the moſt frequent occurrence of tabes is obſerved in ſcrofulous habits, the ſcrofula being always ſlow in its progreſs: and one of the moſt common varieties of tabes ariſes, where ſcrofula attacks the glands of the meſentery. In this caſe emaciation is produced, not only by the diſturbance of functions, and the ſweats of the hectic fever, but by the phyſical impediment to the nutrition of the body, occaſioned by the morbid condition of the meſenteric glands, through which the chyle cannot paſs, in order to enter the thoracic duct, and thence to be poured into the blood-veſſels.

3. *Atrophia*, derived from the primitive particle α, and τρέφω, *nutrio*, implying *defect of nouriſhment*, has been adopted to denote the ſimple emaciation and loſs of ſtrength, which is not accompanied with hectic fever, nor originates from any organic diſeaſe; but depends altogether on the privation, corruption, or abſtraction, of that which would otherwiſe ſupport the ſtrength of the body. It is defined, "emaciation, without fever." Hence atrophia occurs in thoſe who have ſuffered great evacuations, as from ſalivation, hæmorrhage, ſweat, leucorrhœa, &c.; in thoſe from whom nutriment is abſtracted in undue proportion to their ſtrength and digeſtive powers, as in nurſes ſuckling ſtout children, or continuing them at the breaſt too long; and in thoſe whoſe nutriment is corrupted, as the ſalt proviſions, which excite ſcurvy.

For a view of the nature and requiſite treatment of the different kinds of conſumption, ſee the following articles: TABES *Meſenterica* (or Meſenteric Conſumption), and ATROPHY. Savage's Noſol. Method. Claſs x. ord. 1. Cullen's Synopſis Noſol. Claſs i. ord. 4. and Claſs iii. ord. 1.

CONSUMPTION, *Pulmonary*, the *phthiſis pulmonalis* of medical writers, from φθίω, or φθέω, *corrumpo*, *conſumo*, a diſtreſſing and very fatal diſeaſe, diſtinguiſhed by the occurrence of a frequent cough, with expectoration of puriform matter, hectic fever, emaciation, and debility; to which, in the latter ſtages, colliquative ſweats, often alternating with diarrhœa, ſupervene.

In this diſeaſe the number, degree, and progreſs, of the ſymptoms are extremely various, in different caſes. It uſually commences in an inſidious manner, with a ſlight and ſhort cough, which is often little remarked by thoſe affected with it, but ſoon becomes habitual; or with an occaſional cough, which is more ſevere. At the ſame time, the breathing becomes eaſily hurried by any bodily motion, the patient grows leaner, and becomes languid and indolent. In this ſtate he ſometimes continues for a year, or even for two years, without making any complaint, excepting that he is affected by cold more readily than uſual, which frequently increaſes his cough, and produces catarrh. This, however, is ſometimes relieved, is ſuppoſed to have ariſen from cold alone, and therefore gives no alarm either to the patient or to his friends, nor leads them to take any precaution. But upon ſome occaſion of catching cold, as we commonly ſpeak, the cough becomes more conſiderable; is particularly troubleſome, when the patient lies down at night, and in this ſtate continues longer than is uſual in the caſe of a ſimple catarrh. This may more particularly attract attention, if the increaſe and continuance of cough occur during the ſummer ſeaſon.

The cough, in many inſtances, continues for a long time dry, or without any expectoration; frequently, however, it is accompanied, from the firſt, with an expectoration of a blackiſh or blueiſh mucus, or of tough phlegm; the expectoration being generally moſt conſiderable in the morning, in conſequence of the accumulation of the matter during ſleep. This matter becomes by degrees more copious, more viſcid, and more opake; at length of a yellow or greeniſh colour, and of a purulent appearance, ſometimes ſtreaked with blood. As theſe changes take place, and the cough increaſes, the breathing at the ſame time becomes more difficult, and the emaciation and weakneſs go on alſo increaſing. In the female, as the diſeaſe advances, and ſometimes early in its progreſs, the menſes ceaſe to flow; and this circumſtance, although doubtleſs an effect, the ſex themſelves are generally diſpoſed to believe to be the ſole or principal cauſe of the diſeaſe. During this progreſs ſome pain is commonly felt in the thorax, at firſt under the ſternum, eſpecially, or almoſt ſolely, on the occaſion of coughing: but very often there is a pain in one ſide, ſometimes dull and oppreſſive, ſometimes ſharp and ſhooting, and ſuch as to prevent the perſon from lying eaſy upon that ſide. Even

when

DIAL, *Siderial.* See NOCTURNAL.

DIAL, *Tide.* See TIDE-*Dial.*

DIAL-*Bird*, in *Ornithology*. the *dial grekle* of Latham, and *Saularis Gracula* of Gmelin, which ſee.

DIAL-*Plate*, is the face of an inſtrument which ſhews the time or hour of the day either by means of a moving hand or index, or by the ſhadow of a gnomon that falls upon it; hence we hear of clock-dials, watch-dials, and ſun-dials.

The clock makers have alſo given the name of dials to a particular ſort of time-pieces; *viz* ſuch as are generally uſed in kitchens, ſhops, &c. They are eight day pendulum movements, which do not ſtrike, but only ſhew the hours and minutes.

The dial-plates of clocks and watches are almoſt univerſally divided into twelve hours, which are denoted by Roman numerals, and each of thoſe hours is ſubdivided into five minutes, ſo as to divide the whole circumference into ſixty equal parts or minutes. Inſtead of Roman numerals, the hours of ſome clocks and watches are often indicated by the common numerical or Arabic figures; and ſometimes they are even fancifully indicated by the letters of ſome particular word, or name. We have ſometimes, though ſeldom, ſeen the dial-plate of a clock divided into 24 hours, or twice 12; and in them the hour hand of courſe goes round once only in 24 hours. In certain particular time-pieces, the hours on the dial plate are diſpoſed in a ſpiral manner; ſo that four or ſix of them fill up the whole circumference, and the reſt are marked under thoſe, and nearer to the centre (as in Dr. Franklin's clock, and others); the hour hand then going round the whole circumference in leſs time than 12 hours. See the next article.

DIAL-*Plate* of a *Clock* or *Watch*, called alſo the *face*, is that fixed plate which contains the divided circles of hours, minutes, and ſeconds, pointed to by the reſpective hands, and which is pinned to the frame by the dial-pillars. This plate, in the ancient machines, was made of braſs, engraved into various devices, and ſilvered, ſometimes only partially; but the modern makers prefer enamel to ſilvering, and that either real or imitative, according to the price intended to be charged for the workmanſhip. The maker's name is alſo uſually put on ſome conſpicuous part of the dial-plate; and if the machine is contrived ſo as to have the repeating mechaniſm, the days of the month, the moon's age, the days of the week, or ſun's place in the ecliptic, &c. The divided circles containing theſe, or ſome of theſe, are introduced, and perforations to ſhew the diviſions of other ſmaller plates, revolving within or behind the principal plate, are frequently ſuperadded.

DIAL-*Work* of a *Clock* or *Watch*, properly ſpeaking, is that work which relates to the dial-plate, hands, dial-pillars, and ſmall revolving plates, that are ſometimes calculated to perform their revolutions in certain given periods of time; but, becauſe the reſpective periods, and relative ſituations of the moving parts depend on the motion-work, or wheel-work, contained between the dial-plate and the frame, the term dial-work may be ſaid to include alſo the motion-work, on which depend the figure, dimenſions, and circles of indication on the dial-plate, as well as the number of indicating hands. In the infancy of clock-work, there was but one hand, indicating the hours and ſubdiviſions of the hour, and inſerted on the protruding arbor of the fuſee, or barrel, made to revolve in twelve hours; but when the motion-work was introduced to ſubdivide the hour more ſenſibly into minute portions, it was found that any modified period of time might be repreſented by wheel-work, borrowing its motion from the going-part of the machine, without materially altering its rate of going, particularly when the motions produced are ſlow. Hence aroſe the practice of repreſenting planetary phenomena, and of introducing various devices, either for uſe or ornament, which enhance the value, or rather the price of many clocks and watches, of which a great portion of the mechaniſm is ſuperfluous, and frequently renders the rate of their going unſteady. It might be conſidered as unneceſſary now, that clocks and watches are in every perſon's poſſeſſion, to give a minute detail of the circles and hands on an ordinary dial-plate; but as many of our readers may wiſh to know the connection between the hour and minute hands, in regard to the mechaniſm behind the dial, we beg leave to refer to *Plate* XII. of *Horology*, and to the deſcriptions of an eight-days' portable clock with repeating mechaniſm, under the head CLOCK, where the requiſite information has been already given. The ſame deſcription is equally applicable to the dial-work of an ordinary watch: and when the ſeconds are ſhewn by a long hand moving from the centre of the face, the calliper is ſo laid down, that a cannon wheel revolves in a minute, (over a bridge that has got a tube ſurrounding the interior cannon wheel of the hours) in conſequence of its connection with a ſimilar wheel on the arbor of the wheel that uſually carries the ſeconds' hand out of the centre. The dials ſhewn in *Plate* XXIII. already deſcribed, as contrived by Dr. Franklin and Mr. Ferguſon, have no motion-work, but ſimply the hands, or revolving plates attached to the arbors of the going part of the clock, which we mention here with a reference to the word CLOCK, leſt the reader ſhould conſult our preſent article for them in vain. We have alſo deſcribed the dial-work of Enderlin's equation clock, as ſeen in *Plate* XXIV., in *fig.* 2, of which is ſeen a dial with the hours, minutes, and ſeconds out of the centre, together with other appendages, with the account of which the curious reader will be intereſted in the article already referred to. We have, however, reſerved for our preſent article three or four different ſpecimens of dial-work, that have not been before deſcribed, and that, we truſt, will therefore be acceptable to the public.

Plate XXXI. of *Horology* preſents two figures, the firſt of which exhibits the motion-work under the dial of a clock, that indicates the days of the week and month, together with that of the moon's age, and at the ſame time repreſents the moon's phaſes; and *fig.* 2, is the repreſentation of the correſponding dial, with the parts ſeen through the perforated parts. In *fig.* 1, the letter *a* is placed on the wheel of 72 teeth that revolves, as in common, in twelve hours, by means of its connection with the cannon pinion of ſix leaves; to this wheel is attached another ſmaller one, *b*, of 30 teeth, or any other convenient number, which actuates a third of ſixty, *i. e.* double its number, in 24 hours exactly, but in a contrary direction, which is ſeen denoted by *c*. This wheel of 60 teeth has two pins projecting from its plane, ſeen near the ſmall letter *c*, one of which only we will regard at preſent. The pin nearer to the extremity of the wheel comes in contact with a tooth *d*, projecting from the edge of the vertical bar *de*, once in every 24 hours, and lifts this bar, which is kept in a true vertical poſition by a little bridge, *e*, below, and a pin within the ſlit at the ſuperior end, which pin is held by a ſmall cock, over the plane of the twelve-hours' wheel: the conſequence of this diurnal lifting is, that a jointed tooth, *f*, attached to the ſaid vertical bar, takes one of the ſeven points of the ſtar *g*, and turns the ſtar till the heel of the ſautoir, *h*, paſſes the point of the ſtar at preſent reſting againſt its leg, and puſhes it one-ſeventh part round by the action of the ſmall ſpring, *i*; the vertical bar then deſcends by its weight, its tooth being clear of the pin in wheel *c*, till its jointed tooth, *f*, falls on the next ſucceeding point of the ſtar, on which

which it would reſt if it had no joint; but the weight of the bar is ſufficient to make this tooth, *f*, turn on its pivot or joint, till it has paſſed the ſaid point of the ſtar, after which the little ſpring underneath the back part of the tooth reſtores its horizontal poſition, below the point of the ſtar that is to be caught the ſucceeding day; and in this way, the ſtar is made to revolve in ſeven days, by as many ſudden daily leaps, and it preſents an attached plate with ſeven days of the week on it, as they occur, to an aperture at one of the inferior corners of the dial where the word *Monday* is now ſeen exhibited in *fig.* 2.

Again, the inner pin, projecting from the plane of the 24 hour wheel *c*, meeting with the curved triangular part of K*l*, which is a piece of metal moveable on a ſtud at the point *l*, ſlides along it, and at the ſame time raiſes it upwards, while the jointed tooth, attached to its oppoſite end, is depreſſed, ſo as to urge a tooth of the ſerrated rim, kept in its place by the three rollers, *m*, *n*, and *a*; preſently, however, the pin of *c* comes in contact with the extreme corner of K, that points downwards, and paſſing it, allows it to return from its elevated poſition, till its tail-piece meets with a pin in the ſmall cock below *l*; but its weight is ſufficient to make it fall with velocity enough to bend the joint of the tooth that impels the rim; therefore, a ſpring is attached to the ſmall cock, and acts on the back portion of the tail-piece, to give the requiſite force in the fall. The tooth here has alſo a re-acting ſpring, like the jointed tooth *f*, and finds its horizontal poſition by means of its action on the back part of the tooth ſeen reſting on a pin, that prevents its falling beyond the horizontal line. Now, as the rim in queſtion has 31 teeth on its interior edge, one of which is moved thus every day, it is evident, that if its plane be divided into 31 equal ſpaces, they will be ſo many day ſpaces, to indicate the day of the month, as ſeen through ſome convenient opening in the dial, which, for the ſake of uniformity, may be juſt above the point VI of the dial, as we have given it in *fig.* 2. This rim, it will be obſerved, will require a monthly adjuſtment by hand, that No. 1. may begin with the firſt day of each month. We have, indeed, ſeen a contrivance, different from Enderlin's already deſcribed, for making the month-plate adjuſt itſelf at the end of each month, in a clock made by a Scotchman of the name of Smith, of Pittenween, in Fifeſhire, and exhibited in 1808, for public inſpection, at No. 27, Leiceſter ſquare; but as ſome part of the value of the ſuperb machine conſiſted of this contrivance, which was ſhewn us in confidence, we feel not at liberty to make it public, without the proprietor's previous conſent. On the rim we have been deſcribing is a pin, which takes hold of one of the 12 points of the ſtar *p*, the action of which is preciſely the ſame as that of ſtar *g*, already deſcribed; on a plate connected with this ſtar, and revolving with it in 12 months, are the months deſignated and ſhewn through another opening at the inferior corner of the dial, in *fig.* 2. oppoſite to that of the days. The two engraved plates of the days and months are deſignated in *fig.* 1. by dotted circles only. The wheel *a*, which we have ſaid revolves in the ſpace of 12 hours, has alſo its pin for the moon's wheel, independently of its pin for making the clock ſtrike, which pin takes the interior end of the lever *q*, that carries a third jointed tooth, in every reſpect like thoſe deſcribed, ſo far as relates to the action; and whenever the interior end of the ſaid lever is depreſſed by its pin of wheel 72, which happens once in each 12 hours, the jointed tooth puſhes a tooth of the moon's wheel, which conſiſt of 118; hence two of theſe are actuated in the ſpace of each 24 hours, and the ſautoir *r* keeps this wheel ſteadily to its place after each puſh; thus the moon's wheel, denoted by *s*, revolves once in 59 days, or in a period ſomewhat more than two lunations. On the plane of the moon's wheel, which is ſolid plate, are painted two moons diametrically oppoſite each other, which appear to put on all the natural aſpects ſucceſſively, by the help of a triangular aperture in the dial-plate, two ſides of which figure are ſemi-circles to the radius of the moon's curvature, as repreſented in *fig.* 2, which is the ſituation for Monday, July 4th 1808, when the moon's age is 12. The edge of the moon's plate, beyond the painted part, is figured twice over into 29½ ſpaces, which are the ſpaces of the moon's age ſeen through the curved opening over the moon herſelf, at any given time. The hour and minute hands, and alſo the circles of the dial, being of the ordinary kind, require no explanation. The practical objections to the dial-work here deſcribed, are, that the regularity of the maintaining power is greatly interrupted by the hourly, daily, and monthly oppoſing forces to be overcome by only ſhort intervals of action, particularly when the weights and ſprings that conſtitute the oppoſing forces are conſiderable, which they muſt be to anſwer their purpoſe; ſecondly, the means uſed, though they profeſs to be ſimple, in as much as they avoid ſolar and lunar calculations for appropriate wheel-work, yet are actually more complex and expenſive than proper trains would be, without re-acting ſprings, and other mechanical appendages; and, laſtly, manual adjuſtment of the monthly plate is requiſite many times within the year, as well as occaſionally a rectification of the moon's age neceſſary, when the deficiency of 44 minutes 3 ſeconds amounts to an entire day. We might here proceed to ſhew how Ferguſon, Jenkins, and others, have obviated the objections we have ſtated, by introducing the reſpective calculations of trains into their aſtronomical, or rather planetary, clocks; but as the accounts of them have been publiſhed by the authors themſelves, in Ferguſon's Mechanical Exerciſes, and in a deſcription of ſeveral aſtronomical and geographical clocks, by Henry Jenkins, London, 1778, we will give the dial-work of a ſmall portable clock, contrived by the writer of the preſent article in the year 1800, which indicates all the periods of the preceding clock, with the addition of the moon's place in the ecliptic, and of her nodes, latitude, and apogee, in a ſimple and unobjectionable manner, and which is the only clock that has been made of the kind.

Fig. 1. of *Plate* XXXII. of *Horology*, ſhews the motion-work of the little clock alluded to, and *fig.* 2. its dial, forming together what may be called its dial-wheel. Partly on account of the ſimplicity of the wheel-work, which ſtands in place of the ordinary motion-work, and partly for the ſake of novelty, in the mode of reading the time indicated, the hours and minutes are both pointed to, at all times, by the ſame hand; the minutes are indicated in the outer large circle of Arabic figures, and the hours in the inner one, or circle of Roman numerals, which, at firſt ſight, will appear a paradox, but when the reader is told that the inner circle moves as well as the common hand, the wonder will ceaſe; their reſpective velocities are 60 : 55; ſo that ſuppoſing the point XII and the hand to ſtart together from the point 60, in the fixed circle, when the hand has gone round, which it does in an hour, and indicates minutes on the fixed circle, the hour-plate has its point XII at 55, and its point I at 60, under the end of the hand; and at every ſucceſſive revolution of the hand, the hour-plate falls back the twelfth part of a circle, and in the ſame proportion for any ſmaller quantity, by which means both the hour and minute, at any period of the day, are both immediately under their common hand. At preſent the indication is half paſt one o'clock, as ſeen in *fig.* 2; and puzzling as this mode may ſeem at firſt, it is actually more ſimple for a child to learn, than the ordinary mode by two hands, where one may be miſtaken for the other; the only

objection

objection is, that the hour cannot ſo well be known at a diſtance. The moveable plate being ſmall, and equally poiſed, by being circular, conſtitutes no obſtacle to free motion. The relative velocities are thus effected: the hand is carried by the arbor of the hour-wheel in the uſual way, and a tubed or cannon pinion, *a*, of 22 leaves, is put on tight, in the common manner, which gives its velocity to a pinion, *b*, of a ſimilar number, and this pinion being made long and conical, turns on a ſtud in the front of the frame, and actuates a third pinion of 24, concentric with the firſt and covering it, round the tube of the little bridge that takes off the friction as uſual, ſo that, as the velocities of the firſt and third pinions are to each other inverſely as their reſpective numbers of leaves, the revolving hand and hour-plate move with the velocities 24 and 22, that is, 60 and 55, as before ſtated. In this mode of indicating time, three pinions without wheels are all that are neceſſary for the motion-work, whereas three wheels and one pinion, or two wheels and two pinions, are uſually wanted to make the velocities of two hands 12 : 1.

But this ſimple mode of indicating time has no connection with the other motions in the upper part of the dial-work, and the indication might be effected in the ordinary way without interfering with what follows, provided the ſtriking work ſhould be introduced and require it. It may be proper to obſerve here, that the long ſide pinion will act better when made not quite conical, but like two pinions, varying a little in diameter, placed cloſe in contact. The ſmall wheel *c* in *fig.* 1, revolves in ſeven days by means of its interior connection with the fuſee-arbor, from which the moving power is taken, and is always detached, by puſhing in the key, during the act of winding, which is performed on the poſterior part; it is not neceſſary to ſtate more particularly how the multiplication from 12 hours to ſeven days ariſes, as the operation is of the ſimpleſt nature; being only as 1 to 14; the arbor of this wheel *c*, which has 32 teeth, carries the ſmall hand that points out the ſeven days of the week in one of the two correſponding ſmall divided circles in *fig.* 2; by this wheel of 32 teeth is a large one of 135 driven, which is concentric with the lunar plate, that is carried round by its arbor in $\frac{135}{32}$ of 7 days, or in $29^d\ 12^h\ 45^m$. The arbor of this large wheel, as well as that of wheel 32, paſſes through both plates of the clock frame, and is therefore ſteady. On the plane of the moon's plate is painted a black ſpiral on a white ground, tapering both ways from the middle in ſuch a way, that the greateſt breadth will juſt cover the round hole made at the top of the dial, through which the moon's preſent aſpect may always be ſeen, as it correſponds to her age. The arbor of the lunar wheel projects and receives three hands; that with a lune on it points out the moon's age in the outermoſt circle of $29\frac{1}{2}$ ſpaces of Arabic characters, and alſo the time of ſouthing in the ſecond circle of Roman numerals; the ſtraight hand indicates the time of high water at each tide in the ſaid ſecond circle, when ſet for any particular place at new moon; and the third hand, that has a croſs near its extremity, ſhews the day of the month in the outermoſt circle, but requires adjuſtment at the end of the month. To the lunar arbor is attached a pinion of 24 leaves, not ſeen, driving a wheel *d*, of 107 teeth round a ſtud in the front plate, and another pinion of 31 leaves, faſt to it, actuates a ſecond wheel of 86 teeth round, in $\frac{107}{24}$ of $\frac{86}{31}$ of $29^d\ 12^h\ 45^m$, which period reduced is $365^d\ 6^h\ 1^m\ 5^s$, and a hand, inſerted on its arbor, points out the month and ſun's place in the ſmall ecliptic, correſponding in ſize to the week circle, in which the days are indicated.

Upon the annual arbor of wheel 86 is alſo put a ſmall circular plate divided into $29\frac{1}{2}$ ſpaces, which fits into a round hole cut in the dial, the arbor being pivoted acroſs the frame, like the lunar and weekly arbors; the uſe of this ſmall plate is to ſhew the moon's place in the contiguous ſmall ecliptic; for whatever be the moon's age indicated in its proper circle, the ſame age looked to, in this little revolving circle of $29\frac{1}{2}$, will be oppoſite the moon's mean place in the ecliptic at that time. Juſt behind the ſmall lunar plate which revolves in a year, and in the ſame plane with the principal dial-plate, are fixed faſt to the annual arbor two other wheels, one of 98 teeth, and the other of 55; the former cloſe behind the dial, and the other contiguous to that; theſe drive each a correſponding wheel round the lunar arbor, conſidered as a common ſtem; the 98 drives a fellow of 93 teeth, and the 55 a fellow of 62; the former pair of wheels regulate the plate of the moon's nodes and latitude, marked on the plane of the wheel itſelf, which is not croſſed, and the other pair carries a double hand, having A at one end, and P at the other, to ſhew when the moon's hand comes in conjunction with the mean apogeal or perigeal point of her variable orbit. At the time the contriver of this clock adopted the numbers for the retrograde motion of the nodes, and progreſſive motion of the apogee and perigee, he was not aware that they had been uſed in orreries, but he has ſince found that the ratios he calculated for theſe purpoſes have been choſen for the like uſes in ſome other inſtruments of illuſtration. According to theſe numbers, the periods produced by the wheel-work are reſpectively $18\frac{3}{5}$, and $8\frac{6}{7}$ civil years: and wherever the lunar hand is ſeen at any time, the latitude is indicated thereby on the innermoſt circle, and the moon's poſition, with reſpect to the apogee or perigee, may be ſeen, and conſequently her apparent diameter and horizontal parallax, depending on her diſtance from the earth, may be judged of at the time of inſpection, and might even be indicated if another ſtill ſmaller plate were marked therewith, and ſubſtituted for the double hand. The poſitions of the reſpective hands, and ſmall plates, are for Monday July 4th, of the year 1808, when the moon's age is 12, her ſituation at perigee, and alſo a little to the north ſide of the aſcending node, the ſun's place, a little ſhort of the middle of Cancer, and the moon's, a few degrees ſhort of the end of Scorpio. In our article CHRONOMETER, we mentioned that the late Margetts contrived the dial-work of his chronometers ſo ingeniouſly, that both ſolar and ſidereal time, in the three different denominations of hours, minutes, and ſeconds, are conſtantly indicated at the ſame time, and conſequently, the ſun's mean right aſcenſion alſo, which is the difference between mean ſolar and ſidereal time, at any given inſtant; and as we promiſed to deſcribe the contrivance under the preſent head, we propoſe to introduce it next.

Fig. 1. of *Plate* XXXIII. is a plan of the wheels and pinions employed in the motion-work, and *fig.* 2. is the repreſentation of the dials, of which there are four, one large and three ſmall, and of the three hands; both figures being of the real ſize. We will explain, *fig.* 1. firſt; after premiſing that we have inſerted the letters of reference *a*, *b*, *c*, *d*, and *e*, on the margin of the face to avoid confuſion, and have referred by dotted ſtraight lines to the centres to which they reſpectively belong, and where the reader is deſired to conceive them placed: at the centre *a*, the hour-wheel or centre-wheel arbor projects, as uſual, from the frame of the chronometer, and takes the minutes-hand round the large circle, beyond the ſmall face to the right in *fig.* 2, in a ſolar hour on a tube of ſteel that fits tight by friction on the ſaid arbor, which tube is ſquared as uſual to receive its hand; to the lower extremity of this tube, or cannon, as the workmen call it, are attached two cannon pinions, the inferior one of 80 leaves,

leaves, and the ſuperior one of 15, both which conſequently revolve together, in the ſame period of one hour; the under pinion of 80, being of ſmall diameter, has its teeth ſo diminutive, that the naked eye can ſcarcely perceive that there are any, and drives the large wheel of 487 teeth round the centre *c*, where a tube ſurrounds the ſolar ſeconds' hand, and forms a ſtud for this wheel, in order that the arbor of the ſeconds' hand, projecting as uſual from the frame, may have no friction from contact, which it would have if the ſaid fixed tube were not interpoſed; the period of this large wheel is $\frac{487}{80}$ of a ſolar hour, or $6^h\ 5^m\ 15^s$, and it carries round with it the loweſt ſmall face in *fig.* 2, in a direction contrary to that of the motion of the ſeconds' hand, which points to its diviſions, and alſo to the fixed diviſions of the circle ſurrounding this ſmall face on the large dial itſelf. Again, the upper cannon pinion, of 15 leaves, actuates one of the two wheels of 75 teeth that revolve on the fuſee's arbor, as on a ſtud, at the point *d*, both of which wheels, being of the ſame diameter and conſtruction, and lying over one another, appear to an eye placed over them in the plan as one wheel; the wheel, however, in queſtion, is the under one, to which a pinion of 15, not ſeen, is attached, that drives the under one of two ſimilar wheels of 72 teeth each, round a ſtud at the point *b*, in the period $\frac{75}{15} \times \frac{72}{15}$ of a ſolar hour, that is, in 24 hours of ſolar time; and upon a tube on this under wheel of 72 is the ſolar hour hand placed, that revolves in an exact ſolar day, and indicates the 24 hours of mean ſolar time on the large circle of Roman characters, that ſurrounds the left-hand ſmall face. Thus, the three hands indicate the ſolar hours, minutes, and ſeconds on the three fixed circles of the large plate or dial. We have already ſeen, that the great wheel of 487 teeth revolves, by its connection with the cannon pinion, of 80, in $\frac{487}{80}$ of an hour, or in $6^h\ 5^m\ 15^s$, which period is exactly $365\frac{1}{4}$ minutes of ſolar time; to this wheel a pinion of 12 leaves is faſt, that impels a wheel of 72 teeth round a ſtud, or pin, on the cock *f*, that lies over a part of wheel 487, at the point *e*; this wheel has again a pinion faſt to it of 8 leaves, that impels the wheel of 80 teeth round the cannon at *a*, in $\frac{72}{12} \times \frac{80}{8} = \frac{60}{1}$ of $365\frac{1}{4}$ minutes, which period is $15^d\ 5^h\ 15^m$, or $365\frac{1}{4}$ hours; and to the tube of this wheel of 80 the retrograde right-hand ſmall plate, or dial, is attached by friction, and, conſequently, revolves with it, as the ſmall dial on the inferior part of the face does with the large wheel of 487, to which it is alſo attached by the friction of their tubes; and, laſtly, a train of $\frac{75}{15} \times \frac{72}{15}$, in every reſpect ſimilar to the one of this denomination, already deſcribed, converts the $365\frac{1}{4}$ hours into $365\frac{1}{4}$ days, for the period of the third, or left-hand ſmall dial's retrograde revolution; that is, the pinion of 15, faſt to the wheel of 80 teeth, drives the upper 75 round the point *d*, and its pinion of 15 again drives the upper 72 in the manner before deſcribed, the train being, in both caſes, equal to $\frac{24}{1}$. Now, the manner in which ſidereal time is indicated is, by means of the ſolar hands pointing to the three ſmall dials that revolve in a retrograde direction, as they regard theſe hands, in $365\frac{1}{4}$ days, $365\frac{1}{4}$ hours, and $365\frac{1}{4}$ minutes reſpectively; the ſidereal hours, minutes, and ſeconds being ſhorter in duration than ſolar ones, by ſuch a minute quantity, as amounts, in the aggregate, to an entire ſidereal day in a year, conſtitute that ſpecies of time which is uſed as the meaſure of the right aſcenſion of any of the heavenly bodies, and which is itſelf meaſured by the earth's abſolute rotations on its axis, as they have a reference to a ſtar, or any fixed point in the heavens; whereas, ſolar, or common time, is meaſured by the ſaid rotations, as they reſpect the ſun, in apparent motion; which apparent motion is the conſequence of the earth's annual progreſs in the ecliptic. The difference between a ſolar and ſidereal day, in ſolar time, is ſomewhat leſs than four minutes, or $3^m\ 56^s.55$, ſo that a difference, or acceleration of ſidereal, on ſolar time of one ſecond, takes place in about ſix minutes of ſolar time, namely, in $\frac{365^m.25638}{60} = 6^m.0876$; hence, ſuppoſing the figures of the ſmall dials to be put, at any time, to coincide with the ſame figures on the circles ſurrounding them on the fixed face, after about ſix minutes, or entire revolutions of the ſolar ſeconds'-hand, the revolving ſeconds'-face or ſmall dial, ought to fall back *one ſecond ſpace*, but the other two ſmall dials will appear unaltered, by reaſon of the ſlowneſs of their motion; in the next ſix minutes *two ſeconds* of difference will be indicated by the ſeconds'-hand, *i. e.* the ſolar ſeconds will be pointed to on the fixed face, and ſidereal ſeconds on the moveable dial, which, therefore, we call the ſidereal ſeconds'-dial, and the difference of the two indications will be two ſeconds; in like manner, after ſixty ſuch periods of ſix minutes nearly, that is, after upwards of ſix hours, one minute-ſpace of difference will be indicated by the minutes'-hand, when the time, ſhewn on the moveable dial, is compared with the time on the fixed circle of minutes, and the ſeconds'-hand will now, as at firſt, indicate both ſolar and ſidereal ſeconds alike, by reaſon of the firſt minute of difference being completed; and thus, in the courſe of the whole 24 ſolar hours, there will be a difference of nearly four minute ſpaces ſhewn by the minute hand; but as yet there is ſcarcely any alteration perceptible in the hour-circles, nor will there be a difference of one hour's ſpace till upwards of 15 days have tranſpired. Strictly ſpeaking, the period in which the acceleration will amount to a ſecond, by the wheel-work, will be $\frac{487}{80}$ of a minute, or 6.0875 minutes, and as the annual period of the retrograde motion of the ſidereal hour-dial is $365^d\ 6^h\ 0^m$, inſtead of $365^d\ 6^h\ 9^m\ 11^s.5$, the whole error in the indication of ſidereal time, by the ſolar hands pointing to the ſidereal, or moveable dials, will be little more than one ſecond and a half in a ſidereal year, which, it will be allowed, is hardly worth naming. The adjuſtment of the dials is performed by the ſun's mean right aſcenſion, which is determined from the apparent right aſcenſion, given for noon of each day, in the Nautical Almanac, and in White's Ephemeris, by applying the equation of time, together with the acceleration added thereto, at the rate of one ſecond in each ſix minutes of equation, to convert it into ſidereal time; but care muſt be taken to apply the equation with a contrary ſign, to what is applied when apparent ſolar time is converted into mean. When the ſun's mean right aſcenſion is thus obtained in hours, minutes, and ſeconds, at the noon of any day, the hour on the ſidereal hour-dial muſt be put to coincide with XII on the ſolar dial, the minutes on the ſidereal minute-dial muſt be put to coincide with 60 on the ſolar minute-dial, and the ſeconds ſo determined muſt be put as counted on the ſidereal ſeconds'-dial to 60 on the ſolar ſeconds'-plate, in which ſituation of things, the chronometer will indicate not only ſolar and ſidereal time, but alſo the ſun's mean right aſcenſion at mean noon, from which the ap-

parent right aſcenſion may be obtained, by the application of the equation of time, increaſed by the acceleration, with the ſign ſet down in the almanac. In *fig.* 2, the rectification of the dials and hands is for the 3d of Sept. 1808, when the ſolar time is noon or 24^h, the ſidereal is $10^h\ 49^m\ 46^s$, the ſun's mean right aſcenſion alſo $10^h\ 49^m\ 46^s$, and the equation — 50″, which makes the apparent right aſcenſion $10^h\ 48^m\ 56^s$, agreeably to the almanac.

From this view of the dial-work of Margett's chronometers, it is eaſy to ſee, that when the ſolar time is accurately indicated, the ſidereal time correſponding muſt neceſſarily be indicated, accurately too, within a ſecond in the firſt eight months after rectification, and within two ſeconds for the next eight months, and ſo on for any length of time; and when the time of rectification has been noted, the error may be applied, as a rate, if neceſſary, at any ſubſequent period, which conſideration annihilates the objection to a want of complete accuracy. The motions produced by the wheels and pinions in this complex motion-work, being all very ſlow, deduct very little from the maintaining power, ſo little, indeed, as to be abſolutely imperceptible in practice, particularly when a good detached eſcapement is uſed. The uſe of ſuch dial-work in a chronometer, that is regulated by a tranſit inſtrument, muſt be evident to every perſon ſkilled in aſtronomy, navigation, or that branch of ſurveying which has to do with long lines, the bearings of which are aſcertained by the greateſt elongations of the pole ſtar. The ſmall dials will tell, at all periods of day or night, throughout the year, what heavenly bodies, the right aſcenſions of which are previouſly known, are on or near the meridian of the place for which the chronometer has its time adjuſted.

We might enlarge this article by the addition of various other contrivances, introduced by ingenious workmen into the dial-work of clocks and watches, but we will ſatisfy ourſelves with a deſcription of a curious method of indicating time that has hardly yet gained a name, but which ranks among the other modes of pointing out time, though it has not yet been made public. A German mechaniſt happened to be at Copenhagen, ſelling a valuable clock which he had contrived and made, when the Engliſh cauſed that city to capitulate, and the artizan was brought over to England, where he remains in effect a priſoner; being thus ſeparated from his family, and having no means of ſubſiſtence but his ſkill in mechanics, he invented the contrivance we are going to give a brief ſketch of, and the plan of which is given in *fig.* 3, of *Plate* XXXIII. A B is a circle of braſs divided into twelve hours, and ſub-divided into five minute ſpaces, which circle is ſupported, as ſeen in the figure, in a vertical poſition on a wooden baſe; C and D are two weights, apparently balanced on the oppoſite ends of a bar, that turns on an axis, placed horizontally at right-angles, and ſupported by a bearer in the ſhape of a fiſh reſting on its head, the counterpoiſe C is ornamented with a ſtar for the ſake of a deception, that the mind may not be induced to ſuppoſe that any mechaniſm is included. The curioſity, as well as utility of the contrivance, conſiſt in this apparently ſelf-acting principle; move the bar, that now reſts at $7^h\ 55^m$, forcibly round, ſo as to give it conſiderable velocity, and it will continue to ſpin round for ſome time, but whenever it comes to reſt, it will come to a ſtate of quieſcence, at any hour and minute of the day or night, with its index at the very point of the large divided circle that the preſent hour and minute require, though a ſuperficial view of the thing will not diſcover any cauſe for ſuch tendency to reſt always at the preſent hour and minute, any more than the polarity of a magnetic needle can be diſcovered by ocular examination. The fact, however, is, that a watch is contained in the box C, which makes a wheel revolve in twelve hours, that is loaded with a weight heavy enough to alter the common centre of gravity of the loads C and D, as the ſaid wheel revolves, thereby throwing the centre of gravity to the right and left of the axis of motion alternately, and cauſing the ends of the bar, with its loads, to preponderate alternately, and, conſequently, to revolve gradually from XII round to XII again, as the watch governs the rate. It will be ſeen, however, that the velocity of the bar will not be uniform in every part of its revolution, becauſe the coſines of the angles, denoted by equal times, do not vary by equal quantities, and the ingenious remedy for the natural inequalities of motion among the equally divided ſpaces of the circle, conſtitutes the ſecret on which the accuracy of the thing, as a meaſure of time, depends, when the watch is good, and which, therefore, we feel not at liberty to diſcloſe under the preſent circumſtances of the manufacturer. We underſtand, that their royal highneſſes the dukes of York and Kent have purchaſed each one of theſe horoſcopes, as they may be not improperly called, as has alſo general Campbell; and Meſſrs. Rundell and Co. of Ludgate-hill, have kindly undertaken to vend this ingenious article for the benefit of the inventor, who puts no higher price on it than about ſeven guineas.

DIALECT, Διαλεκτος, from Διαλεγεσθαι, *to diſcourſe*, the peculiar language of ſome province, or part, of a nation, formed by corruption of the general, or national language.

Homer could ſpeak five different languages in one verſe, *i. e.* five dialects; *viz.* the Attic, Ionic, Æolic, the Doric, and the common dialect of the Greeks.

The Attic dialect is that which was uſed in Athens and the adjacent country; and it was more particularly uſed by Xenophon, Thucydides, Ariſtophanes, Plato, Iſocrates, and Demoſthenes. The Ionic was almoſt the ſame with the ancient Attic; but after it had paſſed into ſeveral towns of Aſia Minor, and into the adjacent iſlands, which were colonies of the Athenians, and of the people of Achaia, it received a ſort of new tincture, and did not attain to that perfect delicacy which the Athenians afterwards acquired. It was uſed by Herodotus and Hippocrates. The Doric was firſt in uſe among the Spartans, and the people of Argos; it paſſed afterwards into Epirus, Libya, Sicily, Rhodes, and Crete. Archimedes and Theocritus, both of them Syracuſans, and Pindar, adopted this dialect. The Æolic dialect was at firſt uſed by the Bœotians and their neighbours, and then in Æolis, a country of Aſia Minor, between Ionia and Myſia, which contained 10 or 12 cities that were Grecian colonies. Sappho and Alcæus wrote in this dialect. We find alſo a mixture of it in the writings of Theocritus, Pindar, Homer, and many others.

The Bologneſe, Bergamaſque, Tuſcan, &c. are the dialects of the Italian; the Gaſcon, and Picard, are dialects of the French.

In Great Britain, almoſt every county has a dialect of its own, all differing conſiderably in pronunciation, accent, and tone, though the language be the ſame.

The method which the Gileadites took to prove the Ephraimites, by the pronunciation of *ſhibboleth*, with *ſchin*, or *ſamech*, is well known. Judges, xii. 6.

DIALECTICA, Dialectics, Διαλεκτικη, the art of reaſoning and diſputing juſtly.

The word comes from the Greek διαλεγομαι, *I diſcourſe*, formed of δια, and λεγω, *dico*, *I ſay*.

Zeno Eleates is ſaid to have been the firſt who diſcovered the natural ſeries of principles and concluſions obſerved in reaſoning, and formed an art thereof, in form of a dialogue;

which, for this reaſon, was called dialectica. Brucker (Hiſt. Philoſ. by Enfield, vol. i. p. 421.) ſays, that the invention of the dialectic art has been improperly aſcribed to Zeno; though there can be no doubt that this philoſopher, and other metaphyſical diſputants of the Eleatic ſect, employed much ingenuity and ſubtlety in exhibiting examples of moſt of the logical arts, which were afterwards reduced to rule by Ariſtotle and others.

The dialectica of the ancients is uſually divided into ſeveral kinds: the firſt was the Eleatica, that of Zeno Eleates, which was threefold: *viz.* conſecutionum, colloquationum, and contentionum. The firſt conſiſting of rules for deducing, or drawing concluſions; the ſecond, the art of dialogue; which became of ſuch univerſal uſe in philoſophy, that all reaſoning was called interrogation; then ſyllogiſm being laid aſide, the philoſophers did all by a dialogue; it lying on the reſpondent to conclude and argue from the ſeveral conceſſions made. The laſt part of Zeno's dialectics, ερισικη, was contentious; or the art of diſputing, and contradicting: though ſome, particularly Laertius, aſcribe this part to Protagoras, a diſciple of Zeno.

The ſecond is the Dialectica Megarica, whoſe author is Euclid, not the mathematician, but another, of Megara. He gave much into the method of Zeno, and Protagoras; though there are two things appropriated to him: the firſt, that he impugned the demonſtrations of others, not by aſſumptions, but concluſions; continually making illations, and proceeding from conſequence to conſequence; the ſecond, that he ſet aſide all arguments drawn from compariſons, of ſimilitude, as invalid.

He was ſucceeded by Eubulides, from whom the ſophiſtic way of reaſoning is ſaid to be derived. In his time the art is deſcribed as manifold: mentiens, fallens, electra, obvelata, arcevalis, cornuta, and calva. See SOPHISM.

The third is the dialectics of Plato, which he propoſes as a kind of analyſis, to direct the human mind by dividing, defining, and bringing things to the firſt truth; where being arrived, and ſtopping there a little, it applies itſelf to explain ſenſible things; but with a view to return to the firſt truth, where alone it can reſt.

The ſum of his doctrine on dialectics, as collected from his dialogues, is this: Truth is diſcerned, not by the ſenſes, but by the underſtanding; the human intellect is employed, either upon things which it comprehends by itſelf, and which are in their nature ſimple and invariable, or upon things which are ſubject to the ſenſes, and which are perpetually liable to fluctuation and change. The contemplation of the former creates ſcience; attention to the latter produces opinion. Senſe is the paſſive perception of the ſoul through the medium of the body. When the forms of things are, by means of the corporeal organs, ſo deeply impreſſed upon the mind, as not to be eaſily effaced by time, this permanent impreſſion is called Memory. From the union of ſenſe and memory, or from the compariſon of a preſent with a recollected perception, ariſes Opinion: when theſe agree, the opinion is true; when they differ, it is falſe. The ſeat of perception and memory is like a waxen tablet, or picture, which the mind contemplates, and thence frames opinions. In meditation, the ſoul converſes with itſelf: thought flows through the lips by means of the vocal organs. Intellection is the operation of the underſtanding, contemplating intelligible forms, or ideas. It is twofold; the firſt, that of the ſoul contemplating ideas before it deſcends into the body: the other, that which it exerciſes after it is immerſed in the body, which may be alſo termed natural knowledge. This kind of knowledge conſiſts in the recollection of thoſe things which the mind had known in its pre-exiſtent ſtate, and differs from memory in the object; memory being employed upon ſenſible things, reminiſcence upon things purely intelligible. The intelligible objects of contemplation are either primary or ſecondary: the primary are ideas; the ſecondary are the forms inſeparable from material objects. The mind, in exerciſing its judgment, conſiders theoretically what is true or falſe, and practically what may, or may not be done. Dialectics conſider the eſſence and the accidents of things; concerning the former, as we have already obſerved, it makes uſe of diviſion, definition, and analyſis. Diviſion ſeparates the genus into its ſpecies, the whole into its parts, and the like. Definition expreſſes the genus, or the thing to be defined, and diſtinguiſhes it from all others by adding its ſpecific difference. Analyſis riſes from objects of ſenſe to intelligibles; from demonſtrable propoſitions to axioms, or from hypotheſis to experience. Induction riſes from individuals to univerſals. Syllogiſm produces a concluſion by means of ſome intermediate propoſition. Theſe topics are curſorily touched upon by Plato; and it is rather by examples, than by precepts, that he teaches the true art of reaſoning, or expoſes the fallacies of ſophiſtry.

The fourth is Ariſtotle's dialectics, containing the doctrine of ſimple words, delivered in his book of "Predicaments:" the doctrine of propoſitions, in his book "De Interpretatione;" and that of the ſeveral kinds of ſyllogiſm, in his books of "Analytics," "Topics," and "Elenchuſes." See ARISTOTLE and LOGIC.

The fifth is the dialectics of the Stoics, which they call a part of philoſophy, and divide into rhetoric, and dialectic; to which ſome add the definitive, whereby things are juſtly defined, comprehending, likewiſe, the canons, or criterions, of truth. See LOGIC.

The Stoics, before they come to treat of ſyllogiſms, have two principal places; the one about the ſignification of words; the other, about the thing ſignified. On occaſion of the firſt, they conſider abundance of things belonging to the grammarian's province: what, and how many letters; what is a word, diction, ſpeech, &c. On occaſion of the latter, they conſider things themſelves, not as without the mind, but as in it, received in it by means of the ſenſes. Accordingly, they firſt teach, that "nil ſit intellectu, quod non prius fuerit in ſenſu;" whatever is in the mind, came thither by the ſenſes; and that, "aut incurſione ſui," as Plato, who meets the ſight; "aut ſimilitudine," as Cæſar by his effigy; "aut proportione," either by enlarging, as a giant, or by diminiſhing, as a pigmy; "aut tranſlatione," as a Cyclops; "aut compoſitione," as a Centaur; "aut contrario," as death; "aut privatione," as a blind man.

Concerning the whole buſineſs of dialectics, as it appears to have been conducted by the Stoics, we may exclaim with Seneca: "O pueriles ineptias! in hoc, ſupercilia ſubduximus? in hoc, barbara demiſſimus? hoc eſt, quod triſtes docemus, et pallidi?"

The ſixth is Epicurus's dialectics. For though he ſeems to have deſpiſed dialectic, he cultivated it with vigour: he was only averſe to that of the Stoics, who he thought attributed too much to it; as pronouncing him alone wiſe, who was well verſed in dialectics. For this reaſon, Epicurus ſeeming to ſet aſide the common dialectics, as only productive of thorny diſputes, idle quibbles, and fruitleſs cavilling, had recourſe to another way; *viz.* to certain canons, which he ſubſtituted in their ſtead, the collection whereof he called canonica; and as all queſtions in philoſophy are either *de re*, or *de voce*, he gave ſeparate rules for each. See EPICUREANS.

The dialectic philoſophy, loaded with metaphyſical ſubtleties, which had been ſtudied and profeſſed by ſeveral of the clergy towards the cloſe of the 11th century, began, at the opening

opening of the 12th, to be publicly taught in the ſchools, and to take the lead of every other kind of learning.

Abelard devoted himſelf to this kind of ſtudy at the commencement of his literary career, and in the review of this part of his courſe, he obſerves, that philoſophy was thus waſting its ſtrength upon trifles, and that, at this time, it was, perhaps, more than ever, the employment of the philoſophical world to diſpute *de lana caprina*. Dialectic philoſophy was now in high eſteem, from a notion, that it was the key of theology, without which it would be impoſſible to unlock the myſteries of ſacred wiſdom. It was on account of this ſuppoſed alliance between logic and theology, that the former was made the principal object of ſtudy in all the ſchools, and that thoſe who excelled in the dialectic art were regarded with the higheſt admiration, and attended by crowds of pupils. Beſides, the logical and metaphyſical writings of Ariſtotle were ſtudied in the Saracen ſchools in Spain, and induſtriouſly diſperſed through France, Germany, and Italy. It was alſo about this time that many Greek copies of the works of Ariſtotle were brought from Conſtantinople into the weſt. By degrees the fondneſs for the ſubtleties of Ariſtotelian logic and metaphyſics became ſo general, that the orthodox clergy complained, that ſcholars ſpent their whole time in diſputation. Their complaints and their prohibitions were, however, ineffectual; and at length it was found neceſſary, under certain reſtrictions, to favour the ſtudy of Ariſtotle. In proceſs of time, and by no very ſlow gradation, the Ariſtotelian dialectics became intimately connected with theology, and on this account obtained the zealous patronage of thoſe who preſided in the church; ſo that almoſt the whole Chriſtian church became ſcholaſtics. (See SCHOLASTICS.)

At length, about the time of the reformation, many learned men, particularly Valla, Agricola, and Vives, ſpoke with great freedom of the defects of the Ariſtotelian logic; but no one attempted to introduce a better in the room of it, till Peter Ramus undertook the taſk, and executed it with a degree of courage and ſucceſs, which has juſtly given his name conſiderable celebrity. (See RAMUS.) The fame of Ramus, however, vaniſhed before that of Des Cartes; and the ultimate demolition of the Ariſtotelian philoſophy, as it reſpects the ſubject of this article, was principally owing to the labours of the celebrated Mr. Locke, and to the eſſay on the Human Underſtanding. See LOGIC.

DIALECTICAL ARGUMENTS, in *Logic*, are ſuch as are only probable, and do not convince, or determine, the mind abſolutely to either ſide of the queſtion.

DIALIA, in *Antiquity*, ſacrifices performed by the flamen dialis, or prieſt of Jupiter.

It was not, however, of ſuch abſolute neceſſity, that the Dialia ſhould be performed by the flamen dialis; but that others might officiate. We find in Tacitus, Annal. lib. ii. cap. 58. that if he were ſick, or detained by any other public employ, the pontifices took his place.

DIALIS, a Latin term, ſignifying ſomewhat that belongs to Jupiter.

The word is formed from Διος, the genitive of Ζευς, *Jupiter*.

DIALIS, *Flamen*. See FLAMEN.

DIALISIS. See DIALYSIS.

DIALITHA, from δια, and λιθος, *gem*, in the *Writings of the Ancients*, a word uſed to expreſs the elegant ornaments of the Greeks and Romans, compoſed of gold and gems. They alſo called theſe lithocolla, cemented ſtones or gems, the gold being in this caſe, as a cement, to hold the ſtones together. They wore bracelets, and other ornamental things about their habits, thus made; and their cups and table-furniture for magnificent treats were of this kind. The green ſtones were found to ſucceed beſt of all in theſe things; and the emerald and greeniſh topaz, or, as we call it, chryſolite, are moſt in eſteem for this purpoſe. This uſe of the ſtone explains what Pliny very often ſays of them in his deſcription: "Nihil jucundius aurum decet: nothing becomes gold better." This he ſays of the green topaz or chryſolite; and this, and many other like paſſages, have greatly perplexed the critics who did not hit upon this explication. The Latins called theſe dialitha, lithocolla, and aurum gemmatum; and thus Martial, where he ſays "miratur Scythicas virentis auri flammas Jupiter," alludes to cups of gold, ornamented with Scythian gems, that is, emeralds.

DIALIUM, in *Botany*, Linn. Mant. 3. Schreb. 14. Willd. Sp. Pl. v. 1. 49. Vahl. Enum. v. 1. 303. Juſſ. 424. Afzel. Gen. Pl. Guin. p. 1. 13. (Aruna; Schreb. 26. Willd. Sp. Pl. v. 1. 156. Arouna; Aubl. Guian. v. 1. 16. Juſſ. 366.) Claſs and order, *Diandria Monogynia*. Nat. Ord. *Lomentaceæ*, Linn. *Leguminoſæ*, Juſſ. The origin of the name we have not been able to diſcover.

Gen. Ch. reformed. *Cal.* Perianth irregular; in five deep ſegments, equal in length, ovate, obtuſe, concave. *Cor.* none. *Stam.* Filaments two, awl-ſhaped, ſituated at the upper ſide of the receptacle; anthers not extending beyond the calyx-leaves, oblong, obtuſe, heart-ſhaped at the baſe, of two lobes and two cells. *Piſt.* Germen ſuperior, nearly ſeſſile, ovate, oblique, downy; ſtyle awl-ſhaped, the length of the ſtamens, ſmooth at the ſummit, and ſomewhat recurved; ſtigma ſimple, obtuſe. *Peric.* Legume, internally pulpy, with one or two compreſſed ſeeds.

Eſſ. Ch. Calyx in five deep ſegments. Corolla none. Stamens at the upper ſide of the flower. Legume nearly ſeſſile, pulpy within.

1. D. *indum*. Linn. Mant. 24. Willd. Sp. Pl. v. 1. 49. Vahl. Enum. v. 1. 303. (D. javanicum; Burm. Ind. 12.) Leaflets ſmooth on both ſides, elliptic-oblong. Anthers thrice as long as the filaments.——A native of Java, where it is called, in the Malay language, *Coerandie*. It is a tree, with alternate pinnated leaves; leaflets ſeven, alternate, on ſhort thick round ſmooth partial ſtalks, elliptic-oblong, inclining to ovate, pointed, entire, veiny, ſmooth on both ſides, except a bliſtery appearance underneath. Panicles cluſtered, axillary and terminal; their branches downy, alternate, compound and racemoſe, ſome of the lower ones rather corymboſe. Flowers drooping, reddiſh, the ſize of *Clethra alnifolia*, externally downy. Segments of the calyx elliptical, obtuſe, concave, three of them external. Filaments very ſhort and thick. Anthers large, full thrice as long, with a deep furrow on each ſide between their lobes, and a ſlighter one along their edges. Germen ſeſſile, ovate, pointed, oblique, ſilky, with a gland at its baſe. Style awl-ſhaped, recurved and ſmooth at the ſummit. Ripe fruit unknown.

Concerning this plant there has been much uncertainty. Our deſcription is taken from the original ſpecimen in the Linnæan Herbarium, which Dr. Afzelius alſo inveſtigated. See his Diſſertation above quoted. His object was to diſtinguiſh it generically from his *Codarium*, preſumed to be the *Dialium guineenſe* of Willdenow. (See CODARIUM.) In doing this, Dr. Afzelius juſtly terms calyx what Linnæus calls corolla. It is ſingular that Vahl ſhould not have made his own elaborate deſcriptions of theſe two genera accord in this particular. The fruit of the *Codarium acutifolium* of Afzelius, (*C. nitidum* of Vahl.) is called at Sierra Leone the Velvet Tamarind, its pulp being agreeably acid and nutritious. Another ſpecies, found in the country vulgarly called Cape Coaſt, is termed by Afzelius *C. obtuſifolium*; "Leaflets equal in ſize, rounded at their points."

2. D. *divaricatum*. Vahl. Enum. v. 1. 303. (Arouna guianenſis; Aubl. Guian. v. 1. 16. t. 5. Aruna divaricata; Willd. Sp. Pl. v. 1. 156.) Leaflets downy beneath, ovate,

oblique at the baſe. Anthers roundiſh, ſcarcely ſo long as the filaments.—Gathered by Aublet, (one of whoſe own ſpecimens is now before us) in the great foreſts of Guiana, towards the river Sinemari. This is a tree 30 or 40 feet high, flowering in November, and bearing fruit in March. Branches round, tuberculated, leafy. Leaves alternate, three or four inches long, pinnate; leaflets uſually five or ſeven, alternate, on ſhort thick round downy partial ſtalks, ovate, pointed, entire, veiny, oblique or ſloped off at their baſe; ſmooth or nearly ſo above, finely downy and ferruginous beneath, eſpecially their ribs and veins. The partial ſtipulas, deſcribed and figured by Aublet, are declared by Vahl not to exiſt, nor do we find them in our ſpecimen. Panicles much ſmaller than in the firſt ſpecies, and rather more divaricated, clothed with ruſty down, their branches corymboſe. Unexpanded flowers the ſize of muſtard ſeed, ovate, ſhort and thick, ruſty. Calyx at length reflexed, apparently permanent. Stamens ſomewhat diſtant. Anthers ſhort, heart-ſhaped. Germen ſilky, nearly ſeſſile in the diſk of an annular receptacle, without any peculiar gland. Style twiſted. Fruit, according to Aublet, an oval, ſlightly compreſſed, capſule, or rather pod, containing one or two ſeeds lodged in reddiſh acid pulp. One of the ſeeds is often abortive.

We venture to follow Vahl in uniting theſe two plants under one genus, notwithſtanding the fruit of the former being unknown, and ſome ſlight diſcrepancy in the poſition or ſituation of their ſtamens. In habit they are ſufficiently akin. Can the apparent gland, hitherto unnoticed, which we have found in *D. indum* be the rudiment of a petal? If ſo, it brings this ſpecies very near to *Codarium*. S.

DIALLACTERII, among the Athenians. See DIÆTETÆ.

DIALLELOS, Διαλληλος, in *Rhetoric*, a figure, wherein the words and meaning of a ſentence are inverted, as doctis diſertior, diſertis doctior. Voſſ. Rhet. lib. v. p. 405.

DIALLING, the art of drawing ſun, moon, and ſtar-dials, on any given plane, or on the ſurface of any given body. See DIAL.

The Greeks and Latins call this art gnomonica, and ſciatherica, becauſe it diſtinguiſhes the hours by the ſhadow of a gnomon. Some call it photo-ſciatherica, becauſe the hours are ſometimes ſhewn by the light of the ſun. Laſtly, others call it horologiography.

Dialling is wholly founded on the firſt motion of the heavenly bodies, and chiefly the ſun; or rather on the diurnal rotation of the earth; ſo that the elements of ſpherics, and the ſpherical aſtronomy, ſhould be maſtered, before a perſon advances to the doctrine of dialling: the doctrine, or theory, we ſay, for as to the practice, or the operations themſelves diſtinct from the demonſtrations, nothing is more eaſy and obvious.

The principles of dialling may be eaſily deduced from the method, already illuſtrated, of conſtructing dials by the globe. Or, they may be farther explained, by ſuppoſing the whole earth P *c p* (*Plate* IV. *fig.* 36.) to be tranſparent and hollow, like a ſphere of glaſs, and its equator to be divided into twenty-four equal parts by ſo many meridian ſemicircles *a*, *b*, *c*, *d*, *e*, *f*, *g*, &c. one of which is the geographical meridian of any given place, as London, which is ſuppoſed to be at the point *a*; and if the hour of XII were marked at the equator, both upon that meridian and the oppoſite one, and all the reſt of the hours in order on the other meridians, thoſe meridians would be the hour-circles of London: becauſe, as the ſun appears to move round the earth, which is in the centre of the viſible heavens, in twenty-four hours, he will paſs from one meridian to another in an hour. Then, if the ſphere had an opake axis, as P E *p*, terminating in the poles P and *p*, the ſhadow of the axis, which is in the ſame plane with the ſun, and with each meridian, would fall upon every particular meridian and hour, when the ſun came to the plane of the oppoſite meridian, and would conſequently ſhew the time at London, and at all other places on the ſame meridian. If this ſphere was cut through the middle by a ſolid plane A B C D in the rational horizon of London, one half of the axis E P would be above the plane, and the other half below it; and if ſtraight lines were drawn from the centre of the plane to thoſe points where its circumference is cut by the hour-circles of the ſphere, theſe lines would be the hour-lines of the horizontal dial for London; for the ſhadow of the axis would fall on each particular hour-line of the dial, when it fell upon the like hour-circle of the ſphere. If the plane which cuts the ſphere be upright as A F C G (*fig.* 37.) touching the given place, *e. g.* London, at F, and directly facing the meridian of London, it will then become the plane of an erect direct ſouth dial; and if right lines be drawn from its centre E, to thoſe points of its circumference where the hour-circles of the ſphere cut it, theſe will be the hour-lines of a vertical or direct ſouth dial for London, to which the hours are to be ſet in the figure, contrary to thoſe on a horizontal dial; and the lower half E *p* of the axis will caſt a ſhadow on the hour of the day in this dial, at the ſame time that it would fall upon the like hour-circle of the ſphere, if the dial plane was not in the way. If the plane, ſtill facing the meridian, be made to incline, or recline, any given number of degrees, the hour-circles of the ſphere will ſtill cut the edges of the plane in thoſe points to which the hour-lines muſt be drawn ſtraight from the centre; and the axis of the ſphere will caſt a ſhadow on theſe lines at the reſpective hours. The like will ſtill hold, if the plane be made to decline by any given number of degrees from the meridian towards the eaſt or weſt; provided the declination be leſs than 90 degrees, or the reclination be leſs than the co-latitude of the place; and the axis of the ſphere will be the gnomon; otherwiſe, the axis will have no elevation above the plane or the dial, and cannot be a gnomon.

Thus it appears, that the plane of every dial repreſents the plane of ſome great circle on the earth, and the gnomon the earth's axis; the vertex of a right gnomon the centre of the earth or viſible heavens; and the plane of the dial is juſt as far from this centre as from the vertex of this ſtyle. The earth itſelf, compared with its diſtance from the ſun, is conſidered as a point; and therefore, if a ſmall ſphere of glaſs be placed upon any part of the earth's ſurface, ſo that its axis be parallel to the axis of the earth, and the ſphere hath ſuch lines upon it, and ſuch planes within it, as above deſcribed, it will ſhew the hours of the day as truly as if it were placed at the earth's centre, and the ſhell of the earth were as tranſparent as glaſs. Ferguſon, ubi ſupra. See GNOMONIC *Projection*.

The principal writers on dialling are, Vitruvius, Sebaſtian Munſter, John Dryander, Conrade Geſner, Andrew Schoner, Fred. Commandine, Joan. Bapt. Benedictus, J. G. Schomberg, Solomon de Caus, J. B. Trolta, Deſargues, Kircher, Hallum, J. Mark, and Clavius, who demonſtrates all, both the theory and the operations, after the rigid manner of the ancient mathematicians; but ſo intricately, that probably few ever read them: Dechales, Ozanam, and Schottus, give much eaſier in their Courſes, and Wolfius in his Elements.

M. Picard has given a new method of making large dials by calculating the hour-lines; and M. de la Hire, in his Dialling, printed in 1683, a geometrical method of drawing hour-lines from certain points, determined by obſervation. Eberhardus Walperus, in 1625, publiſhed his Dialling, wherein

wherein he lays down a method of drawing the primary dials on a very eaſy foundation. The ſame foundation is deſcribed at length by Sebaſtian Munſter, in his Rudimenta Mathematica, publiſhed in 1651. Sturmius, in 1672, publiſhed a new edition of Walperus's Dialling, with the addition of a whole ſecond part, about inclining and declining dials, &c. In 1708, the ſame work, with Sturmius's additions, was republiſhed with the addition of a fourth part, containing Picard's and De la Hire's methods of drawing large dials, which makes much the beſt, and fulleſt book on the ſubject. Peterſon, Michael, and Muller, have each written on dialling, in the German tongue; Coetſius, in his Horologiographia Plana, printed in 1689; Gauppenius, in his Gnomonica Mechanica; Leybourn, in his Dialling, fol.; Bion, in his Uſe of Mathematical Inſtruments; and Wells, in his Art of Shadows. We have a treatiſe by M. Deparcieux, in 1740. Mr. Ferguſon has alſo written on this ſubject in his Lectures on Mechanics: Mr. Emerſon, in the 9th volume of his works; and Mr. W. Jones, in his Inſtrumental Dialling.

Dialling *Cylinder, Univerſal*, is repreſented by *fig.* 38. A B C D is a glaſs cylindrical tube, cloſed at both ends with braſs plates, in the centres of which a wire or axis E F G is fixed. The tube is either fixed to an horizontal board H, ſo that its axis may make an angle with the board equal to that which the earth's axis makes with the horizon of any given place, and be parallel to the axis of the world; or it may be made to move on a joint, and elevated for any particular latitude. The twenty-four hour-lines are drawn with a diamond on the outſide of the glaſs, equidiſtant from each other, and parallel to the axis. The XII next B ſtands for midnight, and the XII next the board H for noon. When the axis of this inſtrument is elevated according to the latitude, and the board ſet level with the line H N in the plane of the meridian, and the end N towards the north, the axis E F G will ſerve as a gnomon or ſtyle, and caſt a ſhadow on the hour of the day among the parallel hour-lines, when the ſun ſhines on the inſtrument. As the plate A D at the top is parallel to the equator, and the axis E F G perpendicular to it, right lines drawn from the centre to the extremes of the parallels will be the hour-lines of an equinoctial dial, and the axis will be the ſtyle. An horizontal plate *e f* put down into the tube, with lines drawn from the centre to the ſeveral parallels cutting its edge, will be an horizontal dial for the given latitude; and a vertical plate *g c*, fronting the meridian and touching the tube with its edge, with lines drawn from its centre to the parallels, will be a vertical ſouth dial: the axis of the inſtrument ſerving in both caſes for the ſtyle of the dial; and if a plate be placed within the tube, ſo as to decline, incline, or recline, by any given number of degrees, and lines being drawn, as above, a declining, inclining, or reclining dial will be formed for the given latitude. If the axis with the ſeveral plates fixed to it be drawn out of the tube, and ſet up in ſunſhine in the ſame poſition they were in the tube, A D will be an equinoctial dial, *e f* an horizontal dial, and *g c* a vertical ſouth dial, and the time of the day will be ſhewn by the axis E F G. If the cylinder were wood, inſtead of glaſs, and the parallel lines drawn upon it in the ſame manner, it would ſerve to facilitate the operation of making theſe ſeveral dials. The upper plate with lines drawn to the ſeveral interſections of the parallels, which appears obliquely in *fig.* 38, would be an equinoctial dial, as in *fig.* 39, and the axis perpendicular to it be its ſtyle. An horizontal dial for the latitude of the elevation of the axis might be made, by drawing out the axis and cutting the cylinder, as at *e f g h*, parallel to the horizontal board H; the ſection would be elliptic, as in *fig.* 40. A circle might be deſcribed on the centre, and lines drawn to the diviſions of the ellipſe would be the hour lines; and the wire put in its place again, as E, would be the ſtyle. If this cylinder were cut by a plane perpendicular to the horizontal board H, or to the line S H N, beginning at *g*, the plane of the ſection would be elliptic, as in *fig.* 41, and lines drawn to the points of interſection of the parallels on its edge would be the hour-lines of a vertical direct ſouth dial, which might be made of any ſhape, either circular or ſquare; and F the axis of the cylinder would be its ſtyle. Thus alſo inclining, declining, or reclining dials might be eaſily conſtructed, for any given latitude. Ferguſon, ubi ſupra.

Dialling *Globe*, is an inſtrument made of braſs, or wood, with a plane fitted to the horizon, and an index; particularly contrived to draw all ſorts of dials, and to give a clear exhibition of the principles of that art.

Dialling *Lines*, or *Scales*, are graduated lines, placed on rules, or the edges of quadrants, and other inſtruments, to expedite the conſtruction of dials.

The principal of theſe lines are, 1. A ſcale of ſix hours, which is only a double tangent, or two lines of tangents, each of 45 degrees, joined together in the middle, and equal to the whole line of ſines, with the declination ſet againſt the meridian altitudes in the latitude of London, ſuppoſe, or any place for which it is made: the radius of which line of ſines is equal to the dialling ſcale of ſix hours. 2. A line of latitudes, which is fitted to the hour-ſcale, and is made by this canon: as the radius is to the chord of 90 degrees; ſo are the tangents of each reſpective degree of the line of latitudes to the tangents of other arches: and then the natural ſines of thoſe arches are the numbers, which, taken from a diagonal ſcale of equal parts, will graduate the diviſions of the line of latitude to any radius. The line of hours and latitudes is generally for pricking down all dials with centres. For the method of conſtructing theſe ſcales, ſee Scale. There are ſeveral other lines put upon ſcales for dialling, adapted to particular latitudes. Such are, 1. A line of chords: 2. A line of the ſubſtyle's diſtance from the meridian: 3. A line for the height of the ſtyle above the place: 4. A line of the angle of the hours of 12 and 6: 5. A line of the plane's difference of longitude, or inclination of meridians. All theſe are calculated for every degree of declination, for ſome particular latitude, *e. g.* that of London, by the following problem. Let the latitude of the place and the declination of the plane be given; and let it be propoſed to find the height of the pole above the dial-plane, the diſtance of the ſubſtyle from 12 o'clock, and the plane's difference of longitude. Let N E S W (*fig.* 42.) be the horizon, C its centre, N S the meridian, P the pole, and Z the zenith; H A the declining vertical plane; P 1, P 2, P 3, &c. meridians or ſemi circles, interſecting the circle H A in *t, v*, &c. Let the meridian P *v* 2 be perpendicular to H A, then the plane of the meridian P *v* 2 will be perpendicular to the plane of the dial; and therefore the angle Z P *v* is the plane's difference of longitude, or the angle on the ſphere contained between the meridian of the place and the meridian of the plane, called alſo the "inclination of meridians," and the arc P *v* is the height of the pole above the plane; and the arc Z *v* is the diſtance of the ſubſtyle from the meridian. Therefore in the right-angled ſpherical triangle P Z *v* all the three requiſites will be found. For we have P Z the complement of the latitude, and the angle P Z A the complement of the declination A E; whence will be found P *v*, Z *v*, and the angle Z P *v*. Thus 1. As radius is to the ſine of declination, ſo is the cotangent of latitude to the tangent of the ſubſtyle's diſtance from 12 o'clock; for by a caſe of right-angled ſpherical triangles, rad. : cof. P Z *v* :: tang. P Z : tang. Z *v*. 2. Radius is to the coſine of declination as the coſine of latitude is

to

to the ſine of the ſtyle's height; for by right-angled ſpherical triangles, rad. : S. PZ :: S. PZ v : S. P v. 3. Sine of latitude is to radius as the tangent of declination is to the tangent of the plane's difference of longitude; for, rad. : cof. PZ :: tang. PZ v : cotang. ZP v :: tang. ZP v. cotang. PZ v. 4. For the hour angles, it will be, as radius is to the ſine of the pole's height, ſo is the tangent of the hour-arc from the meridian of the plane to the tangent of the hour angle from the ſubſtyle. For let P t 1 be any hour-circle; and in the triangle P t v, we have the pole's height P v, and the hour-arc, equal to the angle t P v; and therefore to find t v, ſay, rad. : S. P v :: tang. t P v : tang. t v = the angle at the centre, or hour-angle. That theſe ſeveral concluſions are rightly deduced will appear thus. The planes of the two meridians PZ, P v, interſect one another on the ſphere in an angle ZP v, equal to the plane's difference of longitude. And the ſame meridians interſect the plane of the dial in an angle equal to ZV, as it ſhould be. For they interſect one another in the centre of the ſphere, which is the centre of the dial. And they interſect the dial-plane HA in Z and v, and Z v meaſures that angle at the centre. For the ſame reaſon, t v meaſures the hour-angle from the ſubſtyle. Again, P v meaſures the angle of the ſtyle above the ſubſtyle. For P v is perpendicular to HA, and the arc P v meaſures the angle formed at the centre of the ſphere, which is the centre of the dial; one ſide being the axis drawn from P, the other the ſubſtyle drawn from V. Moreover, ZP v has been ſhewn to be the plane's difference of longitude. It appears farther, that the plane's differencce of longitude on the ſphere is converted into the ſubſtyle's diſtance from 12, by the interſection of the two meridians (of the place and of the plane) with the dial-plane: For the angle ZP v expreſſes the one, and the arc Z v the other. Again, every hour-angle on the ſphere is converted into the hour-angle in the dial, by the interſection of the ſame two hour-circles, with the plane of the dial; for the angle t P v expreſſes the hour-angle on the ſphere, and t p the angle at the centre. Similar reſults may be obtained from other data by different proportions. Thus, 1. For finding the ſubſtyle's diſtance: cof. of pole's height above the plane P v: S. lat. or cof. PZ :: radius : cof. of the diſtance of the ſubſtyle from 12. Or, radius: S. declination or cof. PZ v :: tang. of the pole's height above the plane P v : S. of the ſubſtyle's diſtance Z v. 2. For finding the ſtyle's height: cof. of ſubſtyle's diſtance, Z v : S. lat. or cof. PZ :: radius : cof. ſtyle's height P v : or, rad. : S. ſubſtyle's diſtance, Z v :: cotang. declination, or tang. PZ v : tang. of ſtyle's height, P v. 3. For the plane's difference of longitude; cof. lat. or S. PZ : rad. :: S. ſubſtyle's diſtance, Z v : S. plane's difference of longitude, ZP v. Or, rad. : tang. lat. or cotang. PZ :: tang. ſtyle's height, P v : cof. of plane's difference of longitude, ZP v. Or, rad. : cof. declination, S. PZ v :: cof. ſubſtyle's diſtance Z v: cof. of plane's difference of longitude, ZP v. Or, cof. ſtyle's height. P v : S. declination, or cof. PZ v :: rad. : S. of plane's diff. of longitude, ZP v. Or, S. of ſtyle's height P v : rad. :: tang. of ſubſtyle's diſtance, Z v : tang. of plane's diff. of longitude, ZP v. On a ſcale the ſeveral requiſites for any declining dial are had by inſpection. In uſing it count the plane's declination on the line of chords, and a line drawn directly acroſs, will interſect all the other lines in their proper points; which the numbers of graduation will indicate, and theſe give all the requiſites without calculation.

When a ſcale of this ſort is not to be had, the requiſites may be found by Gunter's ſcale, extending upon the ſeveral lines, according to the rules and proportions laid down for that purpoſe.

DIALLING *Sphere*, is an inſtrument made of braſs, with ſeveral ſemi-circles ſliding over one another, on a moving horizon, to demonſtrate the nature of the doctrine of ſpherical triangles, and to give a true idea of the drawing of dials on all manner of planes.

DIALLING, in a *Mine*, called alſo *Plumbing*, is the uſing of a compaſs (which they call dial), and a long line, to know which way the load, or vein of ore inclines, or where to ſhift an air-ſhaft, or bring an adit to a deſired place. See MINING, *art of*, and PLUMBING.

In the ancient books of the Derbyſhire mining laws, directions are given for the practice of dialling, wherein a dial is deſcribed, whoſe circle is divided into 32 points each $= 11\frac{1^\circ}{4}$, and each of theſe into 4 pricks, each $= 2\frac{13^\circ}{16}$. Cary, in the Strand, manufactures dials, or ſquare compaſs boxes, with a ſmall reflector in the lid that turns on an hinge; by means of which, and a pin ſtanding up on the oppoſite ſide of the box, obſervations can be made either to a candle under-ground, or to an object above-ground, and its azimuth conveniently and accurately aſcertained.

DIALOGISM, Διαλογισμος, in *Rhetoric*, is uſed for the ſoliloquy of perſons deliberating with themſelves. We have an inſtance of it in Virgil, where Dido ſays,

> "En quid agam? rurſuſne procos irriſa priores
> Experiar? &c."

In which ſenſe, it is diſtinguiſhed from dialogue. Voſſ. Rhet. lib. v. p. 355. See DIALOGUE.

DIALOGISM is alſo taken in a more extenſive ſenſe for diſcourſe in general, whether held by a perſon alone or in company.

DIALOGUE, a converſation of two or more perſons, real or feigned, either by word or mouth, or in writing. The word is formed from the Latin *dialogus*, of the Greek διαλογος, which ſignifies the ſame.

Dialogue is greatly recommended by many authors, and is the moſt ancient form of writing, and that wherein the firſt authors wrote moſt of their pieces. The archbiſhop of Cambray gives a fine account of the advantages of dialogue, at the head of his paſtoral inſtruction. The ſacred writers, and the fathers, Athanaſius, Baſil, Chryſoſtom, &c. have uſed this mode of inſtruction.

Antiquity made uſe of dialogue, not only on humorous and comical ſubjects, as Lucian did, but alſo on the moſt ſerious and abſtract: ſuch are the dialogues of Plato, and thoſe of Cicero, which turn altogether on ſubjects of philoſophy or politics.

Plato is eminently diſtinguiſhed for the beauty of his dialogues. The ſcenery, and the circumſtances of many of them, are admirably painted. The characters of the ſophiſts, with whom Socrates diſputed, are well drawn: a variety of perſonages is exhibited: we are introduced into a real converſation, often ſupported with much life and ſpirit, after the Socratic manner. For richneſs and beauty of imagination, no philoſophical writer, ancient or modern, is comparable to Plato; the only fault of his imagination is ſuch an exceſs of fertility as allows it ſometimes to obſcure his judgment. It frequently carries him into allegory, fiction, enthuſiaſm, and the airy regions of myſtical theology. The philoſopher is, occaſionally, loſt in the poet. He affords, however, much edification; but whether we be edified with the matter or not, we are always entertained with the manner, and left under a ſtrong impreſſion of the ſublimity of the author's genius.

Cicero's dialogues, or thoſe recitals of converſation which he has introduced into ſeveral of his philoſophical and critical works, are not ſo ſpirited, nor ſo characteriſtical as thoſe of

Plato.

Plato. Yet ſome, as that "De Oratore" eſpecially, are agreeable and well ſupported. They ſhew us converſation carried on among ſome of the principal perſons of ancient Rome, with freedom, good breeding, and dignity. The author of the elegant dialogue "De cauſis corruptæ Eloquentiæ," which is ſometimes annexed to the works of Quintilian, and ſometimes to thoſe of Tacitus, has happily imitated, or perhaps excelled Cicero, in this manner of writing.

Lucian has given us a model of the light and humorous dialogue, which he has carried to great perfection. A character of levity, and at the ſame time of wit and penetration, diſtinguiſhes all his writings. His great object was to expoſe the follies of ſuperſtition, and the pedantry of philoſophy, which prevailed in his age; and he could not have taken any more ſucceſsful method for this purpoſe, than that which he has employed in his dialogues, eſpecially in thoſe of the gods and of the dead, which abound with pleaſantry and ſatire. In this invention of dialogues of the dead, he has been followed by ſeveral modern authors.

Among the moderns, the principal dialogiſts are M. de Fenelon, archbiſhop of Cambray; M. Paſchal, in his Provincial Letters; F. Bouhours, in his Entretiens d'Ariſte, & d'Eugene; M. Fontenelle, in his Dialogues of the Dead, and Plurality of Worlds; Addiſon, Hurd, lord Lyttelton, &c.

Fontenelle's dialogues are ſprightly and agreeable; but his characters are all French, whoever are his perſonages: ſo difficult is it to exhibit characters properly diſtinguiſhed. Hence few authors are eminent for characteriſtical dialogue on grave ſubjects. One of the moſt remarkable in the Engliſh language is

Dr. Henry More, in his Divine Dialogues, relating to the foundations of natural religion. Although his ſtyle be now in ſome meaſure obſolete, and his ſpeakers bemarked with the academic ſtiffneſs of the times in which he lived, yet the dialogue is animated by a variety of character, and a ſprightlineſs of converſation, beyond what are commonly met with in writings of this kind.

Biſhop Berkeley's dialogues, concerning the exiſtence of matter, do not attempt any diſplay of characters; but they furniſh an inſtance of a very abſtract ſubject, rendered clear and intelligible by means of converſation properly managed.

Dialogue writing may be executed, either as direct converſation, where none but the ſpeakers appear, which is the method uſed by Plato; or as the recital of a converſation, where the author himſelf appears, and gives an account of what paſſed in diſcourſe, which is the method generally followed by Cicero. In theſe two methods the form may admit of ſome variation, but the nature of the compoſition is the ſame in both, and ſubject to the ſame laws. A dialogue, in one or other of theſe forms, on ſome philoſophical, moral, or critical ſubject, when it is well conſtructed, ranks high among the works of taſte; but it is more difficult of execution, than writers have generally imagined: for it requires more than merely the introduction of different perſons ſpeaking in ſucceſſion. It ought to be a natural and ſpirited repreſentation of real converſation; exhibiting the character and manners of the ſeveral ſpeakers, and ſuiting to the character of each that peculiarity of thought and expreſſion which diſtinguiſhes him from another. A dialogue, thus conducted, affords the reader a very agreeable entertainment; as by means of the progreſs of the debate among ſeveral perſonages, he receives a fair and full view of both ſides of the argument; and is, at the ſame time, amuſed with polite converſation, and with a diſplay of conſiſtent and well-ſupported characters. An author, poſſeſſing genius for ſuch a kind of compoſition, has it in his power both to inſtruct and to pleaſe. But a compoſition of this ſort is very different from that of many modern writers of dialogues; in which, if we except the outward forms of converſation, and that one ſpeaks and another anſwers, it is altogether the ſame as if the author ſpoke in perſon throughout the whole. Such a mode of writing is frigid and inſipid; it is the form, without the ſpirit of converſation.

A dialogue conſiſts of two parts, an introduction and the body of the diſcourſe. The introduction acquaints us with the place, time, perſons, and occaſion of the converſation. However the introduction ought not to be too long and tedious. Mr. Addiſon complains of this fault: for though, as he ſays, ſome of the fineſt treatiſes of the moſt polite Latin and Greek writers are in dialogue, as many very valuable pieces of French, Italian, and Engliſh appear in the ſame dreſs; yet in ſome of them there is ſo much time taken up in ceremony, that before they enter on their ſubject, the dialogue is half over. (Dial. II. of Med. ap. init.) As to the body of the diſcourſe care ſhould be taken, to keep up a juſtneſs of character in the perſons that are introduced through the whole of the dialogue: and the characters ſhould be ſo diſcriminated, that it may be known from the words themſelves who is the ſpeaker. The principal ſpeaker ſhould appear to be a perſon of great ſenſe and wiſdom, and intimate acquaintance with the ſubject; and he ſhould be capable of fairly anſwering every queſtion that may be aſked, and every objection that may be ſtarted. In the whole diſcourſe, all wrangling, peeviſhneſs, and obſtinacy ſhould be avoided; and nothing appear but good humour and good breeding, with a readineſs to ſubmit to conviction, as evidence preſents itſelf. Cicero has given us two characters of this kind in Craſſus and Antony; from whom Mr. Addiſon ſeems to have taken his Philander and Cynthio, in his "Dialogues upon the Uſefulneſs of Ancient Medals." If younger perſons are introduced, they ſhould rather inquire than diſpute; and neither be too long nor too frequent in the queſtions they propoſe. Sulpitius and Cotta are made to ſuſtain this character by Cicero, and Eugenius by Mr. Addiſon. A perſon of humour may be alſo introduced to enliven the diſcourſe, as Cæſar by Cicero, and Cynthio by Mr. Addiſon. With regard to the ſubject of a dialogue, all the arguments ſhould at leaſt appear probable, and nothing be advanced, which may ſeem weak or trivial. Short and pleaſant digreſſions are allowed, but they ſhould not interrupt the thread of the diſcourſe, and break the union of the parts and conſtant reference to the main end, which are eſſential to a dialogue. The time allowed for a dialogue has been various: Cicero allows two days for his three dialogues concerning an orator; but Mr. Addiſon extends his to three days, allowing a day for each. The method of compoſing dialogues has likewiſe been various: ſometimes a writer relates a diſcourſe by way of narrative, which paſſed between other perſons; ſuch are the dialogues of Cicero and of Mr. Addiſon laſt mentioned: at other times the ſpeakers are introduced in perſon; Cicero's dialogues of "Old Age, of Friendſhip, and of the Parts of Oratory," are written in this manner. Plato and Lucian generally chuſe this method. As for the ſtyle of a dialogue, the low ſtyle is the proper character in which they ſhould generally be written. Ward's Orat. vol. ii. p. 221, &c. Blair's Lectures, vol. iii. p. 61, &c.

Dialogue, in *Muſic*, is a compoſition for at leaſt two voices, or two inſtruments, which anſwer each other; and which frequently uniting at the cloſe, make a trio with the thorough-baſs.

Such are many of the ſcenes in the Italian and French operas.

DIALTHÆA, in *Pharmacy*, is an ointment made (as its name imports) with the althæa or marſh-mallow root. It is now diſuſed.

DIALYSIS, or DIALISIS, in *Grammar*, a character conſiſting of two points ¨ placed over two vowels of a word, which would otherwiſe make a diphthong, but are hereby parted into two ſyllables: as in *Moſaïc*. See DIÆRESIS.

DIAM, in *Geography*, a town of Perſia, in the province of Choraſan; 80 miles N. of Herat.

DIAMANT, LA, a town of the iſland of Martinico, on the ſouth coaſt. N. lat. 14° 26′. W. long. 60° 56′.

DIAMARGARITON, in *Pharmacy*, is an ancient electuary, compoſed of pearls and various aromatics. It is diſuſed or ſuperſeded by the preſent aromatic confection.

DIAMARTYRIA, διαμαρτυρια, in *Antiquity*, a proteſtation that the deceaſed perſon had left an heir, made to hinder the relations from entering upon the eſtate. Potter, Archæol. Græc. tom i. lib. i. cap. 24. p. 128.

DIAMASTIGOSIS. It was a cuſtom among the Lacedæmonians, at the ſolemnization of a feſtival bearing this name, for the children of the moſt diſtinguiſhed families to flaſh and tear each others bodies with rods before the altars of the gods; the fathers and mothers who were preſent at the ſpectacle, animating and exciting them all the while, not to give the leaſt ſign of pain, or concern; though ſome of them were ſo ſeverely laſhed as to die upon the ſpot. Such as were victims to this barbarity were crowned before they were buried, and had ſtatues erected to their honour. They afterwards contented themſelves with whipping their youths till the blood came. During the ceremony the prieſt held in his hand a ſtatue of Diana Orthia. This practice they called diamaſtigoſis, a Greek term derived from διαμαστιγοω, *I whip, ſcourge*. The deſign hereof, apparently, was no other than to harden their youth, and inure them betimes to blows, wounds, &c. that they might deſpiſe them when they came to war.

The cuſtom above deſcribed is ſaid to have had its riſe in conſequence of an oracle, which ordered that the altar of the goddeſs at Sparta ſhould be ſprinkled with blood. Accordingly they offered every year in ſacrifice a man choſen for that purpoſe. This was changed by Lycurgus into the whipping of boys at her altar. But when the boys were whipped to death, it was the moſt cruel method of ſacrificing them; of which Plutarch, in his life of Lycurgus, declares he had ſeen ſeveral inſtances. Dacier, in his notes on Plutarch's life of Themiſtocles, obſerves, that in one of the towns of Arcadia, they uſed to whip the women, as they did the young men or boys round Diana's altar at Sparta; and Potter, in his Greek antiquities, ſays, that Bacchus had an altar in Arcadia, upon which a great many young damſels were beaten to death with rods.

DIAMBRA, in *Pharmacy*, is an electuary of the older pharmacopœias, into which ambergris entered as an ingredient, and is now diſuſed.

DIAMETER, from δια and μετρειν, *to meaſure*, in *Geometry*, a right line paſſing through the centre of a circle and terminated on each ſide by its circumference.

Or, the diameter may be defined a chord paſſing through the centre of a circle. Such is the line AE (*Plate* IV. *Geometry*, *fig.* 78.) paſſing through the centre C. Hence the diameter is the greateſt of all chords, and therefore a line greater than the diameter, drawn from any point within the circle, will cut the circumference. Hence it appears that a line, equal to a given line, leſs than the diameter of the circle, may be applied, or inſcribed in a given circle. Hence alſo it appears, that if, to the circumference of a circle AFEB, (*fig.* 79.) from any point D, which is not the centre, right lines DA, DF, DE be drawn, the greateſt of all, DA, will be that which paſſes through the centre C; and of the reſt, that DF, whoſe other extreme, F, is placed neareſt in the circumference to the extreme, A, of the greateſt, will exceed any other, DE, whoſe extreme, E, is at a greater diſtance. For, from the centre C, draw CE and CF. 1. AD = DC + CF ⌐ DF. 2. Since DC is common, CF = CE, and DCF ⌐ DCE. Therefore DF is ⌐ DE. Whence it follows, that as no two lines, DE, DF, drawn from D, on the ſame ſide of the diameter, AB, can be equal to each other, three equal right lines cannot poſſibly be drawn from the periphery to any point, beſides the centre of the circle; and, therefore, if from a point in any circle, three equal right lines can be drawn to the periphery, that point is the centre of the circle. Moreover, no circle can be deſcribed to cut another in more points than two; for if it were poſſible to cut it in three points, G, E, F, then right lines drawn from the centre, Q, to thoſe points would be all equal, which is impoſſible, unleſs when the centre Q coincides with C: and then the circles themſelves will neither cut, nor touch, but coincide, and become one circle.

Half a diameter, as CD, (*fig.* 78.) drawn from the centre C, to the circumference, is called the ſemidiameter, or radius.

The diameter divides the circumference into equal parts. And hence we have a method of deſcribing a ſemicircle upon any line; aſſuming a point therein for the centre.

To find the ratio of the DIAMETER *to the circumference.*—This has been greatly ſought for by the mathematicians; and no wonder; inaſmuch as if this were juſtly given, the quadrature of the circle were atchieved.

Archimedes firſt propoſed a method of finding it, by regular polygons inſcribed in a circle, till arriving at a ſide ſubtending an exceeding ſmall arc, and then ſeeking a ſide of a ſimilar polygon circumſcribed; each of theſe being multiplied by the number of ſides of the polygon, give the perimeter of the polygon both inſcribed and circumſcribed. In which caſe the ratio of the diameter to the circumference of the circle is greater than that of the ſame diameter to the perimeter of the circumſcribed polygon, but leſs than that of the diameter to the perimeter of the polygon inſcribed. The difference between both gives the ratio of the diameter to the circumference in numbers nearly true. See CIRCLE, art. 23.

That celebrated author, as already obſerved, by polygons of 96 ſides, found the ratio of the diameter to the circumference to be as 7 to 22; *viz.* ſuppoſing the diameter 1, the perimeter of the inſcribed polygon is found $3\frac{10}{71}$, and that of the circumſcribed $3\frac{1}{7}$.

After this example, later authors have found out ratios yet nearer truth; Wolfius finds it as 1000000000000000 to 3141592653589793 2; but none ſpent ſo much time on it as Van Ceulen, who, after immenſe pains, found that ſuppoſing the diameter, 1, the circumferenee is leſs than 3.14159265358979323846264338387950, and yet greater than the ſame number with only the laſt figure 0 changed into 1. Mr. A. Sharp doubled Van Ceulen's numbers; and this is ſo near the truth, that the diameter of the earth being given, we might from thence compute the number of ſands equal to the ſolid contents of the earth ſo near as not to differ one grain of ſand from the truth. Mr. Machin carried them to one hundred places; thus the circumference of a circle whoſe diameter is 1, will be 3.14159265358979 32384626433838795028841971693993751058209749445 92307816405286208998628034825342117067 9.

But as ſuch prolix numbers are too unwieldy for practice, many of our preſent practical geometricians aſſume the diameter to be to the circumference as 100 to 314; or in

greater circles as 10000 to 31415; in which proportion Ptolemy, Vieta, and Huygens, agree with Van Ceulen. Ad. Metius gives us the ratio 113 to 355, which is the moſt accurate of all thoſe expreſſed in ſmall numbers; as not erring 3 in 10000000. Thoſe in common uſe are Archimedes's, Metius's, or the proportion of 1 to 3.14159.

The DIAMETER *of a circle being given, to find the circumference and area; and the circumference being given, to find the diameter.*—The ratio of the diameter to the circumference being had, as in the laſt article, that of the circumference to the diameter is had likewiſe. Then the circumference being multiplied into the fourth part of the diameter, gives the area of the circle. Thus, if the diameter be 100, the circumference will be 314, and the area of the circle 7850. But the ſquare of the diameter is 10000: therefore, this is to the area of the circle as 10000 to 7850, that is, as 1000 to 785 nearly.

The area of the circle being given, to find the DIAMETER.—To 785, 1000, and the given area of the circle 246176, find a fourth proportional, *viz.* 3113600, which is the ſquare of the diameter. Out of this extract the ſquare root, and it is the diameter itſelf.

DIAMETER *of a conic ſection*, is a right line biſecting all the ordinates, &c. See CONIC *Sections*.

This, when it cuts the ſaid lines at right angles, is more particularly called the *axis of the curve*, or *ſection*.

DIAMETER, *Tranſverſe*, is a right line, which being continued each way between two curves, biſects parallel right lines between the ſame.

DIAMETER, *Conjugate*, is a right line, biſecting lines drawn parallel to the tranſverſe diameter. See CONJUGATE.

DIAMETER *of any Curve*, is a right line which divides two other parallel right lines, ſo that in each of them, all the ſegments or ordinates on one ſide, between the diameter and different points of the curve, are equal to each other. This is Newton's ſenſe of a diameter. But, according to ſome, a diameter is that line, whether right or curved, which biſects all the parallels drawn from one point to another of a curve. In this way every curve will have a diameter; and hence the curves of the *ſecond* order, have, all of them, either a right-lined diameter, or elſe the curves of ſome one of the conic ſections for diameters. And many geometrical curves of the higher orders may alſo have for diameters, curves of theſe inferior orders.

DIAMETER *of a ſphere*, is the diameter of the ſemicircle by whoſe rotation the ſphere is generated; called alſo the axis of the ſphere.

DIAMETER *of gravity*, is a right line paſſing through the centre of gravity.

DIAMETER, in *Aſtronomy*, is either apparent or real. The apparent diameter of a heavenly body, is the angle which it ſubtends at the place of the obſerver, and it varies inverſely as the diſtance, becauſe ſmall angles are proportional to their tangents.

It is by obſervations of the apparent diameters of the planets, that we are enabled to aſcertain their true diameters, or real magnitudes, having previouſly found their diſtance. See DISTANCE.

In the triangle T A B, (*Plate* IX. *Aſtronomy. fig.* 64) in which the angle B is a right angle, we have this proportion:

R : ſin. A T B :: T A : A B;

thus the true diameter A B is found by multiplying the diſtance T A by the ſine of the angle A T B, which is the apparent diameter of the planet.

The apparent diameter of the ſun is continually changing, and the law of its variation affords a ſtrong proof of the elliptic nature of the earth's orbit, and that the motion of the earth is really ſlower, as its diſtance from the ſun is greater. For the diameter of the ſun is about 31′ 31″ in ſummer, and 32′ 36″ in winter; from which it is evident, that its diſtance in ſummer is to its diſtance in winter, as 32′ 36″ to 31′ 31″. The hourly motion of the ſun in winter is 2′ 33″; and 32′ 36″ : 31′ 31″ : : 2′ 33″ : 2′ 28″. Therefore, the hourly motion in ſummer would be 2′ 28″, if it was really uniform, and its apparent variation occaſioned only by our greater or leſs diſtance from the ſun. But by obſervation, the hourly motion in ſummer is only found to be 2′ 23″: ſo that beſides the diminution of 5″, cauſed by the increaſe of diſtance, there is a farther dimunition of 5″, which can only be attributed to a decreaſe of velocity in the motion of the earth.

It is only ſince the application of teleſcopes to aſtronomical inſtruments that the diameters of the ſun and planets have been accurately determined.

There are ſeveral methods of determining the diameter of the ſun: By micrometers; by obſerving the time of its paſſage over the meridian wire of a tranſit inſtrument; by the difference of altitude between its upper and lower limb, as obſerved by a mural quadrant or good circular inſtrument, or by a repeating circle.

The meaſurements which uſually have been conſidered as the beſt, and which have been adopted in our ſolar tables, have been made with object-glaſs micrometers. De la Lande, in the year 1760, determined the diameter (apogee) 31′ 30½″. Dr. Maſkelyne 31′ 29″.2. Short, with an object-glaſs micrometer, applied to a two foot teleſcope, 31′ 28″. There is neceſſarily ſome ſmall uncertainty in the meaſure by a micrometer from the difficulty of obtaining the accurate value of its ſcale of diviſions. Some ſmall difference will likewiſe ariſe from the nature of the teleſcope employed.

A good aſtronomical circle, moving eaſily in azimuth, would be well adapted for this determination; as ſeveral obſervations might be made before and after the meridian paſſage, and the correction for change of altitude, applied by the table calculated for that purpoſe, and which we have given under DECLINATION.

Perhaps the repeating circle of Borda would be ſtill preferable. Of the extreme accuracy that may be obtained by repeating the angle, even with a ſmall inſtrument, we may form ſome idea from a ſeries of obſervations, made by M. Quenot, and inſerted in the Connaiſſance des Temps for the year 1803. He repeated the meaſure of the diameter of the ſun a thouſand times, and the obſervations divided into ten parts of one hundred each, were as follows:

52° 32′ 30″	Diameter (apogee) deduced	31′ 31″.5
52 30	———————	31 30
52 33	———————	31 31 8
33	———————	31 31 8
31	———————	31 30.6
33	———————	31 31 8
29	———————	31 29.4
30 30	———————	31 30.3
34 30	———————	31 32.7
30	———————	31 30

Mean 31′ 31″.

The inſtrument uſed was a reflecting circle of Borda of 5 inches radius.

This quantity is the ſame as is adopted by Delambre in his ſolar tables lately publiſhed. Annexed to this article is a table of the ſun's ſemidiameter to every degree of mean anomaly. The variation in the apparent ſemidiameter of the ſun correſponds with the variation of the ſun's horizontal parallax, which is, in fact, the apparent ſemidiameter of the earth, as ſeen from the ſun; they of courſe increaſe and decreaſe together, and inverſely as the diſtance of the two

bodies from each other, as appears from the ſame table, in which the parallax is likewiſe given.

If we examine the meaſures that have been given by different aſtronomers, of the diameter of the ſun, it will be found that they have a tendency to diminiſh as they approach the preſent time; a ſuſpicion has hence ariſen that the ſun may poſſibly be decreaſing in magnitude. But this is ſo highly improbable, that we are inclined to attribute the circumſtance partly to accident and partly to the improvement of teleſcopes, which render the apparent image of the ſun ſomewhat ſmaller.

The difference between the greateſt and leaſt diameters of the ſun is 64.″6.

The ſemidiameter of the ſun, divided by the correſponding parallax, (table I.) gives a conſtant quantity, which expreſſes the ratio of the diameters of the ſun and the earth.

Thus, $\frac{16' 1''.1}{8.'8} = 109.2$.

According to De la Lande, who aſſumes the ſun's horizontal parallax, 8″.6; the ſun's diameter is to that of the earth as 111 : 1.

From which it appears, that if the centre of the ſun be ſuppoſed placed in the ſame point as the centre of the earth, the globe of the ſun would then extend to a diſtance nearly twice as great as the orbit of the moon.

In calculations of eclipſes, it is uſual to diminiſh the diameter of the ſun 5″ or 6″, to allow for the irradiation, which makes the apparent diſk of the ſun appear greater than it otherwiſe would do.

The apparent diameter of the moon varies from 29′ 22″ to 33′ 34″: its mean diameter being nearly equal to the leaſt apparent diameter of the ſun.

The variations in the diameter of the moon are much greater than in the diameter of the ſun, as it is in ſome meaſure affected by almoſt all the lunar irregularities.

Theſe variations indicate a correſponding change in her diſtance. Horrox, as long ſince as the year 1638, obſerved, that the moon being apogee, was not always at the ſame diſtance from the earth, that the diameter was leaſt in the conjunctions apogee, and greateſt in the ſyzigies perigee.

When the argument of the evection is O ſigns, the diameter is diminiſhed 18″ or 20″; but when the argument of evection is VI ſigns, it is, on the contrary, augmented by the ſame quantity, though its diſtance from the apogee ſhould, in both caſes, be the ſame. In the ſame manner with reſpect to the argument of the variation, when that is O or VI ſigns, the diameter of the moon increaſes 14″ or 15″; and when the argument is III or IX ſigns; it decreaſes by the ſame quantity, though at the ſame diſtance from the apogee. See EVECTION and VARIATION.

The expreſſion for the diameter of the moon for any given time is nearly this:

31.′ 7.″3 − 1.42.″3 cof. anomal + 5.″4 cof. 2 anomal. + 13.″7 cof. 2 diſt. ☽ ⊙ − 20.″2 cof. (2 diſt. ☾ ⊙ − anomal ☽) the other equations are ſcarcely ſenſible; but they may be included by taking the equatorial parallax as an argument for the ſemidiameter, as in the new lunar tables, by Burg, publiſhed by the Bureau des Longitudes, at Paris.

As the moon approaches the zenith, her diſtance becomes leſs, and the apparent diameter is increaſed. Let T (*fig.* 65.) be the centre of the earth, O the place of an obſerver on the ſurface, Z the moon ſuppoſed to be in the zenith. The diſtance Z O is about $\frac{1}{60}$ part leſs than the diſtance Z T; its diameter, therefore, ſeen from O, will be greater than if ſeen from T in the ſame proportion.

If the moon be at L, its zenith diſtance being the angle L O Z, the diſtance L O will be evidently leſs than the diſtance L T. When the moon is at the horizon at H, the augmentation will be nearly inſenſible, for which reaſon we conſider the horizontal ſemi-diameter as equal to that which would be ſeen from the centre of the earth; but this is not quite correct, for the moon muſt be below the horizon, by a quantity equal to half her parallax, for the augmentation to be really equal O; that is when the triangle L O T is iſoſceles.

When the horizontal diameter of the moon is known, it is eaſy to compute the augmented diameter, ſince they are to each other as L O to L T.

In the triangle L O T, the angle O is the ſupplement to the apparent zenith diſtance; the angle L T O is the true zenith diſtance, as ſeen from the centre of the earth: and L O : L T :: ſine O T L : ſin. L O T or L O Z. Therefore, the horizontal diameter is to the apparent diameter, as the ſine of the true zenith diſtance of the moon, as ſeen from the centre of the earth, is to the apparent diſtance, as ſeen from the point O. The augmented diameter of the moon may be found, therefore, by this proportion.

As cof. of true altitude is to cof. of apparent altitude, ſo is the horizontal diameter to the augmented diameter. The difference between the two is called the augmentation of the moon's diameter; a table of which has been given under DECLINATION.

In the above computation, if the moon is very near the zenith, her diſtance from the centre and ſurface of the earth ſhould be employed inſtead of the zenith diſtances.

The diameter of the moon may be meaſured in the ſame manner as that of the ſun, or it may be inferred with great accuracy, from the time which elapſes between the immerſion and emerſion of a fixed ſtar. M. Burg, who computed it by this latter method for his lunar tables, found no difference from the reſult, by an object glaſs micrometer of Dollond.

The apparent diameters of the planets, at leaſt of thoſe near to us, vary much more than the diameters of the ſun and moon.

The diameter of a planet, when its diſtance is equal to the mean diſtance of the ſun, being divided by the diſtance of the planet from the earth, gives its actual or apparent diameter as ſeen from the earth; and the diſtance is found by this proportion: As the ſine of the elongation, is to the ſine of the commutation, ſo is the diſtance of the planet from the ſun reduced to the ecliptic, to the diſtance from the earth in the plane of the ecliptic. This diſtance divided by the geocentric latitude, is the diſtance of the planet from the earth.

The moſt favourable opportunity of obſerving the diameter of Mercury is when he paſſes over the diſc of the ſun. It may either be meaſured directly by a micrometer, or computed by the time it takes to paſs over the edge of the ſun.

De la Lande meaſured the diameter of Mercury on the ſun's diſc, in 1753, with an object glaſs micrometer adapted to a teleſcope of 18 feet, and found it 11.″8. At that time the diſtance of Mercury to the earth, was to the mean diſtance of the ſun to the earth, as 55674 to 101007.

Therefore, 1010 : 557 :: 11.″8 :: 6.″5.

Hence, 6.″5 is the diameter of Mercury, at a diſtance equal to the mean diſtance of the ſun.

Dr. Bradley, by a ſimilar method, with a teleſcope of 120 feet, in 1723, found the diameter on the ſun's diſc 10″.7, which gives 7.″3 for the mean diſtance. By computing it from the time it took to quit the diſc, De la Lande found 5.″9.

The diameter of Venus is found in the ſame manner, and with extreme accuracy, for every ſecond of the diameter of Venus employs 19″ to quit the diſc of ſun. And as it is not eaſy to miſtake 5″ in the length of time the planet takes

to

to quit the disc, the diameter of Venus may be known to a quarter of a second.

When the second limb of the planet touches the exterior limb of the sun in E, (*fig.* 66.) Venus is at the point F in her orbit, and the distance C E of the centres of the planet and the sun, is equal to the sum of their semi-diameters; on the contrary, in the interior contact, Venus is at D, and the distance of their centres is equal to the difference of their semi-diameter.

The shortest distance C B is supposed known; therefore, by resolving separately the two triangles, C B D, C B F, we obtain the two portions of the planet's orbit B D, B F: their difference D F gives the length of time the planet should employ to quit the disc, as observed from the centre of the earth. Proper allowance being made for parallax, the transit in 1761 gave 57."9, and that of 1769, 57."2. according to De la Lande. See TRANSIT *of Venus* and PARALLAX.

Picard measured the diameter of Mars on the 8th Sept. 1762, and it appeared to him to be 30". This observation reduced to the mean distance of the sun from the earth, is equal 11."4; according to Monnier, 9."9; by Rochon, with a prismatic micrometer, 8."9.

The diameter of Mars was very acurately determined by Dr. Herschel, in 1783 (Philos. Trans. 1784). He estimates the diameter 8."94, and the difference of $\frac{1}{16}$ between the equatorial and polar diameter. This supposes the planet's distance equal to the mean distance from the sun.

The diameter of Jupiter was observed in the year 1719, by Pound, with a micrometer applied to a telescope of 123 feet. He found it always between 38" and 40"; generally 39". By the length of time which the first and third satellite employed to pass over the disc, observed with the same telescope, Newton computed its diameter $27\frac{1}{4}$" at its mean distance: this would give 3' $13\frac{3}{4}$", at the distance of the sun from the earth.

But astronomers prefer a direct measure by a micrometer.

The equatorial diameter of Jupiter is found to exceed the polar diameter, in the proportion of 1.073 : 1.

The diameter of Saturn, observed by Pound, was 18", and the diameter of the ring 42".

Dr. Herschel, from a mean of a great many measures of the larger ring, makes it 46".67, at the mean distance of Saturn.

The dimensions of the two rings are in the following proportions:

	Parts.
1. Inside diameter of the smaller ring	5900
2. Outside diameter	7510
3. Inside diameter of the larger ring	7740
4. Outside diameter	8300
5. Breadth of the inner ring	805
6. Breadth of the outer ring	280
7. Breadth of the space between the rings	115

which may be thus expressed in English miles:

1.	146,345
2.	184,393
3.	190,248
4.	204,883
5.	20,000
6.	7,200
7.	2,839

The diameter of the planet, at its mean distance, is 1.8"

A great difference of opinion exists, relative to the apparent diameters of the new planets, Ceres, Pallas, Juno, and Vesta.—According to Dr. Herschel, none of their diameters subtend an angle of half a second, at the distance of the earth from the sun, but Mr. Schroeter estimates Ceres at 3" 5, and Pallas 4".5.

The diameters of Jupiter's satellites have been estimated by the time they employ to enter the shadow of the planet.

According to Bailly, they subtend the following angles, as seen from Jupiter.

I.	60' 26"
II.	29 42
III.	22 28
IV.	9 39

Mr. Schroeter, who has made a great number of observations on the satellites of Jupiter, with a view of ascertaining their diameters, objects to the method of Bailly, and prefers employing the time which the satellites take to disappear behind the body of the planet, or to enter on the disc when they pass over it. This method, with a telescope of high power, seems capable of great exactness. The result of M. Schroeter's observations is as follows.

	I.	II.	III.	IV.
Time employed to enter the disk	235"	245".3	544".5	505
Diameters seen from Jupiter	33' 16"	17' 13"	18' 59"	7'.32"
True diameters in miles 15 to a degree	564	465	818	570
In miles 60 to a degree	2256	1860	3272	2280
In proportional parts of diam. of 24	$\frac{1}{34}$	$\frac{1}{42}$	$\frac{1}{24}$	$\frac{1}{34}$
Diameter viewed from the earth. 24 perigee	1.403	1.15	2.04	1.42
The same by direct measurement	1.39	1.09	2.27	1.41
By direct measure of the shadow	1.01	0 91	1.88	——
Diam. at the mean dist. of earth from ⊙, that of Jupiter being 3'13".5	5.53	4 54	8.05	5.60
Diameters. Jupiter being supposed 1	0.0288	0.0238	0.0418	0 0291

They do not appear to differ much in magnitude from each other, they are about $\frac{1}{20}$th of the diameter of Jupiter, or nearly one half of the diameter of the earth.

Diameters of the sun, moon, and planets, according to different astronomers.

Diameter of the Sun.							
		′	″	′	″	′	″
Aristarchus and Archimedes	A.C. 260	30	0.0	30	0.0	30	0.0
Ptolemy	A.D. 120	33	20.0	32	18.0	31	20.0
Albatennius	900	33	40.0	32	28 0	31	20.0
Regiomontanus	1460	34	.00	32	27.0	31	0.0
Copernicus	1510	33	540	32	44.0	31	40.0
Tycho	1570	32	0.0	31	0.0	30	0.0
Kepler	1600	31	4.0	30	30.0	30	0.0
Riccioli	1640	32	8.0	31	40.0	31	0.0
Jean Dominique Cassini	1660	32	46.0	32	13.0	31	40.0
Gascoigne	1640	32	50.0			31	40.0
Picard and Auzout	1670					31	38
Flamstead	1680	32	48.0			31	30.0
Mouton	1665	32	32.0			30	29.0
De la Hire	1685	32	44.0	32	11.06	31	38.0
Louville	1720	32	37.7			31	32.50
Jean Jaques Cassini	1740	32	37.50	32	5.0	31	32.50
Hailey	1720					31	38
Monnier				32	5.0		

Diameter of the Sun—*continued.*								
Bradley (by the time of ſun's tranſit)	1750					31	30.5
Short	1760	32	33	0		31	28.0
La Caille in his ſolar tables	1758					31	34 0
De la Lande	1760					31	31.5
Maſkelyne						31	29.2
Piazzi	1792	mean of 70 obſ.				31	32.5
By Delambre's tables		32	35.6	32.2		31	31.0
Diameter of the Moon.							
Ptolemy		35	20.0			31	20.0
In the conjunction Tycho		28	48 0			25	36 0
In the oppoſition		36	0.0			32	0.0
Kepler		32	44.0			30	0.0
De la Hire		33	30.0			29	30.0
In ſyzygy, ſir I. Newton				31	30 0		
In quadrature				31	30.0		
Full. in perigee, Mouton		33	29.0				
In ſyzygy, Monnier				31	30.0		
In quadrature				31	0.0		
By Burg's tables		33	50.6			28	55.8
Diameter of Saturn.							
Albatennius				1	44·50		
Alfraganus				1	44·50		
Tycho		2	12.0	1	50.0	1	34.0
Hevelius	1660	0	19.0	0	16.0	0	14.0
Hortenſius		0	42.60	0	37.0	0	31 0
Kepler		0	30 0				
Riccioli		1	12.0	0	57.0	0	46.0
Huygens						0	30.0
Flamſtead		0	25.0				
Sir I. Newton, from the obſervations of Pound				0	16.0		
Monnier				0	16.0		
Saturn's ring, according to Huygens				1	4.0	1	8.0
Sir I. Newton, from the obſervations of Pound				0	40.0		
Monnier				0	42.0		
Diameter of Jupiter.							
Albatennius and Alfraganus				2	36.7		
Tycho		3	59.0	2	45.0	2	14.0
Hevelius		0	24.0	0	1 8 0	0	14.0
Hortenſius		1	1.6	0	50.0	0	38.5
Kepler		0	50.0				
Riccioli		1	8.7	0	49.7	0	38.3
Huygens						1	4.0
Flamſtead		0	54.0				
Sir I. Newton, from the obſervations of Pound				0	37.2		

Diameter of Jupiter—*continued.*							
Pound's obſervation uncorrected for irradiation				0	39.0		
Monnier				0	37.0		
Diameter of Mars.							
Albatennius and Alfraganus				1	34.0		
Tycho		6	46.0	1	14.0	0	57.0
Hevelius		0	20 0	0	5.0	0	2.0
Hortenſius		1	4 0	0	36.0	0	9.0
Kepler		6	30 0				
Riccioli		1	32.0	0	22.0	0	10.1
Huygens						0	30.0
Flamſtead		0	33.0				
Monnier						0	26.0
Diameter of Venus.							
Albatennius		3	8.0				
Alfraganus		1	34.0				
Tycho		4	40 0	3	15 0	1	52.0
Hevelius		1	5.0	0	16.0	0	9 0
Hortenſius		1	40.0	0	53 0	0	15.3
Kepler		7	6.0				
Riccioli		4	8.0	1	4.2		
Huygens						1	25.0
Flamſtead		1	12.0				
Horrox	1635	1	18.3				
Crabtree	1639	1	9.0				
Monnier				1	17.0		
By the tranſit of 1761				0	58.0		
By the tranſit of 1769				0	59.0		
Diameter of Mercury.							
Albatennius				2	5.3		
Alfraganus				1	15.2		
Tycho		3	57.0	2	10.0	1	29.0
Hevelius		0	11.0	0	6.0	0	4.0
Hortenſius		0	28 0	0	19.0	0	10.0
Riccioli		0	25.2	0	13.8	0	9.3
Bradley		0	10.45				
Monnier						0	10.0

TABLE I.

	Apparent mean Diameter, as ſeen from the Earth.	Mean Diameters at the Diſtance of the Sun.	Mean Diameters in Engliſh Miles.	Mean Diameters as ſeen from the Sun.	Apparent Diameter of the Sun.	Proportional Diameters.
Sun	32 ′ 2		883246			110
Moon	31 8	0′ 4″.7	2180	4.″6	32′	0.27
Mercury	0 7	0 7.0	3224	16.0	80	0.4
Venus	16.5	0 16.5	7687	300	46	0.9
Earth		0 17.4	7912	17.4	32	1
Mars	11	0 8.9	4189	10.0	21	0.5
Ceres		Her. 0.35 Schro. 3.5	doubtful—probably none leſs than 100 miles, nor greater than 400.			
Pallas		H. 0.32 S. 4.5			12	
Juno						
Veſta						
Jupiter	0 39	3 6.8	89170	37.	6.1	11.6
Saturn	18	2 51.7	79040	16.0	3.4	9.8
Herſchel	4	1 14.5	35100	4.0	1 6	4.25

TABLE

TABLE II.

Semi-diameter of the Sun for every Degree of Mean Anomaly.

Argument. Mean Anomaly.										
Sig. 0.				Sig. I.			Sig. II.			
Deg.	Semidiam.	Days of the Month.	Paral.	Semidiam.	Days of the Month.	Paral.	Semidiam.	Days of the Month.	Paral.	Deg.
	′ ″		″	′ ″		″	′ ″		″	
0	16 17.79	Jan. 1.	8.95	16 15.49	Feb. 1.	8.93	16 9.30	Nov. 1.	8.87	30
1	16 17.79		8.95	16 15 34		8.93	16 9.05		8.87	29
2	16 17.78	Dec. 30.	8.95	16 15.18	Nov. 30.	8.93	16 8.79	Oct. 30.	8.87	28
3	16 17.77		8.95	16 15.02		8.92	16 8.54		8.87	27
4	16 17.75		8.95	16 14.85		8.92	16 8 28		8.86	26
5	16 17.73		8.95	16 14.69		8.92	16 8.02		8.86	25
6	16 17.70		8.95	16 14.51		8.92	16 7.75		8.86	24
7	16 17.66		8.95	16 14.34		8.92	16 7.49	Mar. 10.	8.86	23
8	16 17.62		8.95	16 14.16		8.92	16 7.22		8.85	22
9	16 17.58	Jan. 10.	8.95	16 13.97	Feb. 10.	8.91	16 6.95		8.85	21
10	16 17.53		8.95	16 13.78		8.91	16 6.68		8.85	20
11	16 17.47		8.95	16 13.59		8.91	16 6.41		8.85	19
12	16 17.41	Dec. 20	8.95	16 13.39	Nov. 20.	8.91	16 6.14	Oct. 20.	8.84	18
13	16 17.35		8.95	16 13.20		8.91	16 5.86		8.84	17
14	16 17.28		8.95	16 12.99		8.91	16 5.59		8.84	16
15	16 17.20		8.95	16 12.78		8.90	16 5.31		8.84	15
16	16 17.12		8.94	16 12.57		8.90	16 5.04		8.83	14
17	16 17.04		8.94	16 12.36		8.90	16 4.76	Mar. 20.	8.83	13
18	16 16.95		8.94	16 12.14		8.90	16 4.48		8.83	12
19	16 16.85	Jan. 20.	8.94	16 11.92	Feb. 20.	8.90	16 4.20		8.83	11
20	16 16.75		8.94	16 11.69		8.89	16 3.92		8.82	10
21	16 16.65		8.94	16 11.46		8.89	16 3.64		8.82	9
22	16 16.54	Dec. 10	8.94	16 11.24	Nov. 10.	8.89	16 3.36	Oct. 10.	8.82	8
23	16 16.42		8.94	16 11.01		8.89	16 3.07		8.82	7
24	16 16.30		8.94	16 10.77		8.89	16 2.79		8.81	6
25	16 16.18		8.94	16 10.54		8.88	16 2.51		8.81	5
26	16 16.05		8.93	16 10.29		8.88	16 2.23		8.81	
27	16 15.92		8.93	16 10.05		8.88	16 1.95	Mar. 30.	8.80	4
28	16 15.78		8.93	16 9.80	Mar. 1.	8.88	16 1.67		8.80	3
29	16 15.63	Jan. 30.	8.93	16 9.55		8.87	16 1.38		8.80	2
30	16 15 49		8.93	16 9.30		8.87	16 1.10		8.80	
Sig. XI.				Sig. X.			Sig. IX.			

If the semi-diameter at the mean distance be supposed to vary by 1″, there results this variation for any other semi-diameter 1.″ + 0″.17 cos. (Long. ☉ + 2ˢ 20° ½).

TABLE II.—*continued.*

Semi-diameter of the Sun for every Degree of Mean Anomaly.

Argument. Mean Anomaly.										
	Sig. III.			Sig. IV.			Sig. V.			
Deg	Semidiam.	Days of the Month.	Paral.	Semidiam.	Days of the Month.	Paral.	Semidiam.	Days of the Month	Paral.	Deg.
	′ ″		″	′ ″		″	′ ″			
0	16 1.10	April 1.	8.80	15 53.17		8 72	15 47.53		8.67	30
1	16 0.82		8.79	15 52.94	Aug. 30	8.72	15 47 40		8.67	29
2	16 0.54	Sep. 30.	8 79	15 52.70		8.72	15 47.27	July 30.	8 67	28
3	16 0.26		8.79	15 52 48		8.72	15 47.15		8.67	27
4	15 59 98		8.78	15 52.25		3.72	15 47.03		8 67	26
5	15 59.70		8.78	15 52 03		8.71	15 46.92		8.67	25
6	15 59.42		8.78	15 52.81		8 71	15 46.81		8.67	24
7	15 59.14		8.78	15 51.59		8.71	15 46.70		8.67	23
8	15 58.87		8.78	15 51.37	May 10.	8.71	15 46.60		8.66	22
9	15 58.59	April 10.	8 77	15 51.16		8.71	15 46.50	June 10.	8.66	21
10	15 58.32		8.77	15 50.96		8.70	15 46.41		8.66	20
11	15 58.05		8.77	15 50 75	Aug. 20.	8.70	15 46.32		8.66	19
12	15 57.77	Sep. 20	8.77	15 50.55		8.70	15 46.24	July 20.	8 66	18
13	15 57.50		8.77	15 50.35		8.70	15 46.16		8.66	17
14	15 57.23		8.77	15 50.15		8.70	15 46.08		8.66	16
15	15 56.96		8.77	15 49.96		8.69	15 46.01		8 66	15
16	15 56 70		8.76	15 49.77		8.69	15 45.95		8.66	14
17	15 56.44		8.75	15 49.59		8.69	15 45.88		8.66	13
18	15 56.17	April 20.	8.75	15 49.41	May 20.	8.69	15 45.83		8.66	12
19	15 55.91		8.75	15 49.23		8.69	15 45.78	June 20.	8.66	11
20	15 55.65		8.75	15 49.06		8.69	15 45.73		8.66	10
21	15 55.39		8.74	15 48.89	Aug. 10	8.69	15 45.68		8.66	9
22	15 55.13	Sep. 10	8.74	15 48.72		8.68	15 45.64		8.66	8
23	15 54.88		8.74	15 48.56		8.68	15 45.61	July 10.	8.66	7
24	15 54.63		8.74	15 48.40		8.68	15 45.58		8.65	6
25	15 54.38		8.74	15 48.24		8.68	15 45.55		8.65	5
26	15 54.14		8.73	15 48.09		8.68	15 45.53		8.65	4
27	15 53.89		8.73	15 47.94		8.68	15 45.52		8.65	3
28	15 53.65	April 30.	8.73	15 47.80	May 30.	8.68	15 45.51	June 30.	8.65	2
29	15 53.41		8.73	15 47.66		8.67	15 45.50		8.65	1
30	15 53.17		8 72	15 47.53		8.67	15 45.50		8.65	0
	Sig. VIII.			Sig. VII.			Sig. VI.			

TABLE III.

Semi-diameter of the Sun in Siderial and Mean Time.

Months.	Sun's true Longitude.	Siderial Time.	Mean Time.	Months.	Sun's true Longitude.	Siderial Time.	Mean Time
	' °	' "	' "		' °	' "	' "
21 March	0	1 4.5	1 4.3	23 Sept.	VI. 0	1 4.1	1 3 9
26	5	4 4	4.2	28	5	4.2	4.0
31	10	4.5	4.2	3 Oct.	10	4.4	4.2
5 April	15	4.5	4 3	9	15	4.7	4 5
10	20	4.7	4 5	14	20	5.1	4 9
15	25	4.9	4.7	19	25	5.5	5.3
20	I. 0	5.2	5.0	24	VII. 0	6.0	5.8
25	I. 5	5.6	5.4	29	VII. 5	6.5	6.3
1 May	10	6.0	5.8	3 Nov.	10	7.1	6.9
6	15	6.4	6.2	8	15	7.7	7.5
11	20	6 8	6.6	13	20	8 3	8.1
16	25	7.2	7.0	18	25	8.8	8.6
21	II. 0	7.6	7.4	22	VIII. 0	9.4	9.2
27	II. 5	8.0	7.8	27	VIII. 5	9.9	9.7
1 June	10	8.3	8.1	2 Dec.	10	10 3	10.1
11	15	8.5	8.3	7	15	10.7	10.5
16	20	8.7	8.5	12	20	11.0	10.8
22	25	8.8	8.6	17	25	11.1	10.9
22	III. 0	8.9	8.7	22	IX. 0	11.2	11.0
27	III. 5	8.8	8.6	27	IX. 5	11.1	11.0
2 July	10	8 7	8.5	1 Jan.	10	11.0	10.8
7	15	8.5	8.3	6	15	10.8	10.6
13	20	8.2	8.0	11	20	10.5	10.3
18	25	7 8	7.6	16	25	10.1	9 9
23	IV. 0	7.4	7.2	20	X. 0	9.6	9 4
28	IV. 5	7.0	6.8	25	X. 5	9.1	8.9
3 Aug.	10	6.5	6.3	30	10	8.5	8.3
8	15	6.1	5 9	4 Feb.	15	7.9	7.7
13	20	5.7	5.5	9	20	7.4	7.2
18	25	5 3	5.1	14	25	6.8	6 6
23	V. 0	4 9	4.7	19	XI. 0	6.3	6 1
29	V. 5	4.6	4.4	24	XI. 5	5.8	5.6
3 Sept.	10	4.3	4.1	1 March	10	5.4	5.2
8	15	4.1	3.9	6	15	5.1	4.9
13	20	4.0	3 8	11	20	4.8	4.6
18	25	4.0	3.8	16	25	4.6	4.4
23	VI. 0	4.1	3.9	21	XII. 0	4.5	4.3

DIAMETER *of a Column*, is its thickneſs juſt above the baſe. From this the module is taken, which meaſures all the other parts of the column.

DIAMETER *of the Diminution*, is that taken from the top of the ſhaft. See DIMINUTION.

DIAMETER *of the Swelling*, is that taken at the height of one-third from the baſe.

DIAMINTZ, or DUNAMUND, in *Geography*, a town of Ruſſia, in the government of Riga, on the coaſt of the Baltic; 12 miles N. W. of Riga.

DIAMIUM, in *Ancient Geography*, *Gianutti*, an iſland of Italy, in the vicinity of that of Igillium.

DIAMOND; *Diamant*, Fr.; *demant*, Germ.; adamas *of ancient authors*.

The diamond has from the remoteſt antiquity been conſidered as the moſt valuable or more properly, the moſt coſtly ſubſtance in nature. The reaſon of the high eſteem in which it was held by the ancients, was its rarity and its extreme hardneſs; for, the art of cutting and poliſhing this gem, not having been then invented, its ſuperior brilliancy and luſtre could not be duly appreciated. The ſhort account which Pliny (Hiſt. Nat. lib. 37. § 15.) gives of this ſubſtance, contains more error than truth: we ſhall, however, commence our article by a detail of theſe particulars, as they conſtitute the whole of the information handed down to us by the ancients concerning this, the moſt precious of all the productions of art or nature.

The diamond, ſays Pliny, is the moſt coſtly of human poſſeſſions:

poſſeſſions: it was found diſſeminated like gold, through metallic veins; but was of very rare occurrence, and was always accompanied by gold. The moſt ancient writers deſcribe it as found only in Ethiopia, between the iſland Meroe and the temple of Mercury; and as reſembling a cucumber ſeed both in ſhape, ſize, and colour. It has of late, continues the ſame author, been brought from India. The Indian diamond is not found in gold mines, and appears to have ſome relation to rock-cryſtal, ſince it reſembles this ſubſtance in its colourleſs tranſparency, and in its form, which is either that of a ſmooth ſix-ſided priſm, terminated in a point on one extremity, or of two pyramids united by their baſes. Its magnitude is ſometimes equal to that of a hazel nut. The Arabian diamond reſembles the above, only it is ſmaller. The diamond is diſtinguiſhed from all other ſubſtances by its hardneſs, which is ſuch as to break and ſplinter both the hammer with which it is ſtruck, and the anvil on which it lies. It is incapable alſo of being heated by the moſt violent fire: on both which accounts it is called by the Greeks *adamas*, that is, unconquerable. But though it reſiſts the action of fire and ſteel, yet if macerated in the freſh blood of a he-goat, it may, with difficulty, be ſplit by a hammer. The ſmall ſhivers thus obtained are much ſought after by engravers on gems; for when ſet in an an iron handle, they enable the artiſt readily to cut the hardeſt ſtones. A kind of antipathy ſubſiſts between the diamond and magnet, ſo that the latter cannot attract iron when in contact with the former. The diamond alſo deſtroys the effect of poiſons, and cures inſanity, on which account it is called by ſome *anachitis*. So far concerning the knowledge poſſeſſed by the ancients of this gem.

When the Arabians, during the dark ages of Europe, had eſtabliſhed themſelves in Spain, and on the ſouthern and eaſtern coaſts of the Mediterranean ſea, the wild and monſtrous fictions of theſe and other oriental nations, obtained a currency in Europe, which even at preſent has not entirely ceaſed. Among other abſurdities, the occult qualities and ſuperſtitious uſes of the gems was adopted with peculiar eagerneſs, and, no doubt, contributed greatly to the high eſtimation in which theſe ſubſtances were held. The diamond, as being the moſt valuable and beautiful of the gems, was ſuppoſed to be endowed with theſe hidden virtues in the higheſt degree: hence it was held as an infallible ſpecific in many diſeaſes, a teſt of conjugal fidelity, a reconciler of domeſtic ſtrife, and an amulet of higheſt power againſt poiſons, inſanity, witchcraft, incantations, nocturnal goblins, and evil ſpirits.

At length, after a long night of intellectual darkneſs, men began to be convinced, that the beſt way of acquiring a knowledge of the properties of natural ſubſtances, was by an inveſtigation of facts, inſtead of appealing to the fancy. Yet it was a long time before the falſe facts and idle fancies concerning the gems in general, and the diamond in particular, began to give way to experiment and common ſenſe; for Rulandus in his "Lexicon Alchemiæ," firſt publiſhed in 1607, gives an account of the diamond, even more incorrect than that which Pliny has left us. Two years after this period, however, namely, in 1609, Boetius de Boot publiſhed his valuable treatiſe "De Lapidibus et Gemmis," in which is contained a detailed account of all that was previouſly known or imagined concerning the diamond, and accompanied by his own obſervations and remarks. The whole article is too long to be tranſlated and inſerted in this place, but is well worthy of peruſal as a very curious ſpecimen of the method employed by men of real candour and underſtanding in treating of thoſe ſubjects of natural hiſtory, that were as yet not wholly emancipated from the influence of ſuperſtition. He firſt obſerves, that the diamond is diſtinguiſhed from other gems by the ſuperior luſtre which it exhibits, when fixed in a plate of black maſtich, and the force with which they adhere to each other. This he attributes to a kind of affinity between theſe two ſubſtances; from which circumſtance, and becauſe the diamond, when heated, attracts ſmall ſtraws, &c. as amber does, he concludes that this gem differs from the others, in being of an inflammable, ſulphureous, and oily nature. From this circumſtance, certain modern writers have claimed for De Boot the honour of being the firſt who has maintained the inflammability of the diamond. There is ſurely however a great difference between arriving at truth by means of falſe or true premiſes. Romé de Liſle, who made the experiment with great care, affirms, that rock cryſtal adheres to maſtich with at leaſt as much firmneſs as the diamond does; and it is a fact perfectly well aſcertained, that tourmaline, and many other mineral bodies, that are well known to contain no inflammable matter in their compoſition, will, when warmed or rubbed, attract various light bodies; ſo that the facts adduced by De Boot do not juſtify his concluſion. Newton, on the other hand, ſuſpected the inflammability of the diamond, becauſe in its power of refracting light, it differed greatly from all earthly bodies, and obviouſly ranked in this reſpect among the inflammable ones; an obſervation which all ſubſequent experience has only ſerved to confirm.

But though De Boot has fallen into the error above-mentioned, it ſhould be remarked to the credit of his account of the diamond, that he points out with conſiderable exactneſs the diamond mines of India and Malacca, and is much inclined to doubt the genuineneſs of all the diamonds ſaid to be found in Europe. He diſproves, from experiment, the aſſertions of Pliny reſpecting the impoſſibility of breaking this ſubſtance; and alſo ſhews, that it exerciſes no power over the property of attracting iron, poſſeſſed by the magnet. With regard to the ſuperſtitious and metaphyſical properties of the diamond, though he does not venture to deny them altogether, yet he maintains that they are not to be attributed to the gem itſelf, but to the angelic ſpirits, which it has pleaſed the Almighty to connect in a myſterious manner with certain natural ſubſtances.

The ſubſequent hiſtory of diſcoveries reſpecting the diamond, relates for the moſt part to its combuſtibility; and theſe the reader will find ſufficiently detailed in the article CARBON. We ſhall therefore proceed to the deſcription of this gem, according to the moſt accurate modern writers on the ſubject.

The diamond is either colourleſs, or of a light yellow, or ſmoke-grey paſſing into bluiſh, or pearl-grey, or clear wine-colour; on one hand deepening into clove-brown, and on the other into yellowiſh-green: it alſo occurs of a deep, almoſt black brown, Pruſſian blue, or roſe red. The colourleſs varieties are the moſt eſteemed, and next to theſe in value are the blue, red and black; the light coloured are the leaſt in eſtimation.

It is found cryſtallized in the regular octohedron (which is its primitive form) compoſed of two four ſided pyramids, applied baſe to baſe, or in the cuneiform octohedron. Sometimes each triangular face of the primitive octohedron is replaced by ſix ſecondary triangles, bounded by curvilinear lines; in which caſe the whole cryſtal has forty eight faces, and is of a ſpheroidal figure. Other ſpheroidal varieties of this mineral are the dodecahedron, a ſolid of twenty four faces, and a compreſſed ſpheroid reſembling a very ſhort hexahedral priſm, terminated by very ſhort curvilinear pyramids.

The ſurface of the natural cryſtals, eſpecially the ſpheroidal, is ſomewhat dull and chatoyant. This appearance which is generally repreſented as the effect of a thin cruſt, appears to be cauſed merely by the ſaliant edges of the laminæ of which the cryſtal conſiſts. When its ſurfaces are reduced to perfect ſmoothneſs by grinding and poliſhing, the diamond is of extreme brilliancy, far ſurpaſſing every other ſubſtance in luſtre, and the lively play of priſmatic colours, which dart from it in lines of light, whenever its poſition, with regard to the eye, undergoes the leaſt variation. The fracture of the diamond is ſtraight foliated; hence it may readily be cleft in the direction of its lamellæ by a dextrous artiſt. Some of the ſpheroidal varieties, however, are compoſed of curved plates; theſe are of intenſe hardneſs, and cannot be either ſplit, or very highly poliſhed; they are therefore uſed by the glaziers and engravers on gems, or are ground into a powder, and employed in the poliſhing of other diamonds.

The hardneſs of this gem is ſuperior to that of all other bodies; it yields however to corundum by long-continued friction. It is brittle and frangible without much difficulty. Its ſp. gr. varies from 3.518 to 3.550.

Diamond, even when rough, acquires by friction the vitreous or poſitive electricity. It becomes phoſphoreſcent when expoſed either to the entire rays of the ſun, or to the blue ones alone, when ſeparated by the priſm, and concentrated on the diamond by means of a lens. A ſimilar effect is alſo produced by fixing it to the end of a charged conductor, and taking a few electric ſparks from it. Many diamonds, however, are incapable of becoming phoſphoreſcent, although agreeing in colour, tranſparency, &c. with thoſe which readily become luminous. The ſmaller acquire this property by a much ſhorter expoſure to the light, than the larger ones do; ſometimes a diamond that is not phoſphoreſcent, by the mere action of the ſolar rays, may be made ſo, by previouſly immerſing it for ſome time in melted borax. See Groſſer in Journ. de Phyſique, vol. xx. p. 270.

Diamond, when heated to the temperature of melting copper, and expoſed to a current of air, is gradually, but completely combuſtible; it is ſurrounded by a luminous areola during the proceſs. It is wholly converted into carbonic acid, and therefore conſiſts of pure carbon, as we have already mentioned under that article.

The art of cutting and poliſhing diamonds was probably known to the artiſts of Hindooſtan and China at a very early period: but the only material uſed in the Eaſt for this purpoſe being corundum, and the apparatus being of extreme ſimplicity, the jewellers of theſe countries are incapable of bringing out the peculiar beauty of the diamond in a degree at all comparable to what is readily effected by European artiſts. The extreme hardneſs of this gem had baffled the attempts of the jewellers of Europe till the year 1456, when a young man, named Louis Berghen, a native of Bruges, endeavoured to poliſh two diamonds, by rubbing them againſt each other: he found that by this means a facet was produced on the ſurface of the diamonds, and in conſequence of this hint, conſtructed a poliſhing wheel, on which, by means of diamond powder, he was enabled to cut and poliſh this ſubſtance, in the ſame way as other gems are wrought by emery. Previouſly to this diſcovery, diamonds were ſet in jewellery, preciſely in the ſtate in which they arrived from India, and hence the octohedrons were much more eſteemed than the reſt, both on account of the regularity of their figure and the ſuperiority of their poliſh.

On the ſubject of the manufacture of diamonds, we ſhall ſtate the following particulars, on the authority of Jeffries's treatiſe of Diamonds.

Diamonds are cut and manufactured by jewellers into brilliants and roſe diamonds; the former being for the moſt part made out of the octohedral cryſtals, and the latter from the ſpheroidal varieties. To faſhion a rough diamond into a brilliant, the firſt ſtep is to modify the faces of the original octohedron, ſo that the plane formed by the junction of the two pyramids ſhall be an exact ſquare, and the axis of the cryſtal preciſely twice the length of one of the ſides of the ſquare. The octohedron being thus rectified, a ſection is to be made, parallel to the common baſe, or *girdle*, ſo as to cut off $\frac{5}{18}$ths of the whole height from the upper pyramid, and $\frac{1}{18}$th from the lower one. The ſuperior and larger plane, thus produced, is called the *table*, and the inferior and ſmaller one is named the *collet*: in this ſtate it is called a *compleat ſquare table diamond*. To convert it into a brilliant, two triangular facets are placed on each ſide of the table, thus changing it from a ſquare to an octagon; a lozenge-ſhaped facet is alſo placed at each of the four corners of the table, and another lozenge extending lengthways along the whole of each ſide of the original ſquare of the table, which, with two triangular facets ſet on the baſe of each lozenge, compleats the whole number of facets on the table-ſide of the diamond: *viz.* eight lozenges and twenty-four triangles. On the collet-ſide are formed four irregular pentagons, alternating with as many irregular lozenges radiating from the collet as a centre, and bordered by ſixteen triangular facets adjoining the girdle. The brilliant, being thus compleated, is ſet with the table-ſide upwards, and the collet-ſide implanted in the cavity made to receive the diamond.

The regular roſe diamond is formed by inſcribing a regular octagon in the centre of the table-ſide of the ſtone, and bordering it by eight right-angled triangles, the baſes of which correſpond with the ſides of the octagon; beyond theſe is a chain of eight trapeziums, and another of ſixteen triangles. The collet-ſide alſo conſiſts of a minute central octagon, from every angle of which proceeds a ray to the edge of the girdle, forming the whole ſurface into eight trapeziums, each of which is again ſub-divided by a ſaliant angle (the apex of which touches the girdle,) into one irregular pentagon, and two triangles.

In the formation of either a brilliant or roſe-diamond of regular proportions, ſo much is cut away, that the weight of the poliſhed gem is no more than half that of the rough cryſtal out of which it was formed; whence the value of a cut diamond is eſteemed equal to that of a ſimilar rough diamond of twice the weight, excluſive of the coſt of the workmanſhip. The weight, and conſequently the value, of diamonds, is eſtimated in carats; one of which is equal to four grains, and the difference between the price of one diamond and another, *ceteris paribus*, is as the ſquares of their reſpective weights. Thus the value of three diamonds of one, two, and three carats' weight reſpectively, is as one, four, and nine. The average price of rough diamonds, that are worth working, is about 2*l.* ſterling for the firſt carat, and conſequently in wrought diamonds, excluſive of the coſt of workmanſhip, the coſt of the firſt carat is 8*l.* In other words, in order to eſtimate the value of a wrought diamond, aſcertain its weight in carats, and fractions of a carat, multiply this by two, then multiply this laſt product into itſelf, and finally multiply this latter ſum by 2*l.* Hence a wrought diamond of

1	Carat,	is	worth	£ 8
2	-	-	-	32
3	-	-	-	72
4	-	-	-	128
5	-	-	-	200
6	-	-	-	288

7	Carats are worth		£392
8	-	-	- 512
9	-	-	- 612
10	-	-	- 800
20	-	-	3,200
30	-	-	7,200
40	-	-	12,800
50	-	.	20,000
60	-	-	28,800
70	-	-	39,200
80	-	-	51,200
90	-	.	64,800
100	-	.	80,000

This rule, however, actually holds good only in the ſmaller diamonds of 20 carats, and under; the larger ones, in conſequence of the ſcarcity of purchaſers, being diſpoſed of at prices greatly inferior to their eſtimated worth. The value of ſome of the moſt perfect diamonds exceeds that given in the table; but for a ſtone that is flawed, cloudy, or of a bad colour, ſometimes three quarters of the whole tabular value muſt be deducted.

We now proceed to enumerate ſome of the moſt remarkable diamonds, and at the head of the liſt ought unqueſtionably to be placed the great diamond of Portugal, if it were not now become the general opinion, both of jewellers and mineralogiſts, that this ſuppoſed diamond is only a colourleſs topaz. It was found in the diamond mines of Brazil, and is as yet in its native rough ſtate; it weighs 1680 carats.

The largeſt, therefore, of all the undoubted diamonds, is that mentioned by Tavernier, as in the poſſeſſion of the great Mogul; its weight, according to the ſame author, (who himſelf weighed it,) is $279\frac{9}{16}$ carats: its form and ſize are equal to about half a hen's egg. It was found in the mine of Colore, to the eaſt of Golconda, about the year 1550.

The next in ſize is a Braſilian diamond, in poſſeſſion of the king of Portugal, weighing 215 carats, and of ſingular beauty.

An oriental diamond, formerly belonging to one of the Perſian ſultans, and at preſent in poſſeſſion of the emperor of Ruſſia, deſerves the next place: it is without flaws or faults of any kind, and weighs 193 carats. It was purchaſed by the late empreſs Catherine, for about 90,000*l.* ready money, and an annuity of about 4000*l.* more. Its form is that of a flattened ovoid, and it is about the ſize of a pigeon's egg.

The laſt that deſerves a place among the great diamonds of the world, is the Pitt, or regent diamond; which was brought over from India by an Engliſh gentleman of the name of Pitt, and was ſold by him to the regent duke of Orleans, by whom it was placed among the crown jewels of France, and of which it ſtill forms the great glory. It is cut in the form of a brilliant, and is abſolutely faultleſs; it weighs $136\frac{4}{16}$ carats, and was purchaſed for about 100,000*l.*

Diamonds were much more rare, and of courſe dearer, before the diſcovery of the Braſilian mines of this ſubſtance, than they have been ſince. In the year 1730, the Rio Janeiro fleet brought to Europe no leſs than 1146 ounces of diamonds, the produce of Brazil; in conſequence of which, the price of this article immediately fell three-fourths, and to prevent a ſtill further depreciation, the Portugueſe government reſtricted the number of ſlaves allowed to be employed by thoſe to whom leaſes of theſe mines had been granted.

In order to enable the reader to form ſome judgment of the quantity and value of the diamonds poſſeſſed by the ſovereigns of Europe, we ſhall preſent him with an abſtract of a curious inventory of the crown diamonds of France, preſented to the National Aſſembly by a commiſſion of jewellers, appointed for that purpoſe in the year 1791.

	Weight in Carats.	Eſtimated Value in Livres.
1. A brilliant diamond, called *Le Regent* - -	$136\frac{14}{16}$	12,000,000
2. A diamond cut in facets, called *Le Sancy*, perfect in luſtre and tranſparency -	$33\frac{12}{16}$	1,000,000
3. A diamond cut in facets -	$28\frac{6}{16}$	250,000
4. A brilliant diamond -	$26\frac{12}{16}$	150,000
5. A pear-ſhaped diamond, of a peach-bloſſom colour -	$24\frac{13}{16}$	200,000
6. Le Miroir de Portugal -	$21\frac{2}{16}$	250,000
7. A yelloviſh pear-ſhaped diamond - - -	$20\frac{14}{16}$	65,000
8. A roſe-coloured brilliant, flawed	$20\frac{12}{16}$	48,000
9. A colourleſs olive-ſhaped diamond	$18\frac{13}{16}$	85,000
10. A greeniſh brilliant, flawed	$18\frac{11}{16}$	20,000
11. A pale wine-coloured brilliant	$18\frac{9}{16}$	75,000
12. A ſteel-coloured brilliant	$17\frac{7}{16}$	18,000
13. A brilliant, cloudy -	17	50,000
14. Le dizieme Mazarin, cloudy	16	50,000
15. A peach bloſſom-coloured brilliant	$14\frac{14}{16}$	25,000
16. A colourleſs brilliant -	$14\frac{14}{16}$	150,000
17. A peach bloſſom-coloured brilliant	$14\frac{12}{16}$	30,000
18. A brilliant - -	$13\frac{10}{16}$	60,000
19. A browniſh brilliant -	$13\frac{8}{16}$	35,000
20. A yelloviſh brilliant -	$11\frac{10}{16}$	15,000
21. A browniſh brilliant - -	$11\frac{10}{16}$	10,000
22. A yelloviſh brilliant -	$11\frac{6}{16}$	15 000
23. A peach-bloſſom coloured brilliant	$11\frac{2}{16}$	10,000
24. A pale blue brilliant -	$10\frac{7}{16}$	30,000
25. A browniſh brilliant - -	$10\frac{4}{16}$	25,000
26. A colourleſs brilliant -	10	30,000
27. 15 brilliants, weight unknown, eſtimated at - - -		833,000
28. 54 brilliants, weighing from five to leſs than ten carats each		756,000
29. 227 brilliants, weighing from one to leſs than five carats each		332,700
30. 1631 ſmall diamonds, weighing in all - - -	425	77,228
31. 12 diamonds, chiefly roſe diamonds, and flawed -	84	82,700
Royal State Dreſs, *Parure blanche.*		
32. 12 brilliants, weighing from two to 20 carats each, and 163 ſmaller - - -		413,000
33. Plaque de l'ordre du Saint Eſprit, 9 brilliants from 7 to 14 carats each, and 286 ſmaller ones - - -		324,000
34. Epaulette, 12 brilliants from 3 to 19 carats each, -		306,000
35. Croix du cordon, 6 large brilliants, and 143 ſmaller -		200,000
Parure de Couleur.		
36. A rich ſky-blue brilliant -	$67\frac{2}{16}$	3,000,000
37. A pale blue brilliant -	$31\frac{12}{16}$	300,000
38. Croix du cordon, 13 larger brilliants, 362 ſmaller - -		10,000
39. Epaulette, 9 larger brilliants, 197 ſmaller - - -		47,000

	Weight in Carats.	Eſtabliſhed Value in Livres.
40. Epée de diamans, 2189 roſe diamonds - -	400	329,075
41. Diamond buttons, larger brilliants	112	294,851
——— ſmaller do.	440	
42. Sundry other diamonds of various qualities - -		315,000

The principal uſe of diamond is in ornamental jewellery: it is alſo employed by glaziers for cutting glaſs; by lapidaries for cutting and engraving upon the hardeſt gems, and in the finer kinds of clock-work.

The mineralogical ſituation of the diamond is not very well aſcertained. It occurs in India, in detached cryſtals, in a kind of indurated ochery gravel, not far from the ſurface of the ground; but whether or not this is its native bed is unknown. The diamond mines of India extend throughout the whole chain of the Ghauts, from Bengal to cape Comorin: many of theſe, however, are at preſent abandoned, the chief that are now worked being ſituated between Golconda and Maſulipatam. The earth which affords them being dug up and broken to pieces, is carefully waſhed till the water comes off colourleſs; the reſidue is then ſpread thin on mats in the ſun, and the diamonds are diſcovered by their ſuperior brilliancy. This valuable gem is alſo found in Borneo and in Brazil: the diamonds of this latter country are procured in the mountainous diſtrict called Serro do Frio, and are contained in alluvial beds of ferruginous ſand.

Diamonds have been found in the Eaſt Indies, principally in the kingdoms of Golconda, Viſapour, Bengal, and the iſland of Borneo. There are four mines, or rather, two mines and two rivers, whence diamonds have been drawn. The mines are, 1. That of Raolconda, in the province of the Carnatic, 17 gos, of four French leagues each, from Golconda, and about 13 gos from Viſapour. It has been diſcovered about 250 years. (See RAOLCONDA.) 2. That of Gani, or Colore, ſituated on the ſouthern bank of the Kiſtnah, and not far from Condavir. It was diſcovered about 170 years ago by a peaſant; who, digging in the ground, found a natural fragment of twenty-five carats. 3. That of Sumbulpour, a large town in the kingdom of Bengal, near the diamond mine; this is the moſt ancient of them all. It ſhould rather be called that of Goual, which is the name of the river, in the ſand whereof theſe ſtones are found. Laſtly, the fourth mine, or rather the ſecond river, is that of Succudan, in the iſland of Borneo. There are alſo the famous diamond mine of Bundelcund, at Panna, or Purna, 165 geographical miles from Bilſah; another at Beiragur, near the Mahanuddy river, and not far from that of Sumbulpour, which is of more modern date than the other; and another near Gandicotta, on the ſouth bank of the Pennar river.

DIAMOND-*mine of Raolconda*.—In the neighbourhood of this mine the earth is ſandy, and full of rocks and copſe: in theſe rocks are found ſeveral little veins, of half, and ſometimes a whole inch broad, out of which the miners, with a kind of hooked irons, draw the ſand, or earth, wherein the diamonds are; breaking the rocks when the vein terminates, that the track may be found again, and continued. When a ſufficient quantity of earth, or ſand, is drawn forth, they waſh it two or three times, to ſeparate the ſtones therefrom: the miners work quite naked, except for a thin linen cloth before them; and, beſides this precaution, they have likewiſe inſpectors, to prevent their concealing of ſtones: which, however, in ſpite of all their care, they frequently find means to do, by watching opportunities, when they are not obſerved, and ſwallowing them down.

DIAMOND-*mine of Gani*, or *Colore*.—In this mine are found a great number of ſtones, from ten to forty carats, and even more; and it was there that the famous diamond of Aurengzebe, the great mogul, which, before it was cut, weighed 793 carats, was found. The ſtones of this mine are not very clear; their water is uſually tinged with the quality of the ſoil; being black, where that is marſhy; red, where it partakes of red; and ſometimes green and yellow, if the ground happen to be of thoſe colours. Another defect, of ſome conſequence, is a kind of greaſineſs appearing on theſe diamonds, when cut, which takes off part of their luſtre. There are uſually no leſs than ſixty thouſand perſons, men, women, and children, at work in this mine.

When the miners have found a place where they intend to dig, they level another, ſomewhat bigger, in the neighbourhood thereof, and encloſe it with walls about two feet high, only leaving apertures, from ſpace to ſpace, to give paſſage to the water: after a few ſuperſtitious ceremonies, and a kind of feaſt, which the maſter of the mine makes for the workmen, to encourage them, every one goes to his buſineſs, the men digging the earth in the place firſt diſcovered, and the women and children carrying it off into the other, walled round. They dig twelve or fourteen feet deep, and till ſuch time as they find water; then they ceaſe digging: and the water, thus found, ſerves to waſh the earth two or three times; after which, it is let out at an aperture reſerved for that purpoſe. This earth being well waſhed, and well dried, they ſift it in a kind of open ſieve, or riddle, much as we do corn in Europe; then they thraſh it, and ſift it afreſh; and, laſtly, they ſearch it well with the hands, to find the diamonds. They work naked here, as in the mine of Raolconda, and are watched, after the like manner, by inſpectors.

DIAMOND-*mine of Sumbulpour*, or *river Goual*.—Sumbulpour is a large town built all of earth, and covered with branches of cacao-tree: the river Goual runs by the foot thereof, in its paſſing from the high mountains, towards the ſouth to the Ganges, where it loſes its name. It is from this river that are brought all our fine diamond-points, or ſparks, called natural ſparks. They never begin to ſeek for diamonds in this river till after the great rains are over, that is, after the month of December; and they uſually even wait till the water is grown clear, which is not before January: the ſeaſon at hand, eight or ten thouſand perſons, of all ages, and both ſexes, come out of Sumbulpour, and the neighbouring villages. The moſt experienced among them ſearch and examine the ſand of the river; going up it from Sumbulpour to the very mountain whence it ſprings. A great ſign that there are diamonds near, is, the finding of thoſe ſtones which we Europeans call thunder-ſtones. When all the ſand of the river, which at that time is very low, has been well examined, they proceed to take up that wherein they judge diamonds likely to be found; which is done after the following manner: they dam the place round with ſtones, earth, and faſcines: and, lading out the water, dig about two feet deep: the ſand, thus got, is carried into a place walled round on the bank of the river. The reſt is performed after the ſame manner as at Colore, and the workmen are watched with equal ſtrictneſs.

DIAMOND-*mine in the iſland of Borneo*, or *river of Succudan*. We are but little acquainted with this mine; the prince who reigns in that part of the iſland not allowing ſtrangers to have any commerce in theſe ſtones: though there are very fine ones to be bought at Batavia, brought thither by ſtealth. They were anciently imagined to be ſofter than thoſe of the other mines; but experience ſhews, they are in no reſpect inferior to them.

Diamond mines were diſcovered about the year 1728, in the Brazils belonging to the king of Portugal, who, in the year 1740, let them to a company at Rio Janeiro, for a certain ſtipulated annual rent, which is ſaid to be 130,000 cruſades,

on condition that the ſaid company employ no more than 600 ſlaves in working them; ſince which time the value of diamonds is diminiſhed.

The factitious diamonds made in France, called temple diamonds, on account of the temple at Paris, where the beſt of them are made, fall vaſtly ſhort of the genuine ones; accordingly, they are but little valued, though the conſumption thereof is pretty conſiderable for the habits of the actors on the ſtage, &c. See PASTES.

DIAMONDS, *Corniſh*, in *Natural Hiſtory*, a name given in England to all the ſpecies of cryſtals, which are compoſed of a column, terminated at each end by a pyramid. The name takes in two genera of cryſtal, of each of which there are ſeveral ſpecies. Dr. Hill has determined this to be the true figure of perfect cryſtal, and accounts all thoſe which are affixed by one end to ſome ſolid body, and terminated at the other by a pyramid, to be mutilated or imperfect cryſtals. The ſame author, according to the length or thickneſs of the intermediate column, has divided theſe bodies into two genera, the firſt the macroteloſtyla, the other the brachyteloſtyla. See MACROTELOSTYLA and BRACHYTELOSTYLA.

DIAMOND is an inſtrument of conſiderable uſe in the glaſs manufactory, for ſquaring the large plates, or pieces; and among glaziers for cutting their glaſs.

Theſe diamonds are differently fitted up. That uſed for looking-glaſſes, and other large pieces, is ſet in an iron ferril two inches long, and a quarter of an inch in diameter. The reſt of the cavity of the ferril is filled with melted lead, which keeps the diamond firm in its place. The glaziers have a handle of box, or ebony, fitted into the ferril to hold it by. In the former there is a little piece of box croſſing the ferril, in form of a little plane, covered at bottom with a thin copper-plate.

DIAMOND, in *Geography*, a ſmall iſland of the Weſt Indies, near the S.W. coaſt of the iſland of Martinico; half a league S. of cape Diamond.—Alſo, a ſmall iſland in the bay of Bengal, near the S.W. coaſt of Ava. N. lat. 15° 50′. E. long. 94° 30′.

DIAMOND *Point*, a cape on the north coaſt of the iſland of Sumatra, in the ſtrait of Malacca. N. lat 5° 20′. E. long. 97° 52′.

DIAMOND, in *Heraldry*, is uſed to expreſs the black colour in the atchievements of noblemen.

Guillim diſlikes the way of blazoning the coats of peers by precious ſtones, inſtead of metals, or colour. But the Engliſh practice allows it. See COLOUR.

DIAMOND-*cutter*. See LAPIDARY.

DIAMOND-*glaſs*. See GLASS.

DIAMOND-*powder* is of great uſe for grinding hard ſubſtances. And Mr. Boyle obſerves, that though it be much dearer than emery, yet it makes ſo great diſpatch, and the tools employed laſt ſo much longer, as greatly to overbalance the cheapneſs of the emery.

DIAMORUM, of the *Old Diſpenſatories*, is ſyrup of mulberries.

DIAMPER, or UDEAMPER, in *Geography*, a town of India, in the country of Cochin, ſaid to be inhabited by Chriſtians of St. Thomas; 15 miles W. of Cochin. N. lat. 9° 57′. E. long. 76° 21′.

DIAMUNA, in *Ancient Geography*, a name given by Ptolemy to a river of India, which ran into the Ganges.

DIAN BEL, in *Geography*, a town of the iſland of Madagaſcar; about 130 miles E. of Carembole.

DIAN *Dane*, a town of Madagaſcar, on the N. ſide of the river Yonghelahe, under the tropic of Capricorn, N. of cape St. Auguſtine.

DIAN *Katzambe*, a town of Madagaſcar; about 30 miles S. of cape St. Auguſtine.

DIAN *Mahe*, a town of Madagaſcar; 130 miles N. of Carembole.—Alſo, a town of the ſame name, on the ſouth ſide of the river Yonghelahe, near cape St. Auguſtine.

DIAN *Manarghon*, a town of Madagaſcar, on the E. ſide of the river Ronnumina; 130 miles N.E. of cape St. Auguſtine.

DIAN *Manaſſa*, a town of Madagaſcar on the N. bank of the river Yonghelahe; about 100 miles N.E. of cape St. Auguſtine.

DIAN *Maſſo*, a town of Madagaſcar, in the ſouthern diſtrict; about 100 miles N.E. of Carembole.

DIAN *Manauove*, a town of Madagaſcar; about 70 miles N.E. of Carembole.

DIAN *Miſſon*, a town of Madagaſcar; about 80 miles N.E. of Carembole.

DIAN *Raholt*, a town of Madagaſcar; 140 miles N.N.E. of Carembole.

DIAN *Raval*, a town of Madagaſcar; 160 miles N.N.E of Carembole.—Alſo, another town of the ſame name, near the ſource of the river Manhouve; about 80 miles N.N.E. of Carembole.

DIAN *Siandrin*, a town of Madagaſcar, 70 miles E. of Carembole.

DIAN *Simamande*, a town of Madagaſcar, near the W. bank of the river Menerandre; about 68 miles N.W. of Carembole.

DIAN *Soreets*, a town of Madagaſcar; 130 miles N.E. of Carembole.

DIANA, in *Ancient Geography*, *Zainah*, a town of Africa, ſituated in the mountains of Mauritania Sitifenſis, where, among other ruins, is found that of a triumphal arch, ſuſtained by two columns of the Corinthian order.

DIANA, in *Mythology*, the daughter of Jupiter and Latona, and twin ſiſter to Apollo. She is ſaid to have been born firſt, and to have aſſiſted her mother in the delivery of Apollo. The ſuffering of Latona on this occaſion, gave Diana an averſion to marriage, though not to gallantry. She is accuſed of having loved and beſtowed her favours on Endymion, Pan, and Priapus. She was the goddeſs of the woods on earth, Luna in heaven, and Hecate in hell. She was the ſame with Iſis, who is the moſt ancient Diana of all. The Greeks, deriving their theology from the Egyptians, adjuſted it to their own ideas, and attributed to the ſiſter of Apollo what they ſaid of the ſiſter of Oſiris.

The moſt known character of this goddeſs is that of her preſiding over woods, and delighting in hunting. Accordingly the Diana venatrix, or goddeſs of the chace, is frequently repreſented in ancient ſtatues; and deſcribed by the Roman poets, as running, with her veſt ſhortened and girt about her, and yet flying back with the wind: ſhe is tall of ſtature; and her face, though ſo very handſome, is ſomewhat manly: her legs are bare, well-ſhaped, and ſtrong: her feet are ſometimes bare, and ſometimes adorned with a ſort of buſkin: ſhe often has her quiver on her ſhoulder: and ſometimes holds a javelin, but more uſually her bow in her right hand. The ſtatues of Diana were frequent in the woods, where ſhe is repreſented as hunting, bathing, and reſting herſelf after fatigue. Diana has been ſometimes repreſented with three bodies, and hence called the triple, three-headed, and three bodied Diana. Hence the name of *Triformis* given her by the poets (Horace, Virgil, Martial, &c.) and the cuſtom of repreſenting her with three heads, one of which on the right was that of a horſe, one on the left that of a dog, and one in the middle that of a boar. Thus Virgil deſcribes her. (Æn. iv.):

" Ter-

"Tergiminamque Hecatem, tria virginis ora Dianæ."

Pauſanias, however, obſerves (in Corin. c. 30.) that this cuſtom was neither univerſal nor very ancient. Her diſtinguiſhing name, under this triple appearance, is Hecate or Trivia; under which character of the infernal Diana ſhe was invoked in enchantments, and repreſented as a Fury, holding inſtruments of terror in her hands, and graſping cords, ſwords, ſerpents, or flaming torches. When ſhe is repreſented as the intelligencer that preſides over the moon, ſhe appears in a car, drawn by ſtags, or by does, but more commonly by horſes of a perfectly white colour, with a lunar crown or creſcent on her forehead.

Diana's love of chaſtity induced the Greeks to give her virgins for her companions. Although ſhe is ordinarily repreſented with a quiver and dogs, drawn in a chariot by two white ſtags: ſhe is ſometimes figured with wings, as we learn from Pauſanias, having in one hand a lion and in the other a panther, her chariot being drawn either by two heifers, or by two horſes of different colours, but this author owns that he does not underſtand the meaning of theſe ſymbols.

When Diana repreſented the moon, ſhe was called *Lucina;* and alſo when ſhe was invoked by women in child-bed, ſhe bore the ſame appellation, and alſo that of *Juno Pronuba.* She had alſo ſeveral other names; ſuch as that of *Trivia*, from her triform figure, and alſo importing that ſhe was worſhipped in the croſs ways, the ſtreets, and public roads, where her ſtatues were commonly erected. She was alſo called *Orthia*, either from a place, denominated Orthione in Arcadia, where ſhe was worſhipped, or rather from the ſeverity with which ſhe puniſhed thoſe of her companions who did not maintain ſtrict chaſtity, or becauſe the youths of Lacedæmon performed the ceremony of *diamaſtigoſis*, (which ſee) before her ſtatues: The name *Orthion* being given by the Greeks to one that was obdurate and inflexible. The names of *Militta*, *Alilat*, and *Anaitis*, were given to her by the Phœnicians, Arabians, and Cappadocians. The appellation of *Deviana* had its riſe from her being fond of hunting, as thoſe who were addicted to this exerciſe were apt to loſe themſelves, or to deviate. Spon (Miſc. Erud. Ant.) is the firſt who has given a print of a monument, where Diana is named *Clatra.* This goddeſs is there repreſented with Apollo, both charged with ſymbols, Apollo with his lyre, holds in his hand Jupiter's thunder, and has his head encircled with rays, and above, the ſun. In a circle Diana has upon her head the creſcent, a turret, and a pine-apple, like Cybele, a ſerpent wreathed about her arm, as Hygeia the goddeſs of health, the Siſtrum of Iſis, a prow of a ſhip, like Iſis ſurnamed Pelagia. This is evidently Diana, becauſe ſhe repreſents the moon, that is, an Iſis, after the manner of the Greeks. The other names of this goddeſs are moſtly derived from the places where ſhe was worſhipped. Diana is eaſily known in the figures that repreſent her, either by the creſcent upon her head, or by her bow and arrows, or by her hunting habit, or by the dogs that accompany her. The Diana of Epheſus was repreſented with a great number of beaſts, and with other ſymbols that ſignified the earth and Cybele, or rather nature herſelf, whom that goddeſs repreſented. She is ſupported by a couple of deer, and bears on her head a pannier of fruit. Thus the Epheſian Diana is commonly exhibited upon Greek imperial coins. Her buſt is known by the creſcent on her brow, and ſometimes by the bow, or quiver, engraven on one ſide.

Diana had many oracles, in Egypt, in Cilicia, at Epheſus, and many others. She had alſo many temples dedicated to her, of which that at Epheſus was the moſt celebrated, and eſteemed one of the ſeven wonders of the world, on account of its ſtructure, ſize, and furniture. This magnificent edifice, built at the common charge of all the ſtates in Aſia, was ſituated at the foot of a mountain, and at the head of a marſh, which place was choſen, according to Pliny, as being the leaſt ſubject to earthquakes. But it was neceſſary, at a very great expence, to make drains for conveying the water that came down the hill into the moraſs and the Cayſter. Philo Byzantius informs us, that, in this work, ſuch a quantity of ſtone was uſed, as almoſt exhauſted all the quarries in the country; and theſe drains or vaults are what the preſent inhabitants take for a labyrinth. In order to ſecure the foundation of the conduits or ſewers, which were to bear the weight of this immenſe building, they laid beds of charcoal, ſays Pliny, well rammed, and upon them others of wool. Two ancient authors have left us ſome account of the conſtruction of this temple; Vitruvius and Pliny. The firſt tells us that it had eight columns in the fore-front and as many in the back-front; that it had a double range of columns round it; and that it was of the Ionic order; which order, he ſays, was firſt made of eight diameters high. Pliny ſays, (lib. xxxvi. cap. 14.) that 220 years elapſed during its conſtruction; that it was 425 feet in length, and 220 in breadth; that it was adorned with 100 columns, each 60 feet high; that 27 were the gifts of ſo many kings; that 36 were enriched with ſculpture, &c. The original paſſage, with a correction in the punctuation, is as follows: "Univerſo templo longitudo eſt ccccxxv pedum, latitudo ducentorum viginti, columnæ centum, viginti ſeptem a ſingulis regibus factæ, ſexaginta pedum altitudine: ex his triginta ſex cœlatæ, &c." In the paſſage, as it is in the original, there is no comma after *centum*; and accordingly it ſeems to intimate, that in the porticoes of this temple were 127 columns, the gift of ſo many kings. Mr. Wyndham (Archæologia, vol. vi. No. 6.) ſays, that this is totally repugnant to the ſymmetry and proportion obſerved by the ancients in the form of their temples; and farther, that it can hardly be ſuppoſed, that 127 Aſiatic kings ſhould have contributed each a column. He therefore propoſes the above emendation, which removes the difficulty. If we then ſuppoſe theſe columns to have been of eight diameters, the diameter muſt have been ſeven feet ſix inches. The columns, therefore, with their intercolumnar ſpaces, and the ten ſteps by which they aſcended to the level of the portico, will very completely fill up the extent of front mentioned by Pliny; and if we ſuppoſe 17 columns in the flank, it will, in like manner, fill up Pliny's length of the temple; and thus it will be eaſy to account for the 100 columns which that writer has aſſigned to this building. Of theſe columns 27 were very curiouſly carved, and the reſt poliſhed. The architect, employed on this occaſion, was Cteſiphon or Cteſifonte (ſee CTESIFONTE), called by Pliny and Strabo Cherſiphron; and the baſ-reliefs of one of the columns were executed by Scopas, the moſt famous ſculptor of antiquity. The altar was adorned with the maſterly ſculptures of Praxiteles, who had, perhaps, ſelected from the favourite legends of the place the birth of the divine children of Latona, the concealment of Apollo after the ſlaughter of the Cyclops, and the clemency of Bacchus to the vanquiſhed Amazons. Nevertheleſs, this temple, though ſuperior to the cathedral of St. Paul at London, is confeſſedly inferior to the church of St. Peter's at Rome. The length of the Epheſian temple was 425 feet, and that of St. Peter's church 840 Roman palms, each palm being very little ſhort of nine Engliſh inches: and, therefore, the length of the former was about two-thirds of the meaſure of the latter. In other dimenſions, it was ſtill more inferior to that ſublime production of modern architecture. However, ſucceſſive emperors, the Perſian, the Macedonian, and the Roman, have revered its ſanc-

tity,

tity, and enriched its ſplendour. This temple enjoyed the privilege of an aſylum, which at firſt extended to a furlong, was afterwards enlarged by Mithridates to a bow-ſhot, and doubled by Marc Antony, ſo that it took in part of the city; but Tiberius, in order to terminate the many abuſes and diſorders that attended privileges of this kind, revoked them all, and declared, that no man, guilty of any wicked or diſhoneſt action, ſhould eſcape juſtice, though he fled to the altar itſelf.

The prieſts, who officiated in this temple, were held in great eſteem, and truſted with the care of ſacred virgins or prieſteſſes, but not till they were made eunuchs. They were called Eſtiatores and Eſſenæ, had a particular diet, and were not allowed, by their conſtitutions, to go into any private houſe. They were maintained with the profits accruing from the lake Selinuſius, and another that fell into it, which muſt have been very conſiderable, ſince they erected a golden ſtatue to one Artemidorus, who, being ſent to Rome, recovered them after they had been ſeized by the farmers of the public revenues. All the Ionians reſorted yearly to Epheſus with their wives and children, where they ſolemnized the feſtival of Diana with great pomp and magnificence: making, on that occaſion, rich offerings to the goddeſs, and valuable preſents to her prieſts. The Aſiarchæ, mentioned by St. Luke, (Acts, xvi.) were, according to Beza, thoſe prieſts whoſe peculiar province it was to regulate the public ſports that were annually performed at Epheſus, in honour of Diana: they were maintained with the collections made during the ſports; for all Aſia flocked to ſee them. The "great Diana of the Epheſians," as ſhe was ſtyled by her blind adorers, was, according to Pliny, a ſmall ſtatue of ebony, made by one Canitia, though commonly believed to have been ſent down from heaven by Jupiter. This ſtatue was at firſt placed in a nich, which, as we are told, the Amazons cauſed to be made in the trunk of an elm. Such was the firſt riſe of the veneration that was paid to Diana in this place. In proceſs of time, the veneration for the goddeſs daily increaſing among the inhabitants of Aſia, a moſt ſtately and magnificent temple was built near the place where the elm ſtood, and the ſtatue of the goddeſs placed in it. This was the firſt temple, but not quite ſo ſumptuous as that which we have above deſcribed, though reckoned, as well as the ſecond, among the wonders of the world. The ſecond was remaining in Pliny's time, and in Strabo's; and is ſuppoſed to have been deſtroyed in the reign of Conſtantine, purſuant to the edict by which that emperor commanded all the temples of the heathens to be demoliſhed: the former was burnt on the day when Alexander was born, by one Eroſtratus, who owned on the rack, that the only motive which prompted him to deſtroy ſo noble a ſtructure, was the deſire of tranſmitting his name to future ages. The ſtates general of Aſia imagined they ſhould prevent the accompliſhment of his intention, by publiſhing a decree, prohibiting the mention of his name. However, their prohibition only excited a greater curioſity; for ſcarcely one of the hiſtorians of that age has omitted to mention ſo extravagant an act, and to announce the name of the criminal. Alexander the Great offered to rebuild the temple at his own expence, provided that the Epheſians would agree to inſcribe his name on the front; but they rejected this offer in a manner that prevented the reſentment of that vain and ambitious prince, telling him, that "it was not fit one god ſhould build a temple to another." The pillars, and other materials that had been ſaved out of the flames, were ſold, and alſo the jewels of the Epheſian women, who, on this occaſion, willingly parted with them; and the ſum thus raiſed ſerved for the carrying on of the work till other contributions came in, which, in a ſhort time, amounted to an immenſe treaſure. The architect who ſuperintended the conſtruction of this edifice was Dinocrates. This is the temple of which Strabo, Pliny, and other Roman writers have given an account. It ſtood between the city and the port, and was built, or rather finiſhed, as Livy tells us, (lib. i. c. 45,) in the reign of king Servius. This temple, after having riſen with increaſing ſplendour from ſeven repeated misfortunes, was finally burnt by the Goths, in their third naval invaſion, A. D. 260.

It appears, on undoubted evidence, that in England the common people, in ancient times, not only feared Diana as a witch, but that they had on many occaſions paid her reverential honours as a goddeſs. That Diana was worſhipped in Gaul, we learn from Polyænus, (lib. viii. Stratag. c. 39.); and in proof of her having been worſhipped likewiſe in Britain, Mr. Sammes (Antiq. of Britain, p. 135.) takes notice of an image which, in the year 1602, was dug out of the ground in Monmouthſhire, that, both by the form and dreſs, as likewiſe by an inſcription found not far from it, appeared to be the figure of that goddeſs. And Mr. Camden thinks it not improbable, that there was anciently a temple of Diana where St. Paul's cathedral now ſtands, from the great number of ox-heads that were found there in digging up the church-yard in the reign of king Edward I., and were then looked upon as Gentile ſacrifices: and in this opinion he is followed by his learned editor, (Gibſon) by Mr. Sammes, Mr. Howel, and others. Dr. Woodward, particularly (in his Letter to Sir Chriſtopher Wren, § 83.) acquaints us that he had in his collection tuſks of boars, horns of oxen and of ſtags, as alſo the repreſentation of deer, and even of Diana herſelf, upon the ſacrificing veſſels, dug up near St. Paul's church; and likewiſe a ſmall image of that goddeſs, found at no great diſtance. From ancient writers it appears, that not only ſtags, but oxen, and alſo ſwine, were ſacrificed to Diana. An ancient MS. in the Cotton library informs us, that in the time of Melitus, the firſt biſhop of London, Ethelbert, king of Kent, built a church to the honour of St. Paul, on the ſite where before ſtood a temple of Diana: and there were alſo certain ceremonies performed at this church, on the day of St. Paul's converſion, by the multitude, which evidently alluded to the worſhip of Diana, and manors held by the ſervice of offering a doe, or buck and doe, at the high altar of the church, on the above-mentioned day. A ceremony of this kind was continued till the days of queen Elizabeth. Jortin's Life of Eraſmus, vol. ii.

Diana, in *Zoology*. See Simia.

Diana's *Peak Mountain*, in *Geography*, one of the higheſt in the iſland of St. Helena, riſing 2692 feet above the level of the ſea.

Diana's *Tree*. See Arbor.

Dianæ *Fanum*, in *Ancient Geography*, a promontory of Aſia Minor, in Bithynia, at the entrance of the Euxine ſea, according to Ptolemy. Jupiter Urius had a temple on this promontory.—Alſo, a place of Italy, in Campania, 30 ſtadia from Capua.—Alſo, a place of Greece, in Attica.

DIANDRIA, in *Botany*, (from δις, *double*, and ανηρ, a *man*,) the ſecond claſs in the Linnæan artificial ſyſtem, containing plants with two ſtamens only, in the ſame flower with the piſtil. It conſiſts of three orders, of which the firſt, *Monogynia*, is by far the moſt numerous. It ſeparates ſuch of the natural order of labiate flowers as have only two ſtamens, from their allies in the 14th claſs, *Didynamia*, whoſe ſtamens are four, two of them longer than the others; and this is one of the unavoidable defects of all artificial ſyſtems, nor has any ſyſtem hitherto contrived, however natural in its

its pretenſions, eſcaped ſimilar or more inconvenient anomalies in ſome part or other. See DIDYNAMIA, and DIADELPHIA. S.

DIANE, in *Geography*, a lake of conſiderable extent on the eaſtern ſide of the iſland of Corſica, which, through a narrow channel, diſcharges itſelf into the Etrurian or Tuſcan ſea. It is famous for its excellent oyſters, which are taken with pikes in thoſe places where the lake is only ten feet deep. The oyſters that are pierced through are pickled; the others are placed in reſervoirs, and ſold at Baſtia, Leghorn, and the iſland of Elba.

DIANELLA, in *Botany*. See DRACÆNA.

DIANENSIS, in *Ancient Geography*, an epiſcopal ſee of Africa, in Numidia, ſituated in the town of Diana, mentioned by Antonine.

DIANES, a people of Aſia, in Galatia. Steph. Byz.

DIANENTERIUM, a maritime place, 100 ſtadia from Conſtance. According to Ortelius, it was a place in the iſland of Cyprus.

DIANIUM, DENIA, a town in Hiſpania Interior, ſituated on an eminence, ſo that it could be obſerved at a diſtance by navigators. It was one of the three towns on that coaſt, the foundation of which was aſcribed to the Marſeilleſe, who called it *Artemiſium*, from the Greek name of Diana. On a promontory of the ſame name it had a temple of Diana, which was much venerated.—Alſo, an iſland of the Mediterranean, in the vicinity of that of Corſica. It was alſo called *Artemiſia*.—Alſo, a promontory of Spain, in the Mediterranean, oppoſite to the iſles called *Pityuſæ*.

DIANO, in *Geography*, a town of Naples, in the province of Principato Citra, 13 miles N.N.W. of Policaſtro.—Alſo, a town of Genoa, about two miles from the ſea, and three from Oneglia.

DIANTHERA, in *Botany*. See JUSTICIA.

DIANTHON, in *Pharmacy*, an aromatic powder, now diſuſed.

DIANTHUS, in *Botany*, (from Διὸς, διὸς, *Jove*, and ἄνθος, a *flower*, a name given by Linnæus to the Pink and Carnation genus, the *Tunica* and *Caryophyllus* of former authors, in alluſion to the magnificence and fragrance of the flowers.) Linn. Gen. 225. Schreb. 303. Willd. Sp. Pl. v. 2. 671. Sm. Fl. Brit. 460. Juſſ. 302. Gærtn. t. 129. Claſs and order, *Decandria Digynia*. Nat. Ord. *Caryophylleæ*.

Gen. Ch. *Cal.* Perianth cylindrical, tubular, ſtriated, permanent, divided into five teeth at the orifice, and furniſhed at the baſe with two pair of ſcales, ſometimes more, croſſing each other, various in length and breadth. *Cor.* Petals five, regular and equal; claws the length of the calyx, narrow, tapering downwards, inſerted into the receptacle; borders horizontally ſpreading, wedge-ſhaped, abrupt, crenate, often bearded or glandular at the baſe. *Stam.* Filaments 10, awl-ſhaped, about the length of the calyx, but five of them commonly ſhorter than the reſt; in ſome ſpecies all united at their baſe; anthers oval-oblong, compreſſed, incumbent. *Piſt.* Germen oval, ſuperior; ſtyles two, awl-ſhaped, uſually longer than the ſtamens; ſtigmas ſimple, linear, acute, recurved, downy on the upper ſide. *Peric.* Capſule cylindrical, covered with the calyx, of one cell, opening by four teeth. *Seeds* numerous, roundiſh, compreſſed, affixed to a ſquare columella about half as long as the capſule. In ſome ſpecies the ſtamens of one flower and the ſtyles of another are occaſionally diminutive and abortive.

Eſſ. Ch. Calyx cylindrical, of one leaf, with ſcales at the baſe. Petals five, with long claws. Capſule ſuperior, cylindrical, of one cell.

The ſpecies are arranged in four ſections, characterized as follows. 1. Flowers aggregate. 2. Fl. ſolitary, ſeveral on the ſame ſtem. 3. Stem ſingle-flowered, herbaceous. 4. Stem ſhrubby. The number of ſpecies in Willdenow are 32; twelve new ones are deſcribed by Dr. Smith in the Prodromus Floræ Græcæ Sibthorpianæ. An attempt was made by the ſame writer in the ſecond volume of the Tranſactions of the Linn. Soc. to define the ſpecies better than they had previouſly been, and ſome unknown to Linnæus are there for the firſt time deſcribed; but ſeveral ſtill remain obſcure. The genus is chiefly European and African, though one or two ſpecies are found in China and Japan.

In the firſt ſection, the moſt remarkable are: D. *barbatus*. Sweet William. "Flowers aggregate, in ſeparate bundles. Scales of the calyx ovate-awl-ſhaped, as long as the tube. Leaves lanceolate." Curt. Mag. t. 207. Ger. em. 598. Native of Germany and Carniola. A hardy perennial herbaceous plant, frequent in gardens, where it varies with different hues of purple, red and white. In a wild ſtate it is ſaid to be red, either plain, or ſpotted with white. The garden varieties thrive beſt in a rather dry calcareous ſoil, but are apt to rot in moiſture, or much manure. Hence they require to be renewed perpetually by ſeed. They can, however, be encreaſed by cuttings, or, as the floriſts term them, pipings. D. *carthuſianorum*. "Flowers moſtly aggregate. Scales of the calyx ovate, awned, ſhorter than the tube. Leaves linear, with three ribs." Found on banks and about the borders of fields, in Germany, Switzerland, and Italy. The flowers are red, with hairy petals. It requires a dry chalky ſoil, or lime rubbiſh, but can ſcarcely be preſerved long in a garden. D. *Armeria*. Deptford Pink. "Flowers aggregate, bundled. Scales of the calyx lanceolate, hairy, as long as the tube."—Engl. Bot. t. 317. Found in gravelly ground in England and other parts of Europe. The petals are ſomewhat lanceolate, toothed, roſe-coloured, elegantly ſpotted with white. D. *japonicus*. Thunb. Fl. Jap. t. 23. Has much of the habit of the Sweet William, but the leaves are broad and elliptical, the calyx-ſcales fringed, and ſhorter than the tube. This has never been introduced into our gardens, and is known only by Thunberg's figure, and the few dried ſpecimens which he has diſtributed amongſt his friends. D. *prolifer*. Engl. Bot. t. 956. Found in gravelly ſoils in ſome few parts of England, is eaſily kept as a hardy annual in gardens, ſowing itſelf ſpontaneouſly. The ruſhy ſtalks are each crowned by a head of ſmall pink flowers, enveloped with numerous large broad ſcarioſe ſcales. Of this ſpecies D. *diminutus* of Linnæus, referred by him to the next ſection, is moſt aſſuredly only a variety, whoſe flowers are ſolitary from poverty of ſoil.

The ſecond ſection comprehends numerous elegant ſpecies, eſpecially D. *Caryophyllus*. Carnation. "Flowers ſolitary. Calyx-ſcales ſomewhat rhomboid, very ſhort. Petals crenate, beardleſs." Engl. Bot. t. 214. Curt. Mag. t. 39. Of this fine and fragrant flower, the varieties of colour and luxuriance are innumerable. Floriſts diſtinguiſh two principal ſubdiviſions, Carnations and Pinks. The latter are diſtinguiſhed by an eye-like ſpot, and a more humble growth, and are moſt aſſuredly a diſtinct ſpecies, though botaniſts have not ventured to define it, ſubject to almoſt as many varieties as the Carnation. Mr. Hudſon told Dr. Smith that he intended this common or pheaſant's-eye pink by his D *arenarius*, it being ſometimes found, ſeemingly wild, on old buildings. Both kinds are propagated by ſeeds, layers, or cuttings. See below. D. *deltoides*. Maiden Pink. "Flowers ſolitary. Calyx-ſcales ovato-lanceolate, acute, two or four. Leaves bluntiſh, ſomewhat downy. Petals crenate." Engl. Bot. t. 61. A native of graſſy gravelly paſtures and fields, eaſily kept in a dry garden, where it forms perennial tufts. The flowers are red, with a dark circle or eye. D. *glaucus* of Linnæus

Linnæus is a variety with white flowers and a violet-coloured eye. They are inodorous. D. *chinenſis*. China Pink. "Flowers ſolitary. Calyx-ſcales awl-ſhaped, ſpreading, leafy, as long as the tube. Petals crenate. Leaves lanceolate." Curt. Mag. t. 25. Native of China, where it is much cultivated, as well as in our gardens. It is annually raiſed from ſeed, and ſome varieties thence frequently occur. D. *ſuperbus*. Superb Pink. "Flowers ſolitary, panicled. Calyx-ſcales very ſhort, pointed. Petals in many capillary ſegments. Stem erect." Smith Spicil. t. 19. Native of Lapland, Denmark, Germany, France, and Switzerland. It requires chalk or lime rubbiſh to ſucceed in a garden, and ſeldom lives more than two or three years. It is renewed by ſeed. The flowers are elegantly feathered, and in an evening highly fragrant. D. *virgineus*. "Flowers ſolitary, few on each ſtem. Calyx-ſcales very ſhort and obtuſe, only two to each flower. Petals crenate." Jacq. Auſtr. App. t. 15. Linn. Sp. Pl. 590. (D. rupeſtris; Linn. Suppl. 240.) Found on lime-ſtone rocks in Auſtria, France, and Switzerland. Haller miſtook this for D. *caryophyllus*, it being his *Tunica*, n. 896. The flowers are inodorous, and inconſpicuous compared with moſt other ſpecies; leaves very ſlender.

Of the third ſection the chief are, D. *cæſius*. Chedder Pink. "Stems ſingle-flowered. Calyx-ſcales roundiſh, ſhort. Petals crenate, hairy. Leaves rough in the margin." Sm. Fl. Brit. 463. Engl. Bot. t. 62. (D. virgineus β; Linn. Sp. Pl. 590.) Native of lime-ſtone rocks in England and Switzerland. It has hitherto been obſerved only on Chedder rocks, Somerſetſhire, and by Mr. Davall on Roche blânche near Orbe, Switzerland. The leaves are very glaucous. Flowers pale pink, very ſweet-ſcented. Some garden pinks, recently introduced, ſeem to originate from this ſpecies. D. *alpinus*. Dwarf Alpine Pink. "Stems ſingle-flowered. Petals crenate. Outermoſt calyx-ſcales leafy, longer than the tube." Jacq. Auſtr. t. 53. A beautiful native of the Alps of Auſtria, Stiria, Siberia, and Savoy, two or three inches high, with large red ſcentleſs flowers, ſometimes more than one on each ſtem.

In the fourth ſection are, D. *arboreus*. "Stem woody. Flowers in bundles. Calyx-ſcales numerous, very obtuſe and abrupt. Leaves linear, glaucous." Sm. in Prod. Fl. Græc. 289. Linn. Sp. Pl. 590. (Betonica coronaria arborea cretica; Bauh. Hiſt. v. 3. 328.) Native of Crete, on rocks near the ſhore, where the late Dr. Sibthorp gathered it. A ſplendid figure of this moſt magnificent ſpecies is deſtined for his *Flora Græca*, that of Bauhin being the only one at preſent extant. The ſtem forms a denſe buſh, two or three feet high. The leaves are thick, narrow, obtuſe and glaucous. Flowers pale red, remarkable for the numerous imbricated ſcales of the calyx. It ſeems to have been formerly in the French gardens, but is now loſt. D. *fruticoſus*. "Stem woody. Flowers in bundles. Calyx-ſcales elliptical, pointed, numerous. Leaves obovate-lanceolate, obtuſe." Sm. in Prod. Fl. Græc. 289. Linn. Sp. Pl. 591. (Caryophyllus græcus arboreus, leucoii folio peramaro; Tourn. Cor. 23. Voyage, v. 1. 70, with a figure.) Found on rocks in the iſland of Seriphos; alſo in Crete. It has the habit of the laſt, to which Dr. Smith, from the examination of old dried ſpecimens only in Tournefort's herbarium, referred it as a variety; but the drawings and better ſpecimens brought to England by Dr. Sibthorp ſhew it to be probably a diſtinct ſpecies. The leaves are broader, green, not glaucous, and the flowers of a much deeper and finer colour. The calyx-ſcales moreover are fewer and more pointed. D. *juniperinus*. "Stem ſhrubby. Leaves awl-ſhaped. Calyx-ſcales about four, obovate with a ſharp point, ſpreading, half as long as the tube." Sm. Tranſ. of L. Soc. v. 2. 303. Native of Crete. A ſmall but very pretty ſpecies, of which no certain figure exiſts, for as Proſper Alpinus deſcribes his Caryophyllus ſylveſtris arboreus, t. 38, as two cubits high, that ſynonym muſt ſurely belong to D. *arboreus*, our preſent plant, though truly ſhrubby, appearing to be ſcarcely a foot high. The leaves are pungent; flowers the ſize of D. *deltoides*, apparently white. D. *contortus*. Georgian Pink. Stem ſhrubby. Leaves awl-ſhaped. Calyx-ſcales about ſix, elliptic-lanceolate, ſhort. Petals twiſted, deeply cut. (D. orientalis; Don. Caut. 101. Sims in Curt. Mag. t. 1069. Caryophyllus orientalis fruticoſus, tenuiſſimo folio, flore laciniato; Tourn Cor. 23 ? Sims.) Dr. Sims informs us this ſpecies is found about Tiflis, in Ruſſian Georgia, and that he received it from the garden of Mr. Loddiges at Hackney. It perhaps ſcarcely belongs to this ſection of the genus, for many in the ſecond have the baſes of their ſtems not leſs woody. The flowers are red, with a very long ſlender calyx, and are remarkable for their twiſted petals. From this laſt ſtriking peculiarity, we have given the above name, for we could not adopt one from the gardeners, which is equally applicable to twenty ſpecies beſides, highly exceptionable in itſelf, and though tolerated in old eſtabliſhed Linnæan ſpecies, never applied by claſſical writers to new ones, any more than names of countries in general.

DIANTHUS, in *Gardening*, comprehends plants of the herbaceous flowery ornamental kind, of which the ſpecies chiefly cultivated in the garden are: the ſweet William, or bearded pink (D. *barbatus*); clove pink or clove gilliflower (D. *caryophyllus*); the common, or maiden pink (D. *deltoides*); the feathered pink (D. *plumarius*); the gray-leaved, or mountain pink (D. *cæſius*); the China pink (D. *chinenſis*); and the ſuperb pink (D. *ſuperbus*.)

Of the firſt ſort, the principal varieties are: the broad-leaved, or ſweet Williams; the narrow-leaved, or ſweet Johns, with ſingle and double flowers in each. And the chief of the ſub-varieties in the firſt, or broad-leaved kind, are, with broad leaves, and tall deep red flowers, with tall fleſh-coloured flowers, with pure white flowers, with white dotted flowers, with ſtriped leaves and red flowers, large double roſe-coloured, with ſweet ſcented flowers, large double with deep purple burſten flowers, and with double variegated flowers.

But in the ſecond, or narrow-leaved variety, they are with narrow leaves and deep red flowers, with pale red flowers, with pale red and fleſh-coloured flowers, with purpliſh white-eyed flowers, with ſnow white flowers, with white and fleſh-coloured flowers, with white and purple flowers, with white ſpotted flowers, and with red flowers and white borders, or painted-lady ſweet-Williams. And it is obſerved by Martyn, that the broad-leaved ſort, with very double flowers of a deep purple, inclining to blue, burſting the calyx, is not ſo much eſteemed; but that the double roſe ſweet-William, with flowers of a fine deep roſe-colour, and ſmelling ſweet, is much valued, as it does not burſt. The mule, or Fairchild's ſweet-William, which is one of the narrow-leaved double ſorts, ſuppoſed to have been produced from ſeeds of a carnation impregnated by a ſweet-William; the flowers are of a brighter red than in either of the former; their branches not quite ſo large, but the flowers have an agreeable ſmell. The narrow-leaved kind are in general the moſt productive of double flowers.

Of the ſecond ſpecies, there are both ſingle and double varieties, with reddiſh flowers, with variegated red and white flowers, with variegated red, white, and purple flowers, with variegated red, ſcarlet, purple, and white flowers, and with variegated red or purple above, and white underneath.

And the carnations are diſtinguiſhed by modern floriſts,

from the difference of variegation into four claſſes: as flakes having two colours only, and their ſtripes large, going quite through the leaves. Bizarres, with flowers ſtriped or variegated with three or four different colours, in irregular ſpots and ſtripes. Piquettes, having a white ground, ſpotted or pounced with ſcarlet, red, purple, or other colours. Painted ladies, with the petals of a red or purple colour on the upper ſide, and entirely white underneath. And each of theſe claſſes have numerous ſub-varieties, eſpecially the third, which was formerly in moſt eſteem with floriſts; but of late years the flakes have been in greater requeſt. It is uſeleſs, however, to enumerate their ſub-varieties, as they are not by any means permanent.

In the Univerſal Dictionary of Gardening, it is mentioned, that the properties of a good carnation are thus ſtated by floriſts: The item of the flower ſhould be ſtraight, ſtrong, and able to ſupport the weight of the flower without hanging down: the flower at leaſt not leſs than from thirty to forty-five inches high: the petals well formed, long, broad, ſtiff, and pretty eaſy to expand; or, as the floriſts term it, make free flowers, being neither too cloſe, nor too thin; the middle of the flower not advanced too high above the other parts; the colours bright, and equally marked all over the flower: the flower very full of petals, ſo as to render it, when blown, very thick in the middle, with the outſide perfectly round. And Martyn adds, "that the lower or outer circle of petals, commonly called the guard leaves, ſhould be particularly ſubſtantial; ſhould riſe perpendicularly about half an inch above the calyx, and then turn off gracefully in a horizontal direction, ſupporting the interior petals, which ſhould decreaſe gradually in ſize as they approach the centre, and this ſhould be well filled with them. All the petals ſhould be regularly diſpoſed, and lie over each other in ſuch a manner, as that their reſpective and united beauties may meet the eye altogether; they ſhould be nearly flat, or at moſt have a ſmall degree of inflection at the broad end; their edges perfectly entire, without notch, fringe, or indenture. The calyx ſhould be at leaſt an inch in length, ſufficiently ſtrong at top to keep the baſes of the petals in a cloſe and circular body; the colours diſtinct, and the ſtripes regular, narrowing gradually to the claw of the petal, and there ending in a fine point. Almoſt one-half of each petal ſhould be of a clear white, free from ſpots." Theſe properties are, however, chiefly expected in the fine potted varieties, which, on coming into blow, are uſually placed together upon a ſtand or ſtage conſiderably raiſed and covered, in order to produce the fulleſt effect, and by protecting them to continue longer in beauty.

The double varieties, as being more large and beautiful in their colours, ſhould be principally cultivated. Some of them, eſpecially the burſters, are extremely large, as three or four inches in diameter over the crown, or top part.

However, whole blowers and burſters are common to moſt of the varieties, eſpecially the flakes and bizarres; the former are thoſe in which the calyx or outer cup is long, and of equal growth, opening regularly each way only at top, to admit a free and equal expanſion of the petals all round: the flowers in theſe, though ſomewhat ſmaller, are more equally expanded, and require leſs trouble in the management of their bloom than in the burſters. The latter are thoſe in which the cup is large, and, as it were, ſwollen, being liable to burſt on one ſide, and permit the petal to break out and produce irregular flowers, if care be not taken to prevent it by tying, and opening the calyx a little on the oppoſite ſide. The whole blowers are on this account the more convenient for culture, where much time cannot be ſpared in attending to the flowers, eſpecially at the time of their blowing.

Of the third ſpecies, there is a cultivated variety in gardens, with white flowers, with a beautiful purple ring, and leaves rather more glaucous than in the common ſort.

Of the ſixth ſpecies Martyn obſerves, the roots often laſt two years in a dry ſoil; but they are generally raiſed from ſeeds annually. In the nurſery grounds, it is generally known by the name of Indian pink. Dr. J. Edward Smith mentions having had a plant from Mr. Sikes's, which ſeemed to be a mule between this and the firſt ſpecies.

And there are varieties, with red flowers, with purple flowers, with white flowers, with variegated flowers, each ſingle and double, and imperial large-flowered.

Of the ſeventh ſpecies, the varieties principally cultivated in the garden are as below, and which flower in the following order: the damaſk pink, which is the firſt of the double ſorts in flower; it has but a ſhort ſtalk; the flower is not very large, nor ſo double as in many others; the colour is of a pale purple, inclining to red. It is very ſweet in its ſmell. The white ſhock, which is thus denominated from the whiteneſs of its flowers, and the borders of the petals being much jagged and fringed: the flower-ſtalks are eight or ten inches in height. Its ſcent is not ſo agreeable as in ſome other ſorts. The pheaſant's eye, of which there are different varieties, and frequently new ones introduced, ſome of which have very large double flowers; thoſe which burſt their pods are the leaſt eſteemed. They have firm flower ſtems, eight or ten inches high: the flowers large, whitiſh, or bluſh-coloured, with dark purple ſpots in the middle. That ſort of pheaſant's eye, called bat's pink, often flowers again in autumn. The cob pink, the ſtalks of which are much taller than in thoſe of the former ſorts; twelve or fifteen inches high; the flowers very double, and of a bright red colour; it has the moſt agreeable odour of all the ſorts; flowering from the latter end of May to the middle of July. The old-man's-head pink, and the painted lady, flower in July, at the ſame time with the carnation, to which they are more nearly allied than to the pink. The firſt, when in its proper colours, is purple, and white, ſtriped, and ſpotted; but it is frequently of one plain colour, as purple: it continues flowering till the froſt in autumn puts a ſtop to it; and the flower having an agreeable ſcent, renders it valuable. The latter is chiefly admired for the livelineſs of its colour; as it is not ſo ſweet, or of ſo long continuance as the other. The clove pink has a large deep red flower, affording a ſtrong ſcent of the clove. And it is ſuppoſed by Martyn, that it is probable, that the red pinks take their riſe from the carnation, whilſt the pheaſant's-eye pinks derive their origin from the fourth ſort. Some, however, give them all as variations of the third; which is not, he conceives, likely.

There are ſingle and double flowers of each of theſe ſorts

Method of Culture.—Though the culture in theſe flowering ornamental plants is effected without much difficulty, conſiderable attention is neceſſary in the management of ſome of the ſorts, to have them flower in the utmoſt perfection and beauty.

Mode of Culture in the Sweet-William kind.—The ſingle ſorts of theſe plants are readily increaſed by ſowing ſeed which has been carefully collected in a bed of light earth, that has not been much enriched by manure, in the latter end of March, or beginning of the following month, either over the ſurface or in ſlight drills, covering it in well: when the plants have attained a proper growth, as about the latter end of June, they ſhould be removed and ſet out on other ſmall beds, prepared for them, planting them out ſix or eight inches diſtant each way, watering them, and keeping them perfectly free from weeds, till the following autumn, or ſpring, when they muſt be taken up, with good balls of earth about their roots, and ſet out where they are to flower. It is by this method that new varieties are produced. Although

though theſe plants are perennial, they ſhould be raiſed every year from ſeed, to have them blow ſtrong, and in the utmoſt perfection.

Theſe, and the double ſorts, may be continued by ſlips or layers. In the former mode the ſlips ſhould be planted out either in the early autumn or ſpring months, where they are to remain, giving them a little water at the time, when the weather is dry. When the ſlips are taken from the young plants, they ſhould be made quite down to the roots, ſo as to have fibres to them. In this way the plants are often good, and flower well. Cuttings, or pipings, managed in the ſame way, alſo ſucceed well in many caſes.

In the latter method, the more tender branches ſhould be laid down in the ſummer months, water being frequently given, when the weather is hot and dry. After they have taken root perfectly, they ſhould be ſeparated or taken off, and be planted out where they are to remain, or in beds of light earth, to be afterwards removed, a little water being given at the time. A few of the beſt ſhould be potted in the beginning of autumn, in order to be more conveniently removed under ſhelter during the ſeverity of winter.

In their general management, theſe plants ſhould be kept neither too moiſt, nor too dry, as in both ſituations they are liable to ſuſtain much injury by the canker.

The ſeed for the culture of theſe plants ſhould be collected, when perfectly ripened, from the beſt and moſt perfect flowers, which have grown at a diſtance from any bad or inferior plants, and be kept in a dry ſituation, till it may be wanted for uſe.

Mode of Culture in the Gilliflower, or Carnation kind.—Theſe plants may be raiſed with facility in the beds or borders of pleaſure-grounds, or gardens, where the ſoil is moderately light and dry; but in order to have them in the greateſt ſuperiority and perfection, it is the practice of floriſts to employ a compoſt prepared by mixing the ſurface vegetable mould of old paſtures with well rotted ſtable-dung, from old hot-beds, or neat's dung in the ſame ſtate, and ſea-ſand, in the proportion of a third of the former, and a fourth of the latter. Theſe materials ſhould be well blended, and lie for a conſiderable length of time, being frequently turned, before they are made uſe of. This mould may be employed, both for filling the pots with, and for forming the beds; and in preparing it for theſe purpoſes, it ſhould not be ſifted fine, but merely well broken down and reduced by the ſpade.

Theſe flowers may be increaſed, and new ones produced by ſeeds, which ſhould be ſown on beds formed of the above compoſt, or on the common borders of light fine mould, from about the middle of March to the ſame period in the following month, raking it in evenly, to the depth of a quarter of an inch, giving ſlight waterings when neceſſary, to promote their vegetation. The fine ſorts are likewiſe often ſown in pots or boxes, in order that they may be readily placed, ſo as to have only the morning ſun when the ſeaſon is hot and dry.

After the plants are come up, they ſhould be kept clear from weeds, and be watered occaſionally, and about July, when the weather is moiſt, be taken up, and pricked out in nurſery-rows, on beds three feet in width, ſetting them ſix inches diſtant, and watering them well at the time, and afterwards, till they have taken freſh root.

At the beginning of autumn, as about September, they will have attained a large growth, and require to be removed into other beds, or ſituations for flowering, in which they ſhould be ſet out in rows eight or nine inches diſtant each way. Some place them in the quincunx manner, as producing a better effect. In this ſituation they ſhould be protected in ſevere weather during the winter, by the application of mats upon hoops placed over the beds. The culture they require in theſe beds is merely that of keeping them free from weeds, occaſionally ſtirring the earth between them by a hoe, and as their flower-ſtalks advance giving them the ſupport of handſome ſticks. They ſhould remain in theſe ſituations till they flower, after which, the ſingles ſhould be taken out, and made uſe of as there may be occaſion, in order to afford full room for the double ſorts, the fineſt and moſt perfect of which being made ſtage or principal flowers, and the others ſet out in the borders; the whole being increaſed as there may be neceſſity, by layering both the firſt and ſucceeding years.

The layer method is that which is principally employed in increaſing and continuing particular varieties, as being the moſt certain. For this purpoſe, the radical leafy ſhoots, proceeding from the crowns of the plants, when of ſix or eight inches growth, are the moſt proper. Theſe ſhould be laid down into the earth, about the latter end of June, or beginning of the following month. The work is performed by ſtripping off the leaves from the lower part of the ſhoot, cutting off a little of the top, and then fixing upon a ſtrong joint, about the middle, to ſlit it with a ſharp knife, nearly half way through, in a ſlanting manner, ſo as nearly to reach the joint above, forming a ſort of tongue on the under ſide of the ſhoot, removing the bark from the enlarged part or joint, to promote the ſtriking root. The mould about the root of the plant ſhould then be ſtirred, and freſh added, where it is wanting, forming a ſlight drill or opening for the branch to be gently laid down into, in a horizontal manner, with the cut part in the earth, the top being left out, and raiſed a little, to keep the ſlit open, pegging the main part of the branch down, by ſhort hooked ſticks, drawing the earth over the cut part. When this method has been practiſed on all the branches, a good watering ſhould be given, to ſettle the mould about them, and frequently repeated when the ſeaſon is dry, in order that they may ſtrike root more perfectly. When the layers thus formed have ſtricken good roots, which is moſtly the caſe in ſix or eight weeks, they ſhould be taken off with the root fibres as entire as poſſible, and after having the ſticky parts about the bottom and the top leaves trimmed off, be planted out either in pots or beds; in the latter method at ſix or eight inches diſtance, with a dibble, a good watering being immediately given, and repeated every two days for ten days or a fortnight, till the plants become well rooted. They ſhould be removed from theſe beds, with balls of earth about their roots, in the beginning of the autumn, into ſmall pots, to have ſhelter during the winter, and in the early ſpring be placed in large ones for flowering; but when there is room, it is a better practice to plant them at once in the pots, as frequent tranſplanting injures their growth. Some floriſts, however, think it beneficial by checking their too vigorous growth.

The leſs fine ſorts may at the above ſeaſon be planted out in the clumps, borders, or other parts, to be left in the beds for flowering.

And theſe flowers may likewiſe be increaſed by cuttings, or pipings, in the manner directed in raiſing pinks, as given below.

And in the winter management of the plants, the fine potted ſorts ſhould about November be removed under the protection of a deep frame covered with glaſs, and plunged cloſely together in a ſlight bed of old tan, dry ſand, or earth. In this ſituation they ſhould have a free admiſſion of air, when the weather is mild, but be covered in froſt, and care ſhould be taken that there be no ſtagnation of moiſture, by the holes in the bottoms of the pots being obſtructed,

as

as by that means they would be much injured, if not deſtroyed.

The flowers which are in the beds ſhould be covered by mats, or other contrivances, when the weather is ſevere at the ſame ſeaſon, care being taken to remove them when the weather is fine in the day time.

And in the ſpring ſeaſon their culture ſhould be continued, by removing thoſe fine varieties which were planted out in ſmall pots in the preceding autumn into large ones for flowering, and ſuch as have remained in the nurſery-beds into the borders or large pots, nine or ten inches over at top, to afford flowers, in each of which the buſineſs ſhould be done by preſerving balls of earth about their roots, about the begining of March, or the following month. The work is performed by cloſing the holes in the bottoms of the pots with pieces of oyſter ſhells or tiles, then filling them half way up with the earth prepared as above, placing the plants with their balls of earth in them, and filling up the vacancies on the ſides with more freſh mould, cloſing it well up about the bodies of the plants, ſo as they may ſtand nearly as high as the tops of the pots, giving a good watering at the time.

When the plants have been thus potted, they ſhould be placed in a ſheltered ſunny ſituation in the open air, being frequently refreſhed with water in hot dry weather.

It is the practice with ſome floriſts to plant two flowers in a large pot: but it is better, as well as more convenient for layering, only to have one; the plants flowering ſtronger, and making more free and finer ſhoots.

And in the ſummer treatment of the flowers, the care of frequent watering ſhould be continued when the weather is hot and droughty, and the ſurface mould be occaſionally ſtirred to promote the growth, and preſerve neatneſs; and when the flower-ſtalks are a little advanced, handſome painted ſticks ſhould be placed for their ſupport both in the pots, and other ſituations; to which they ſhould be neatly tied as they proceed in their growth. When they approach the period of flowering, thoſe which are curious ſhould be removed to a ſtage conſtructed for the purpoſe, and provided with an awning to protect them from being injured by the ſcorching heat of the ſun in the middle of the day, and the effects of too much wet, by which they are continued much longer in blow and beauty.

In regard to ſtages of this nature, they are formed in different methods, according to the fancy of the perſons who make uſe of them. That deſcribed below is a neat mode of conſtructing ſuch apparatus: a platform is erected at the height of eighteen inches or two feet from the ground, conſtituted of two ranges of planks, in order to contain two rows of pots, ſuſtained by poſts in one or two rows underneath, with an open-work roof five or ſix feet in height, covered by means of painted canvas, or ſome other ſuitable material; the whole being ſupported by upright poſts, according to the taſte of the proprietor or perſon who has the management of it.

And the body of the ſtage ſhould be neatly painted for the purpoſe of effect, as well as the preſervation of the wood of which it is conſtructed.

Inſtead of theſe kinds of ſtages, ſome make uſe of a ſort of caps or umbrellas formed of tin, or other ſimilar materials, ſupported on ſtems or ſticks, one for each plant; but theſe are neither ſo convenient, nor afford ſo good an effect as the former, in diſplaying the beauties of the flowers, while in blow.

But whatever may be the nature of the contrivances which are made uſe of for the protection and diſplay of theſe curious flowers, the tying of the plants to the ſupport-ſticks ſhould be continued as the ſtems advance; and ſome curious floriſts contrive to keep them erect at the tops by the uſe of fine wire or other ſimilar means. And in order to procure the flowers as large and fine as poſſible, they trim off all the ſide-ſhoots from the ſtems, leaving only one or two of the top flower buds to expand. When the flowers begin to open, care ſhould be taken to prevent their burſting and expanding in an irregular manner, eſpecially in the burſters, by making a little opening or two in the indentings at the top, and at equal diſtances in other places, by means of fine ſmall pointed ſciſſars. The regular expanſion of the flowers may likewiſe be much aſſiſted, eſpecially where one ſide is more expanded than the other, and they are in pots, by turning the pots, that the contrary ſides may have the full influence of the ſun and light.

And ſome floriſts likewiſe, to blow the curious ſorts as broad and fine as poſſible, make uſe of a kind of ſpreading ſtiff white paper collar, cut open on one ſide, and placed round the bottoms of the flowers to expand the petals upon to the utmoſt extent; but the practice is not in general adviſable, or much had recourſe to at preſent by thoſe who are curious in flowers.

As theſe ſorts of plants flower leſs perfectly as they increaſe in age, it is proper to provide freſh ſupplies of new varieties of them annually by ſowing ſeed obtained from the beſt ſorts in the ſpring ſeaſon, as directed above, and likewiſe to continue the moſt valuable double varieties by means of layering in the ſummer months every year, or the planting of cuttings or pipings, but the firſt is by much the beſt mode of accompliſhing the buſineſs.

And in order to have good ſeed, ſome plants of the beſt and moſt curious ſorts ſhould be preſerved diſtinct, and ſuffered to flower and ripen their ſeed in a perfect manner, which ſhould then be taken off in the pods when the weather is dry, and, after being hardened a little, rubbed out and put up in a bag to be placed in a dry ſituation till wanted for ſowing.

Mode of Culture in the Pink kind.—All the ſpecies and varieties of theſe plants may be increaſed from ſeeds, and the perennial ſorts likewiſe by layers, ſlips, cuttings, and pipings, being managed as directed below.

Where the beſt ſorts only are grown, great care ſhould be taken in providing the ſeed, that it be always had from the beſt and moſt perfect kinds in a full ſtate of maturity.

It ſhould be ſown in the manner directed for carnations, in the beginning of March or the following month, and the plants be managed in a ſimilar manner, only, as being more hardy in their nature, with leſs tenderneſs, and care.

But the ſixth ſpecies is beſt increaſed by ſowing the ſeed on a very gentle hot-bed the beginning of April, as the vegetation is thereby much forwarded. When the plants appear air ſhould be admitted freely, to prevent their drawing up weak; and when of a little growth they may be pricked out with good roots, if the weather be ſuitable, on a bed of light earth, at about three inches diſtance, proper ſhade and water being given. When they are of conſiderable growth, as about the latter end of May, they ſhould be removed with good balls of earth about their roots, and planted where they are to remain for flowering.

The layers ſhould be laid down in the latter end of July or beginning of the following month, in exactly the ſame manner as has been directed for carnations, giving them the ſame culture in every reſpect, till they flower.

In caſes where there are large plants that ſpread conſiderably in a lateral manner, their ſhoots may be covered in the ſpring to the depth of an inch or two; they will thus often take root, form good plants, and be in a ſtate to be planted out in the beginning of the autumn following.

And the ſlips of the young ſhoots, either made from the ſides of the principal ones, or from the roots, ſo as to have fibres to them, and planted out in February, or the two following months, in beds of good mould to a good depth, readily take root, and become good plants before the end of the ſummer, at which time, or in the following ſpring, they may be removed with good balls of earth about their roots, to the places where they are to flower and grow.

Likewiſe cuttings made from the firm ſhoots of the ſame year at the joints, to the length of three or four inches, when planted pretty deeply in a bed of very fine mould, or in large pots at the diſtance of an inch or two, and well watered at the time, readily grow and become plants after being tranſplanted into ſeparate pots, or the borders where they are to flower.

Alſo pipings made by drawing out or breaking off the top parts of the young ſhoots at the joints and trimming them, by which a ſort of pipe is formed, on being planted and managed in the ſame manner, take root and afford good plants.

And in both theſe laſt methods the rooting of the ſhoots is generally promoted by their being cloſely covered by bell, hand, or other ſorts of glaſſes, and having frequent ſlight waterings given round the ſides of them.

In reſpect to the ſeed of the different beſt ſorts, it ſhould be collected in the pods in Auguſt or the following month, when perfectly ripened, chooſing a dry ſeaſon for the purpoſe, ſpreading them out to harden and become dry on paper, or in ſome other manner, after which it ſhould be rubbed out and kept in ſome dry ſituation till it is wanted.

All the different ſpecies and varieties of theſe plants are highly ornamental, and many of them curious, affording an extremely fragrant ſmell during the ſummer months.

The firſt ſort in all the varieties may be made uſe of in the borders, clumps, and other places, where they produce a fine effect by the variety of their flowers in aſſemblage with others of ſimilar growth and ſize.

A few of the double more curious kinds may alſo be cultivated in pots for adorning the more conſpicuous places about the houſe and walk contiguous to it.

The ſecond ſpecies, and all the different varieties of the carnation kind, are proper ornamental plants for the fronts of clumps, borders, and other principal parts of gardens or ornamented grounds, where they have a very agreeable effect from the beauty and elegance of their flowers, as well as the fragrance which they afford during the ſummer ſeaſon.

But the curious double ſorts are moſtly cultivated in pots for the convenience of protection, and being exhibited on ſtages, or in particular ſituations during the time of their blowing, as well as for the eaſe and facility of removal, when neceſſary, to different ſituations.

Likewiſe the third ſort, and the different varieties of the common pink, are all well adapted for producing ornament in the fore parts of beds, borders, and other compartments of pleaſure grounds and gardens, both from the multiplicity of their flowers and their beauty, as well as fragrant ſmell. Theſe are ſometimes uſed for edgings, but from their ſpreading growth they require frequent cutting, when thus employed.

The fourth and fifth ſorts may likewiſe be employed for the purpoſe of affording a greater variety in theſe different ſituations.

The ſixth ſpecies is extremely ornamental from the fineneſs of the colour of the flowers, and the great length of time during which they continue in bloom.

It is obſerved by Martyn, that the ſeventh ſpecies, from the elegance and delicious fragrance of its flowers, is deſerving of being employed in all curious gardens.

In the buſineſs of planting out the various ſorts, the annual kinds are moſtly diſpoſed in patches of three or four plants in each; but the perennial kinds ſingly, as being more buſhy and ſpreading in their habit of growth.

All the different ſpecies and varieties of theſe flowery plants may be brought to blow much more early by being cultivated in frames or the hot-houſe, where there is convenience for it.

DIANUCON, in *Pharmacy*, a kind of rob made with the juice of green walnuts and ſugar: it is now diſuſed.

DIAPALMA, a plaſter much reſembling the diachylon. See EMPLASTRUM.

DIAPASMA, a common name for all powders ſprinkled on the body, whether as perfumes or otherwiſe.

The word comes from the Greek διαπασσειν, *inſpergere, to ſprinkle.*

DIAPASON, in the *Ancient Muſic*, implied the interval or concord of an octave, ſo called, becauſe it contains all the diverſities of ſound. It is $\frac{1}{2} = 612\ \Sigma + 12\ f + 53\ m$. Inſtrument-makers, by diapaſon, underſtand the ſtate of the meaſures, and the proportions of the ſeveral parts of their inſtruments. See ORGAN.

Guido, in his Chap. de Diapaſon & Tinctor; in his Diffinitorium, or Primitive Muſical Dictionary, gives ſeven definitions of the term *diapaſon*.

1. Diapaſon has three diſtinct ſignifications: as a concord, an interval, and a proportion.

2. Diapaſon ariſes from the mixture of two perfect concords, a 4th and a 5th, or from two diſcords, a falſe 5th and a tritonus.

3. Diapaſon is the conjunction and interval of a perfect 4th and 5th.

4. Diapaſon is expreſſed in numbers by $\frac{1}{2}$ or $\frac{2}{4}$. It has, like other intervals, three qualities: it is perfect, imperfect, and ſuperfluous.

5. Diapaſon perfect, conſiſts of five tones and two ſemitones, of which five are concords, and two diſcords.

6. Diapaſon imperfect, is that which conſiſts of four tones, and three ſemi-tones.

7. Is only a diapaſon in appearance: as from b *mi*, to the b *fa* above. Theſe are what we now term falſe octaves, and the moſt offenſive of all diſcords.

DIAPASON *Stop* in an organ, is the foundation upon which the chorus, or full organ is conſtructed; and by the length of the longeſt pipe in that ſtop, the magnitude of the whole inſtrument is known: as an 8 feet, a 16 feet, a 32 feet, or a 64 feet organ, to which ſeveral organs in Holland and Germany amount. The proper compaſs of a voice, or inſtrument, is called its diapaſon. The word is derived from δια, *through*, and παων, *the whole;* becauſe the octave includes the whole compaſs of the whole ſyſtem.

DIAPASON *diateſſaron*. The Pythagoreans did not admit this interval as a conſonance or concord; for this reaſon, that its ratio 8 : 3 was neither multiple nor ſuper-particular. But Ptolemy contends for its being a good concord, for this reaſon, that the diapaſon added to any concord produces a concord. Ariſtoxenus herein agrees with him. Vide Wallis's Append. ad Ptolem. Harm. p. 155.

DIAPASON, among *Muſical Inſtrument-Makers*, is a kind of rule, or ſcale, whereby they adjuſt the pipes of their organs, and cut the holes of their flutes, hautboys, &c. in due proportion, for performing the tones, ſemi-tones, and concords, juſtly.

A ſquare being divided into eight equal parallelograms; the points wherein a diagonal interſects all theſe parallelograms,

grams, expreſs all the uſual intervals in muſic; and on this principle it is that the diapaſon is founded.

There is a particular kind of diapaſon for trumpets, ſerving as a ſtandard, or meaſure, for the different magnitudes they muſt have to perform the four parts of muſic. There is another for ſackbuts, and ſerpents, ſhewing how far they are to be lengthened, or ſhortened, to riſe or fall from one tone or interval to another.

The bell-founders have likewiſe a diapaſon, or ſcale, ſerving to regulate the ſize, thickneſs, weight, &c. of their bells.

DIAPASON-*diaex*, a kind of compound concord; whereof there are two ſorts: the *greater*, or the interval of a major thirteenth, whoſe ratio is $\frac{3}{10}$ths, or VIII + VI = 1063 Σ + 21 *f* + 92 *m*; and the *leſs*, or the interval of a minor thirteenth, whoſe ratio is $\frac{5}{16}$ths, or VIII + 6th = 1027 Σ + 20 *f* + 89 *m*. See CONCORD.

DIAPASON-*diapente*, a compound conſonance, in a triple ratio of 9 to 3.

The diapaſon-diapente is a ſymphony made when the voice proceeds from the firſt to the twelfth tone. The word is properly a term in the Greek muſic: we ſhould now call it a twelfth. It is the interval of a major twelfth, $\frac{1}{3}$, or VIII + V = 970 Σ + 19 *f* + 84 *m*. (See CONCORD.) Martianus Capella thought this interval to be equal to 9 major tones and a minor ſemi-tone, but which exceed it by 2 ſchiſmas (2 Σ).

DIAPASON-*diateſſaron*, a compound concord.

The diapaſon-diateſſaron is a ſymphony wherein the voice proceeds from the firſt tone to the eleventh. This the moderns would rather call an eleventh. It is the interval of a minor eleventh, $\frac{3}{8}$ths, or VIII + 4th = 866 Σ + 17 *f* + 75 *m*. (See CONCORD) M. Capella ſtates this interval to be equal to 8 major tones and a minor ſemi-tone, but which exceeds it by 2 Σ.

DIAPASON-*ditone*, expreſſes the interval of a major tenth, $\frac{2}{5}$ths, or VIII + III = 809 Σ + 16 *f* + 70 *m*. See CONCORD.

DIAPASON-*ſemi-ditone*, is the interval of a minor tenth, $\frac{5}{12}$ths, or VIII + 3d = 773 Σ + 15 *f* + 67 *m*. See CONCORD.

DIAPEDESIS, διαπηδησις, in *Medicine*, a term employed by Galen and his followers, to denote a fourth mode, by which hæmoptyſis may be produced, (in addition to thoſe mentioned under the term DIABROSIS,) namely, when the contained fluids tranſude, as it were, through the unbroken membranes of the veſſels: and, he ſays, that this may happen when the coats of the veſſels become thinner, and the blood is more diſſolved, ſo as to paſs through the pores of the veſſels, as through a ſieve. Quickſilver, ſays Van Swieten, gives no unapt inſtance of this diapedeſis, when it is ſqueezed through leather to purify it; for it tranſudes in minute drops, the leather remaining entire. But, he juſtly adds, although this may ſeem not altogether impoſſible, yet it is hard to conceive that the red blood, which is the moſt denſe of the human fluids, ſhould ſooner force its way through the pores of the membranes of the veſſels, than paſs from the arteries into the veins. See Galen Meth. Med. lib. v. cap. 2. Van Swieten Comment. § 1199.

DIAPENSIA, in *Botany*, (according to profeſſor Martyn, from διαπηδεω, *to mourn*, or *grieve deeply*, probably from its dreary place of growth. But Ambroſinus derives it from δια and πεντε, as if compoſed of five, and in this ſenſe it certainly was applied by the botaniſts of his time to the *Sanicula*, whoſe leaves are compoſed of five lobes. Linnæus, finding the name, as he tells us, in the Flora Lapponica, unoccupied, adopted it for his new Lapland genus, in alluſion, as it ſhould ſeem, to its five-cleft flower and five ſtamens.) Linn. Gen. 79. Schreb. 104. Willd. Sp. Pl. v. 1. 795. Juſſ. 135. Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Preciæ*, Linn. *Convolvulis affine*, Juſſ. *Ericæ*, Saliſb.

Gen. Ch. *Cal.* Perianth of eight leaves; the five innermoſt ranged in a circle; the reſt imbricated upon them; all equal, ovate, obtuſe, erect, permanent. *Cor.* of one petal, ſalver-ſhaped; tube cylindrical, pervious, the length of the calyx; limb in five obtuſe horizontal ſegments. *Stam.* Filaments five, linear, flattened, erect, ſhort, inſerted into the top of the tube, between the ſegments of the limb; anthers ſimple, according to Linnæus, but more juſtly repreſented in the *Paradiſus Londinenſis*, as of two diſtinct, ſeſſile, elliptic lobes. *Piſt.* Germen ſuperior, roundiſh; ſtyle cylindrical, erect, its top on a level with the anthers; ſtigma blunt, with three ſlight notches. *Peric.* Capſule ovate, with three cells and three valves, the partitions contrary to the valves. *Seeds* numerous, roundiſh.

Eſſ. Ch. Corolla ſalver-ſhaped, five-cleft. Calyx of five leaves, encompaſſed by three others. Stamens crowning the tube of the corolla. Capſule of three cells. 1. D. *lapponica*. Leaves tongue-ſhaped, recurved, ſmooth. Anthers without ſpurs. Linn. Fl. Lapp. ed. 2. 57. t. 1. f. 1. Sp. Pl. 202. Oed. Fl. Dan. t. 47. Saliſb. Parad. t. 104. Sims in Curt. Mag. t. 1108. Found by Linnæus very abundantly on the Alps of Lapland. We have it alſo from the coaſt of Labradore. Oeder had it from Norway. It bloſſomed in the garden of the right honourable C. Greville, at Paddington, in February, 1808, for the firſt time we believe in England. The branching ſtems form little denſe tufts, clothed with crowded leaves, which ſpread in every direction, and are tongue-ſhaped, recurved, entire, ſmooth, keeled beneath, channelled above; the lower ones permanent, though faded and almoſt black. Flowers ſolitary, on ſimple terminal ſtalks. Corolla of a brilliant white, with yellow anthers. 2. D. *barbulata*. "Leaves ſomewhat wedge-ſhaped, downy beneath. Anthers ſpurred at the baſe." Saliſb. Parad. (Pyxidanthera barbulata; Michaux Fl. Boreal. Amer. v. 1. 152. t. 17.) A native of the mountains of North Carolina. Dr. Sims and Mr. Saliſbury have both indicated the generic affinity of this plant to the former. We have ſeen no ſpecimens of it. S.

DIAPENTE, in *Muſic*, the name given by the Greeks to the interval which we call the 5th, or 2d concord, in point of perfection. (See FIFTH.) The word is formed of δια, *through*, and πεντε, *five*, as, in forming this interval diatonically, it conſiſts of five degrees.

DIAPENTE is alſo uſed, in *Pharmacy*, for a compound of five ſeveral drugs, or ingredients.

DIAPENTE, among *Farriers*, a drink made for horſes of gentian, round birthworth, barberries, myrrh, and ivory-ſhavings, of each a like quantity, which are to be pounded ſeparately, and finally ſearced: this powder, to the quantity of two or three ſpoonfuls, is mixed with a pint and a half of muſcadine, or ſack, or, for want of either, with ſtrong ale or beer, and given in fevers, the cough, glanders, ſurfeits, inflammations, yellows, &c. It is ſaid to purify the blood from all foulneſſes, as well as to reſtrain the overflowing of the gall, working of the ſpleen, &c.

DIAPER is a name given to a particular ſpecies of cloth, uſed chiefly for table linen. It is known by the French by the name of *toile fourré*, and is ornamented with the moſt extenſive figures of any kind of tweeled cloth, excepting damaſk. The mounting of a loom for working diaper is, in principle, much the ſame as a draw-loom, but the figures being leſs extenſive, the mounting is more ſimple,

and is wrought entirely by the weaver, without the aid of any other perſon. As tweeled cloths, of any number of leaves, are only intervowen at thoſe intervals when one of the leaves is raiſed, the woof above, and the warp below, is kept floating, or fluſhed, until the interſection takes place. Of conſequence, the floating yarn above appears acroſs the fabric, and that below longitudinally. This property of tweeled cloths is applied to form the ornamental figures of all kinds of tweeled goods, merely by reverſing the floating yarn when neceſſary. In the ſimpler patterns, this is effected by a few additional leaves of treddles; but when the range of pattern becomes too great to render this convenient, an apparatus, called a *back harneſs*, is employed, and the cloth woven with this mounting is called diaper. Diapers are generally five-leaf tweels, that is to ſay, every thread of warp floats under four threads of woof, and is raiſed, and, of courſe, interwoven with the fifth. This is done either ſucceſſively, forming diagonals at 45° upon the cloth, or by intervals of two threads, which is called the broken tweel. The latter is generally, if not univerſally, adopted in the manufacture of diaper. The reaſon of preferring the broken to the regular tweel, where ornaments are to be formed, is very obvious. The whole depending upon reverſed fluſhing to give the appearance of the figures, and the regular fluſhing that of the ground, the appearance of oblique or diagonal lines through either would deſtroy much of the effect, and materially injure the beauty of the fabric. The broken tweel, on the contrary, reſtores to the tweeled cloth a great ſimilarity of appearance to plain or alternately interwoven fabrics, and, at the ſame time, preſerves the facility of producing ornaments by reverſing the fluſhing. The ſimpleſt kinds of reverſed tweels will be found in the articles DIMITY and DORNOCK. The diaper mounting is repreſented by *Figs.* 1 and 2. *Plate* VIII. *Miſcellany*.

Fig. 1, is the profile ſection of the mounting of a loom for diaper, viewed from the right ſide. A is the breaſt beam before which the weaver ſits when weaving. After paſſing over this beam, the cloth is wound upon the cloth beam below, and kept faſt by the ratchet-wheel K, which is ſecured by a catch, fixed to one of the ſide rails, or knees of the loom, as in plain weaving. The frame-work is not repreſented in the figure, becauſe it would prevent the view of thoſe parts of the mounting which are peculiar to diaper, and differs in nothing from that of a loom for plain cloth of equal breadth and ſtrength of fabric. B is the yarn beam, and I the rods between which the threads of warp paſs. At L is repreſented the point where the warp is intervoven with the woof to form the cloth. The lay and ſhuttle are not repreſented for the reaſon already given. The parts, in which the diaper mounting differs from that of moſt other looms, are at D and C. The former of theſe repreſents the treddles, in number five, worked by five treddles below at E, the front leaf being raiſed, the back leaf ſunk, and the three intermediate leaves ſtationary. At C is the back harneſs moved, when neceſſary, by the weaver's hand, by pulling one of the cords above through the board M, perforated with holes, in each of which is a notch, to ſecure a knot upon the cord, when pulled down to raiſe the leaf.

In the figure the back leaf is raiſed, and all the others ſtationary. The motion is communicated by means of the cords attached to the leaves of the harneſs, which paſſing over the pullies in the box or caſe H, are made faſt to a piece of wood G, fixed to one ſide of the loom, or to the wall of the ſhop, as moſt convenient. The front treddles at D are connected by cords above to the top levers N, and the motion continued to the treddles by long and ſhort marches, as in other looms mounted for ornamental weaving. As diaper fabrics are always of ſtrong coarſe yarn, the eyes of the harneſs leaves are made of iron or copper, and are called nails; one of theſe is repreſented by *fig.* 2. The eyes of the front leaves are made of a length rather more than the whole depth of the ſhed to be formed. When a diaper loom is mounted, the effect of the harneſs is as follows: Let the tweel, which by reverſing forms the figure, be one of five leaves. In this caſe five threads of warp are drawn through every mail of the harneſs, and one of theſe threads through every leaf of the front-mounting. According to each change of pattern, the number of back harneſs leaves is to be arranged. All thoſe which are raiſed will then form the figure, and thoſe which remain ſtationary, the ground. This is effected by the weaver pulling the cords which paſs through the board G, until the number of leaves required be raiſed. He then preſſes down his treddles in ſucceſſion, until a change is required. As the eyes in front are as long as the depth of the ſhed, thoſe threads which paſs through the mails which are raiſed will be ſunk by the top of the eye, and the threads which are ſunk by the harneſs, will be raiſed by the treddles. But as only one leaf of treddles is raiſed, one ſunk, and three ſtationary, only one thread in every five will be affected by the front mounting, for the long eye of the treddle which riſes will have no effect upon that part of the warp which has been already raiſed by the harneſs, and the leaf which ſinks will have as little upon thoſe which are already down. In the raiſed mails forming the pattern, therefore, four threads will always be above the woof, and one below; in the ſunk mails for the ground, the exact converſe takes place. The two croſſed lines between the harneſs and front treddles will ſhew the effect produced. The pattern is thus produced entirely by the harneſs, and the remaining part of the operation is exactly the ſame as common tweeling.

In mounting diaper looms, the mails of the harneſs muſt be tied ſo low as to allow the warp to touch the race upon which the ſhuttle runs, that its motion may not be interrupted. When the webs are broad, it is alſo found convenient to uſe two ſets of top levers, one ſet being at each ſide of the loom, in order to keep the leaves of treddles level, and to facilitate the weaver's power of treading, which in that, as in all heavy work, requires to be firmly done. The horizontal plan of the diaper mounting will be found in *fig.* 8; and the explanation of that figure in the article DRAUGHT and *Cording*.

DIAPERED, in *Heraldry*. See DIAPRÉ.

DIAPHANOUS, in *Philoſophy*, a thing tranſparent, or that gives paſſage to the rays of light; as water, air, glaſs, talc, fine porcelain, &c. See TRANSPARENCY.

The word is formed of διὰ, *through*, and φαίνω, *I ſhew*.

DIAPHANEITY, in the ſchools, the quality of a tranſparent body; or that which denominates it ſuch. See TRANSPARENCY.

DIAPHANES, in *Ancient Geography*, a river of Aſia, in Cilicia, placed by Pliny on the frontiers of Syria.

DIAPHŒNIX, in *Pharmacy*, an ancient electuary, now obſolete, of which dates were a principal ingredient.

DIAPHONIA, in *Ancient Muſic*, a name given by the ancient Greeks to diſcord, as ſounding twice, and by Guido to diſcant, ſinging in two parts.

In the muſic of the middle ages, during the firſt rude attempts at counter-point, diaphonia was ſynonymous with organum, and implied a part ſuper-added to the canto fermo of the church.

DIAPHONICS, from διὰ, *through*, and φωνὴ, *ſound*, is ſometimes uſed for the ſcience of refracted ſound, as it paſſes through different mediums.

DIAPHORESIS, in *Medicine*, ſynonymous with perſpiration. By ſome it has been confined to the inſenſible perſpiration, or halitus, from the ſkin; but this diſtinction is not generally adopted. See DIAPHORETIC.

DIAPHORETIC MEDICINES, are thoſe which promote a diſcharge by the ſkin, whether it be by inſenſible perſpiration, or by ſweat.

In the common language of writers, the term diaphoretic is applied to thoſe medicines only which promote the inſenſible perſpiration, or the ſlighteſt degrees of ſenſible moiſture on the ſkin; and thoſe which occaſion ſweating, they diſtinguiſh by the term of ſudorific, or ſudoriferous; but as, in the medicines ranged by authors under theſe titles, we can find no difference, but in the degree of force, or what ariſes from the manner of adminiſtration, we may comprehend the whole under the title of diaphoretics.

All the diaphoretic medicines operate either by exciting the force of the circulation, or by exciting the extreme veſſels on the ſurface of the body only; and theſe two operations take place ſometimes ſeparately, and ſometimes together. As the aqueous part of the blood paſſes off by the urine or perſpiration, the quantity of theſe excretions muſt neceſſarily be in proportion to the quantity of water, for the time preſent, in the maſs of blood; and the paſſing of it by the one excretion or the other, will be determined by certain circumſtances of the economy, which we ſhall briefly conſider.

The diſpoſition to perſpiration, both in health and in diſeaſe, depends much upon the condition of the ſkin itſelf, although the activity of the general circulation, as we ſee from the effects of exerciſe, as well as of ſome ſtates of fever, may be conſidered as the prime mover of this excretion. Thus a coarſe and dark ſkin, characteriſtic of the melancholic temperament, is leſs diſpoſed to admit of perſpiration, than the ſoft ſkin of the ſanguine temperament; and a ſtate of moderate health of the conſtitution at large is leſs prone to increaſe the action of the exhalant veſſels, than a ſtate of great fullneſs on the one hand, or of languor and relaxation on the other. As the urine and perſpiration are, as it were, counterbalances to each other, whatever increaſes the diſpoſition to the one diminiſhes that of the other. The ſtate of the ſkin is much connected with that of the ſtomach; ſo that thirſt may be relieved by moiſtening the ſkin, and the ſkin is often ſpeedily relaxed by certain ſubſtances, as warm liquors taken into the ſtomach.

There are two means, therefore, by which perſpiration may be induced, and the action of ſudorific medicines promoted, namely, by application to the ſkin, and ingeſta.

When the ſkin is not in a ſtate unfavourable to perſpiration, the application of heat to the ſurface of the body, without any aſſiſtance from powers internally applied, is ſufficient to produce ſweating; and the application of cold, *i. e.* the abſtraction of the heat, can almoſt certainly prevent the ſame, though conſiderable powers are employed within. Thus ſweating may be obtained by the heat of the air, applied as in what is called the dry bagnio, or by increaſing the heat of the ſurface by previous warm bathing, or by accumulating the warm effluvia of the body itſelf upon its ſurface. This laſt may be done by covering up the body very cloſely with ſuch coverings as may both prevent the eſcape of the warm effluvia ariſing from them, and at the ſame time prevent the acceſs of external cold.

But, farther, to favour the diaphoretic action, a quantity of warm liquid may be taken into the ſtomach, which not only excites the general circulation, but particularly, by conſent of the veſſels on the ſurface of the body with the ſtomach, excites the action of thoſe veſſels which pour out ſweat. The uſe of warm liquids alone, eſpecially in the morning, while in bed, where there is a general diſpoſition to perſpiration, is in ſlight febrile caſes, an ample ſudorific.

Theſe two means of covering up the body cloſely, and taking warm liquids into the ſtomach, are what we call the ſudorific regimen; which will often anſwer alone the purpoſe of exciting diaphoreſis; is often neceſſary to the operation of ſudorific medicines; and will always render their operation more complete and permanent. Cullen Mat. Medica, vol. ii.

But although the application of heat to the ſurface of the ſkin will in general excite perſpiration, it will not, as has lately been aſcertained, invariably produce that effect; but, on the contrary, it will, under a certain condition of the ſkin, rather impede than promote the ſudorific proceſs. The omiſſion of this obſervation, added to the falſe opinions reſpecting the importance of forcing perſpiration, has led to much miſchievous practice in febrile diſeaſes. It is now well underſtood, though not ſatisfactorily accounted for, that in the hot ſtage of continued fevers, as in typhus, ſcarlatina, &c. there is a peculiar conſtriction of the veſſels of the ſkin, marked by extreme dryneſs of its ſurface, and accompanied by great heat, which is increaſed by increaſing that heat, by means of external covering, and the excluſion of cool air. In this condition of the body, *cold* affords the only ready means of removing the febrile conſtriction of the cutaneous veſſels, and cold is, in fact, the only ſudorific under ſuch circumſtances. This principle has been fully proved by Dr. Currie, (ſee his Reports on Cold Water, &c.) and has been obſerved by all who have adopted his practice of cold affuſion, or ſponging, in fevers. The writer of this article has frequently employed the ſhower-bath, and the cold waſhing of the ſkin, in the hot ſtate of typhus, and a free perſpiration was its almoſt invariable conſequence. See COLD.

But although the external application of cold water was not often employed in fevers till within the laſt thirty years, yet the internal uſe of cold water, for the purpoſe of exciting perſpiration, appears to have been among the expedients of the ancients in the cure of fevers. Celſus mentions the practice of giving copious draughts of cold water in ardent fevers, and deſcribes the conſequences to be preciſely ſuch as are produced by the cold affuſion externally, as we have frequently witneſſed: the patient, he ſays, falls into a ſound ſleep, the heat remits, and a free perſpiration breaks out, although he had previouſly ſuffered much from thirſt, heat, and reſtleſſneſs. "Fereque poſt longam ſitim et vigiliam, poſt multam ſatietatem, poſt infractum calorem, plenus ſomnus venit, per quem *ingens ſudor effunditur*, idque præſentiſſimum auxilium eſt." De Medicina, lib. iii. cap. 7. He mentions the ſame practice again in the ninth chapter of the ſame book. Galen and his immediate followers, as well as the phyſicians of the ſixteenth century, ſeem alſo to have made much uſe of cold water, and frequently for the purpoſe of exciting ſweat. See Lommius de Febribus.

A curious controverſy took place in this country early in the laſt century, in conſequence of the publication of a book, entitled, "Febrifugum Magnum, or common Water the beſt Cure for Fevers," by Mr. Hancocke, not a member of the medical profeſſion. He aſſerts, that a pint or a quart of cold water, ſwallowed before going to bed, on the firſt or ſecond day of fever, generally produces a copious ſweat, and cuts the fever ſhort; and he has related ſeveral caſes in which theſe effects took place.

There can be little doubt that cold water, received into the ſtomach in the hot ſtage of fevers, produces its diaphoretic effects in conſequence of the ſympathy which exiſts between that organ and the ſkin: and in the ſame way, moſt probably, the vegetable acids and the neutral ſalts operate on the cutaneous veſſels, as is maintained by Dr. Cullen (Ma-

teria Medica, vol. ii. p. 582.) and all the other ſpecies of diaphoretics, which do not excite ſweating by their ſtimulant power upon the heart and arterial ſyſtem; ſuch as ipecacuanha, antimony, &c. Theſe are the only ſort of diaphoretics that can be employed with advantage or ſafety in fevers, where the primary object is to procure a free diſcharge by the ſkin: in fact, the power of ſudorific medicines in curing fevers is now acknowledged to be very limited. From an obſervation that fevers frequently ſubſided on the appearance of a copious ſweat, and an opinion that ſome noxious cauſe of the fever, a *materies morbi*, was thus evacuated by the pores of the ſkin, the old practitioners laboured hard to produce ſweating, and, by imitating the proceſs of nature, to anticipate her criſis, and aid her efforts in the expulſion of the "peccant humours." But experience has decided that the imitations of art do not produce the ſame reſults as the ſpontaneous operations of the conſtitution: a bliſter does not ſupply the place of an eruption or a boil; a purgative is not equally concluſive in its effects as a ſpontaneous diarrhœa; nor does a ſudorific draught, with the proper regimen, produce the ſame criſis as a natural ſweat: inaſmuch as theſe ſpontaneous diſcharges are rather the effects and firſt ſymptoms of a ſalutary change in the diſeaſe, and not the cauſes. (See CRISIS.) Therefore, when theſe ſpontaneous diſcharges occur, our duty conſiſts only in doing nothing that may tend to interrupt them, unleſs where they are obviouſly detrimental. The profuſe ſweats in hectic fever, for example, and the colliquative, which alternate with them, or that which occurs in the latter ſtages of typhus, are of a dangerous tendency, and, therefore, ſhould be checked when it is poſſible.

The value of the other claſs of diaphoretics, which excite ſweat by accelerating the general circulation, ſuch as contrayerva and ſerpentaria, is to be eſtimated, therefore, upon their other properties, the ſtimulant and cordial, rather than upon their ſudorific powers, in the cure of fevers; and they ought only to be employed in thoſe diſeaſes when debility prevails, in aid of the powers of wine and other ſtimulants. In all febrile diſeaſes connected with local inflammation; as in pneumonia, phrenzy, inflammation of the bowels, liver, or other organs, diaphoretics of this ſtimulant nature muſt be carefully avoided; ſince their miſchievous influence, in accelerating the circulation, would more than counterbalance any advantage which might be received by relaxing the veſſels of the ſkin. Of all the ſtimulant diaphoretics, Dr. Cullen conſiders the guaiacum to be one of the moſt valuable, as it affords a matter which paſſes more entirely to the extreme veſſels, and ſeems to ſtimulate the exhalents more in proportion than it does the heart and great arteries. By this means it is both a more ſafe and more effectual ſudorific than thoſe which ſtimulate the latter almoſt only: but acute rheumatiſm, or rheumatic fever, as it is called, is almoſt the only acute diſeaſe in which it can be recommended; and it is a diſeaſe in which the ſweating is ſpontaneouſly profuſe, and bears ſtimulants better than phlegmonous inflammations.

It may be obſerved, that the combination of opium with ſudorific medicines is valuable in two ways; the opium aids the operation of the ſudorific, on the one hand; and, on the other, the ſudorific, by determining to the ſkin, renders the anodyne effect of the opium more certain and complete, and prevents ſome of its unpleaſant influence on the head: for opium, given when the ſkin is dry, or not accompanied by perſpiration in the courſe of its operation, is very apt to occaſion reſtleſſneſs rather than ſleep, and to produce a ſlight approach to delirium, by its influence on the brain: hence the acknowledged value of the combination which is univerſally known by the name of Dover's powder, as a ſafe and active diaphoretic and anodyne; it conſiſts of opium combined with the diaphoretics, ipecacuanha, and ſulphate of potaſs.

Diaphoretic medicines have been employed in various other diſeaſes of a chronic nature: at one period they were believed to have the power of eradicating the venereal diſeaſe, and the ſtimulant ſort, ſuch as guaiacum, opium, and other vegetable matters. They are allowed to have removed ſome of the primary and ſecondary ſymptoms of lues venerea, and to have alleviated others; and they are deemed capable of removing certain ſequelæ of the diſeaſe, where the farther adminiſtration of mercury would prove injurious: but no ſatisfactory evidence has been adduced, to prove that any, or all of theſe vegetables, given ſingly or combined, are competent to the eradication of lues venerea from the animal body. See John Pearſon's "Obſervations on the Effects of various Articles of the Materia Medica in the Cure of Lues Venerea," p. 234, ſecond edition.

Diabetes has alſo been ſaid to have been cured by the uſe of ſudorific medicines. Two caſes of this diſeaſe are recorded by Dr. M'Cormick of Antrim, in Duncan's Medical Commentaries for 1783, in which the continued uſe of Dover's powder, at bed-time, is believed to have effected a cure: and the adminiſtration of the ſame powder, conjoined with the uſe of another powerful diaphoretic, the warm bath, was ſucceſsfully recommended, in one caſe, by Mr. Werner. See "The London Medical Journal for 1790," p. 221. The natural ſtate of the ſkin in diabetes is that of extreme dryneſs, and diaphoreſis is with difficulty produced: but it is reaſonable to ſuppoſe, that, where a free outlet is obtained by the ſkin, the diſcharge by the kidnies will be diminiſhed. It may be doubted, however, whether this change alone can be conſidered as a cure of diabetes; ſince the conſtitutional or organic diſeaſe, with which it is commonly connected, cannot be removed by ſweating.

DIAPHORETIC *antimony*, or *mineral diaphoretic*, is a preparation of antimony, the proceſs whereof ſee under ANTIMONY.

DIAPHRAGM, in *Anatomy*, (from διαφραττω, *I divide*,) the muſcle which ſeparates the two cavities of the abdomen and thorax, and is the chief agent in inſpiration. It is alſo known among anatomiſts by the names of ſeptum tranſverſum, ſeptum muſculare, and in common language, by that of the midriff.

In anatomical deſcriptions it is often divided into two parts; which however are ſo intimately united, that they form in fact but one muſcle. Theſe diviſions are; the *greater diaphragm*, the true ſeptum, which is a thin, broad, and arched tendino-muſcular expanſion, dividing the cheſt from the abdomen: and the *leſſer diaphragm* (appendices or crura diaphragmatis), which is connected to the back part of the former, and deſcends on the front of the bodies of the lower vertebræ. It is remarkable, as Biſchat has obſerved, for the want of ſymmetry in its two halves. Parts of the body belonging to the animal functions, and placed in the middle line, are generally ſymmetrical; perhaps the deviation from this law in the caſe now under conſideration, may be accounted for, according to the remark of that author, by the circumſtance of its being connected in great meaſure with the organic functions, although it is under the controul of the brain.

Its middle conſiſts of a large broad and thin aponeuroſis, or tendon, ſerving as a common point of attachment to all the muſcular fibres, and named the tendinous centre, or central tendon of the diaphragm. This part is the real diviſion of the two cavities, and is placed in the centre of the ſpace which ſeparates them. Its figure is ſomewhat oval on the lateral aſpects; it is contracted into an obtuſe end towards the

the front, and is marked by a lunated notch poſteriorly. Hence it has an obſcure reſemblance to the leaf of trefoil, and conſiſts of two lateral portions, named alæ, a right and left; and a middle anterior part placed before and between the two latter. The poſterior edge of this tendon is its broadeſt part, and is placed near to the bodies of the vertebræ: it becomes gradually narrower towards the front, and the obtuſe end of this part terminates at a ſhort diſtance behind the enſiform cartilage. It conſiſts of fibres purſuing very various directions, and connected into faſciculi, which decuſſate each other: the greater part perhaps goes from the circumference to the centre. The right ala is generally rather larger than the left. From the whole circumference of this tendinous centre the muſcular fibres depart in a radiated manner; and they may be divided into three parts: the anterior, the poſterior, and two lateral. The front portion conſiſts of a few ſhort fibres, proceeding directly downwards and forwards to be fixed to the poſterior ſurface of the enſiform cartilage. They are often divided into a right and left part, and at the interval between theſe the cellular ſubſtance of the anterior mediaſtinum communicates with that of the abdominal cavity. Sometimes this part is wanting altogether.

The lateral fibres are the moſt numerous; they proceed from each ſide of the tendon, diverge, and deſcribe in their courſe ſemicircles with the convexity upwards. They terminate every where at the circumference of the baſis of the cheſt. The moſt poſterior ones are ſhort, and connected with the back diviſion, or crura of the diaphragm: theſe are inſerted in an aponeuroſis, extended from the end of the laſt rib to the tranſverſe proceſs of the firſt lumbar vertebra, and ſometimes called ligamentum arcuatum, although it ſeems to be merely the upper edge of the aponeuroſis of the tranſverſalis. The reſt of the lateral fibres which increaſe conſiderably in length, are inſerted by broad, diſtinct, and flat, tendinous and fleſhy portions on the inner ſurface of the cartilages of the ſix laſt ribs, and in ſome inſtances of the bone of the ribs. Theſe attachments meet with ſimilar ones of the tranſverſalis, and there is ſometimes a continuity of fibre between the two muſcles.

The poſterior fibres (leſſer diaphragm), ariſing from the broad back edge of the tendon, conſtitute a pretty large muſcular maſs, lying over the bodies of the vertebræ; and formed into two faſciculi, named the crura; of which the right is longeſt, and lies moſt on the front; the left is ſhorter, and placed more to the ſide of the vertebral column. At the part where they ariſe from the central aponeuroſis they ſeparate, and leave an oval opening, through which the œſophagus and nerves of the eighth pair paſs from the cheſt into the abdomen; this is the cardiac, œſophageal, or ſuperior orifice of the diaphragm. The two crura now deſcend nearly in a vertical direction, and a faſciculus of fibres is detached from each: theſe faſciculi croſs each other, and complete by their decuſſation the lower part of the œſophageal orifice, and then join the oppoſite crura. The anterior, which deſcends from the left crus to the right, is the moſt conſiderable. The two crura, ſtill deſcending, ſeparate again, and leave a parabolic opening, directly in front of the vertebral column, giving paſſage to the aorta and thoracic duct, and called the aortic or inferior orifice. They then contract into a flattened tendon, which is inſerted in the front and ſides of the bodies of the lumbar vertebræ; *viz.* into the two upper ones on the left, and three on the right ſide, and ſometimes into the tranſverſe proceſs of the ſecond. The tendons of the two crura are united in the middle by an aponeurotic arch, which forms the anterior portion of the aortic orifice, and which ſtretches immediately over that veſſel: they are alſo confuſed with the longitudinal ligament that extends along the bodies of the vertebræ, ſo that their extent cannot always be very eaſily defined. They are more manifeſt on the poſterior than on the anterior ſurface of the crura.

Parts, which paſs through the Diaphragm.

The aorta, thoracic duct, œſophagus, and nerves of the eighth pair come through the openings already mentioned in the crura of the diaphragm. The two apertures which tranſmit theſe parts, are rather placed towards the left ſide of the body, in conſequence of the left crus being placed on the left of the vertebral column. The interval between the two crura is divided into the two orifices by means of the decuſſating faſciculi of fibres: and conſequently the aorta and œſophagus are ſeparated from each other by theſe faſciculi. The œſophageal opening is compoſed entirely of muſcular fibres, and therefore liable to change in its dimenſions: the aortic orifice, on the contrary, is never affected, in its diameter: the lower part being formed by the ſurface of the vertebræ; the ſides by the tendons of the crura cloſely fixed to thoſe bones; and the upper part by the aponeurotic arch joining the two crura. The inferior vena cava goes through a large opening ſituated on the right ſide of the central tendon, and poſſeſſing a nearly circular outline. It is compoſed of three lunated faſciculi of fibres; an anterior, a poſterior, and a left, which decuſſate each other, and thereby give ſomething of a triangular figure to the opening. It is placed near the poſterior edge of the tendon. It is ſometimes made by four faſciculi. The ſplanchnic nerves, and the trunks of the great ſympathetics, go through the crura of the diaphragm ſeparately on each ſide; and are generally accompanied by the origin of the vena azygos.

The inferior or abdominal ſurface of this muſcle forms a greater or leſs concavity; always greater on the right ſide; and leſs marked in the middle than at the ſides. It is covered almoſt univerſally by the peritoneum, which adheres to it pretty cloſely by ſhort cellular threads. Towards the back part on the right ſide it adheres to the ſurface of the liver. It is in contact with the liver, ſtomach, and ſpleen; and at the lower back part with the renal capſules and kidnies without the intervention of peritoneum. Its ſuperior thoracic ſurface is regularly convex, but higher on the right than on the left ſide: the aſſigned reaſon for this difference is the ſituation of the liver. The greateſt convexity of the right ſide is oppoſite to the fourth true rib, while on the left it is not higher than the fifth. The pericardium is ſtrongly attached to the tendinous centre; which on the front and back part correſponds to the two mediaſtina. The ſides of the diaphragm are every where cloſely covered by the pleura, and are in contact with the baſe of the lungs. Some part of the circumference of the muſcle correſponds to the inner ſurface of the falſe ribs, and the intercoſtal muſcles: and hence a wound of this part might paſs through the cheſt and penetrate the abdomen without wounding any part contained in the former cavity. The convexity of the diaphragm deſcribes an elliptical figure; terminating below by a lunated edge in front, and behind rendered irregular by the deſcending crura. The dextro-ſiniſtral diameter is greater than any antero-poſterior meaſurement. The angle which its ſurface forms with the ſpine, is much more acute than that with the ſternum.

The pleura and peritoneum nearly touch, or are ſeparated however, only by cellular texture, in ſome ſituations of the diaphragm; as at the paſſage of the vena cava, and at the interval of the anterior fibres.

Action of the Diaphragm.

When this muſcle contracts, the convexity of its fibres is deſtroyed; inſtead of curved, they now deſcribe ſtraight lines; and the ſpace which is thus gained in the cheſt, is loſt in the abdomen. The contraction of the crura draws down the back part of the tendinous centre, which can deſcend but little in front, and, when it has thus deſcended, is fixed by the anterior fibres. The aponeuroſis conſequently deſcribes a very oblique plane, extended from the enſiform cartilage downwards and backwards. This motion drives the abdominal viſcera, and particularly the liver, ſtomach, and ſpleen downwards, but principally forwards: thus the ordinary action of the diaphragm is felt but little at the lower part of the abdomen, while the anterior parietes of the cavity are puſhed forwards by the impulſe communicated to the viſcera. If the abdominal muſcles, inſtead of yielding, contract upon the viſcera, the effects of the diaphragm's action are particularly felt about the pelvis, as in expelling the urine, fœces, and child in the act of parturition. The cheſt is enlarged by the diaphragm in the perpendicular direction, and alſo laterally at its lower part. When it acts gently, the middle tendon, connected with the pericardium, does not deſcend much; yet it does deſcend, as any perſon may eaſily aſcertain by feeling the pulſation of the heart, and then drawing in his breath, when the beating manifeſtly changes its ſituation, by becoming lower. In more forcible contractions, this part deſcends further, and Haller ſpeaks of its becoming even convex towards the abdomen, in experiments on animals. After exerting its full effect in rendering its fibres ſtraight, or if it could not depreſs the central tendon, it would draw the enſiform cartilage and the lower ribs inwards.

Its action has no effect upon the aorta, as the ſides of the opening, through which that veſſel paſſes, are unyielding, and incapable, by their very ſtructure, of change in diameter. Neither is the return of the blood to the heart through the inferior vena cava affected, as this opening is tendinous, and the fibres draw from all ſides. But the œſophageal opening is very effectually conſtringed, ſince its ſides are entirely muſcular and moveable; we have the power, by means of the will, of cloſing the cardia ſo as to prevent unpleaſant eructations. When the muſcle has relaxed, the abdominal muſcles, by their action, replace the viſcera, and reſtore the diaphragm to its former convexity.

The action of the diaphragm is much affected by the ſtate of mind: hence ariſe laughing, crying, ſighing, &c., which are ſo many modes of reſpiration produced by different mental affections. This connexion appeared ſo ſtrong to the ancients, that they diſtinguiſhed the diaphragm by the ſame word that ſignifies mind, *viz.* φρην; and the adjective *phrenic* derived from that ſource is ſtill applied to parts which belong to the diaphragm. It is alſo conſiderably influenced by the ſtomach; and hence ariſe the phenomena of hiccoughing.

For further remarks on this ſubject, ſee RESPIRATION. For views of the diaphragm, conſult Albinus, Haller "Nova Icon Septi Tranſverſi." Gotting. 1741.; and the "Tabulæ Poſthumæ" of Santorini, tab. x. See alſo the deſcriptions of the ſame authors, and thoſe of Soemmerring and Bichat in their ſyſtems of anatomy.

DIAPHRAGM is uſed for the ſeptum ſcroti. See SCROTUM.

DIAPHRAGM is alſo a general name, given to all partitions, or ſeparations between two parts of a thing; as the little perforated partitions in the tubes of long teleſcopes.

DIAPHRAGMATIC, an epithet applied to parts belonging to the diaphragm: thus, there are the diaphragmatic arteries, nerves, &c. It has the ſame meaning as the term phrenic.

DIAPHRAGMITIS, in *Medicine*, the noſological term for an inflammation of the diaphragm, or rather of that part of the pleura, or lining membrane of the cheſt, which is ſpread upon the diaphragm.

The membranous and muſcular curtain which ſeparates the lower viſcera from thoſe of the breaſt, being called by the ancients *diaphragma* and *phrenes*, the inflammation of it has received various denominations. Hippocrates, Ægineta, &c. mention the diſeaſe under the term *phrenitis*; intimating at the ſame time that there are other kinds of the diſeaſe, but that the firſt is to be treated like a peripneumony. But to diſtinguiſh this, from the proper phrenſy, alſo called phrenitis, conſiſting of inflammation of the brain, Boerhaave, and others, have called the diſeaſe in queſtion *paraphrenitis*; and Sauvages has given it a place in his Noſology, under the title of *paraphreneſis*. See Van Swieten Comment, ad. § 907. Sauvage Noſol. Method, claſs 3. gen. 12.

This inflammation has generally been deſcribed by writers as a very formidable diſeaſe, and diſtinguiſhed by ſome peculiar ſymptoms of great ſeverity. Thus Boerhaave enumerates its ſymptoms: "A *paraphrenitis* is known by an acute continual fever, with an ardent or inflammatory pain of the affected part of the diaphragm, which, in conſequence of its nervous membranes, can hardly bear it; and this pain is greatly increaſed by inſpiration, coughing, ſneezing, filling the ſtomach, reaching, vomiting, compreſſing or ſtraining of the belly at ſtool, or in diſcharging the urine; the breathing is hereby rendered high up in the breaſt, ſmall, quick, and ſuffocative; performed by the ribs or breaſt only, while the abdomen continues inactive; there is a conſtant delirium; a drawing inwards of the hypochondria; a ſardonic or convulſive laugh; a convulſion, a raving, and a gangrene." Aphoriſm 909.

Now it is acknowledged by all the writers, that this diſeaſe conſiſts of an inflammation of the pleura, extended over the diaphragm: *i. e.* of the ſame membrane which is affected in pleuriſy; and therefore ought only be conſidered as a variety of the latter. In fact, if the muſcular part of the diaphragm is ever affected with acute inflammation, it is at leaſt an extremely rare occurrence, and morbid anatomiſts have not pointed out its exiſtence, as connected with any peculiar ſet of previous ſymptoms. But the pleura is frequently found to have ſuffered inflammation, which has not extended to the muſcular ſubſtance, contiguous to it underneath. In theſe caſes Dr. Cullen maintains, and we believe he is fully ſupported by the experience of others, that the ſymptoms do not differ from thoſe of pleuriſy; he affirms that in his long practice he never witneſſed the occurrence of the ſardonic laugh connected with pleuritic ſymptoms; and that delirium often accompanies other forms of inflammation of the lungs and their membranes, depending, it would ſeem, rather on the high degree of fever, and of the phlogiſtic diatheſis accompanying them, than upon the particular part of the membrane, which is inflamed. The moſt important conſideration, however, is, that it is agreed by thoſe who have given the moſt oppoſite opinions of the peculiarities of the diſeaſe, that it muſt be treated like the various forms of pneumonic inflammation. See Van Swieten, loc. cit. Cullen, Noſol. Method. gen. 11. ſpec. 2. *note*.

DIAPHTHORA, from διαφθειρειν, *to corrupt*, is uſed by Galen and Boerhaave, to denote the corruption of the aliments in the ſtomach, and by Hippocrates for the corruption of the fœtus in the womb, and abortion.

DIAPNOICA,

In the more violent degrees of contuſion, the patients require evacuations, eſpecially cooling purgatives frequently repeated. External preſſure and friction, when the extravaſation is conſiderable, will greatly aid its abſorption, and is therefore beneficial. The more important is the bruiſed part, and the more copious the extravaſation, the more aſſiduouſly muſt all theſe remedies be employed; but in leſs extenſive contuſions, the external applications may be ſufficient.

However, the cold fomentations and ſpirituous aſtringents muſt not be applied without proper ſelection. A decoction of diſcutient herbs in wine, or in a mixture of equal parts of wine and water, eſpecially when aponeurotic and tendinous parts have been much injured, produces often the greateſt benefit; and to this may be added alſo ſal ammoniac, when the pain and tenſion have abated. But if the ſkin be abraded, theſe ſaline applications cannot well be employed.

Sometimes the pain increaſes, in ſpite of theſe applications, to ſuch a degree, that emollient cataplaſms and oleaginous frictions become neceſſary: the following method is particularly recommended in ſuch caſes. Rub well the whole bruiſed part, above and below the contuſion, eſpecially below it, with good oil, and then cover the whole with a mixture of olive oil and ſtrong wine-vinegar, formed into a kind of liniment by agitation. This mixture may beſt be applied upon thick lint, wrapped round the whole part; thus, when the ancle has ſuffered the contuſion, a part of the leg and foot muſt be covered with it. Theſe dreſſings are to be renewed twice or thrice a day, till the ſwelling and pain diſappear. The whole part muſt then be frequently rubbed with camphorated ſpirit of wine. When this has been done for about three or four days, a cloth may be applied, ſpread with a thick ointment compoſed of white of egg mixed with crude alum. This may be repeated about three times, with intervals of 12 hours.

The yellow or blue ſpots that remain after the cure of contuſions, may eaſily be made to diſappear, by applying to them a mixture of bran, ſalt, and vinegar, boiled together till the bran has imbibed the fluids.

When the quantity of extravaſated blood is very large, or when it is ſituated in a part where it cannot eaſily be abſorbed, or when it gives riſe to ſymptoms which demand ſpeedy relief, it muſt be immediately evacuated by an inciſion, and the ſore treated like a wound combined with contuſion. The ſame practice muſt alſo be obſerved, when the internal hæmorrhage by which the extravaſation is produced, proceeds from a large veſſel, continues, and requires to be ſtopped by ſome particular applications; or when, beſides the extravaſation, other leſions of the parts are alſo preſent, as, for example, when the bone has been ſhattered. Should there ſtill remain lumps of coagulated blood behind, after the uſe of the diſcutient remedies, theſe muſt alſo be removed by inciſions, if they threaten to produce further miſchief by their preſſure.

Blows and contuſions of the *joints* deſerve particular attention: for in theſe ſituations, eſpecially in the knee joint, they are always dangerous. The conſequences are violent pain and impeded motion; the pain is generally ſevere at firſt, but ſometimes not. In the firſt caſe the ligaments, and in the ſecond the glands, or interior parts, of the joint have been principally affected. In the latter caſe the conſequences are dropſy, or even ſuppuration of the joint, which frequently proves fatal. When the ligaments or other external parts of the joint have been injured, the part muſt be kept quiet, and treated, according to the peculiar circumſtances of the caſe, with the remedies formerly mentioned, but eſpecially we ſhould have recourſe to leeches: it may afterwards be waſhed with ſpirituous and ſaline applications. When the pain has ceaſed, and there remains behind, as often happens, a ſtiffneſs in the part, the ſoap, liniment, and vapour bath may be employed with advantage. Should arthritic affections be ſuperadded, ſpeedy relief muſt be procured, and the dangerous conſequences obviated by cupping, bliſters, friction with flannel, and the internal uſe of camphorated remedies. When the ligaments have been ſtretched and relaxed by a fall, the German ſurgeons apply, with good effect, ſmall bags filled with the warm powder of plaiſter of Paris, mixed with a fourth part of ſal ammoniac and common ſalt.

When the glands, or internal parts of the joint, have been injured, the ſurgeon ought not to intermit the application of appropriate remedies, till the pain has entirely ceaſed; eſpecially repoſe, blood-letting, and cold fomentations. The leſion of a joint, particularly of the knee, by a fall, blow, &c. eaſily gives riſe to a white ſwelling of the part. In ſuch caſes the ſurgeon cannot employ too great care and attention, as the ſymptoms are ſo numerous and diverſified, that it is in vain to expect a fortunate reſult from a careleſs and inert practice.

Internal contuſions are attended, more or leſs, with diſtreſſing and ſerious ſymptoms. If the head be violently contuſed, there is danger leſt the brain ſhould have ſuffered at the ſame time; or leſt the effuſed blood, lying long upon the cranium, ſhould injure the bone by its preſſure, if it be not ſpeedily abſorbed.

When the thorax has been violently contuſed, the heart, lungs, and large blood-veſſels within the cheſt, are liable to partake of the injury; or a rib may be fractured, and may pierce the lungs, ſo as to occaſion alarming conſequences, if not death itſelf.

A general contuſion of the abdomen, or a blow received upon it, may perhaps hurt the liver, ſtomach, uterus, bowels, &c. or may rupture an important blood-veſſel, and thus cauſe the death of the patient by the internal bleeding, inflammation, or ſuppuration.

The judicious ſurgeon will therefore, in ſuch caſes, conſider what internal parts are likely to have ſuſtained an injury, and will adapt his means to the peculiar circumſtances which ariſe. See CONCUSSION, FRACTURE, and HÆMORRHAGE.

CONTWIG, in *Geography*, a ſmall town of France, in the department of Mont Tonnerre, and chief place of a canton in the diſtrict of Deux Ponts, with 780 inhabitants. The canton itſelf is compoſed of 16 communes, and reckons 4114 inhabitants.

CONTY, a ſmall town of France, on the river Seille, in the department of Somme, 12 miles S.E. of Amiens, which formerly gave the title of prince to the ſecond line of the houſe of Bourbon Condé. It has only 759 inhabitants, but is the chief place of a canton, which, in 27 communes, and upon a territorial extent of 220 kiliometres, reckons 9675 perſons, and forms part of the diſtrict of Amiens; $3\frac{1}{2}$ leagues N.N.E. of it.

CONTZ, a ſmall town of France, in the department of Sarre, and chief place of a canton in the diſtrict of Treves. The number of its inhabitants does not exceed 351, and the whole canton has 31 communes, and a population of 4972 individuals.

CONTZEN, ADAM, in *Biography*, a Jeſuit, and native of the duchy of St. Juliers, has been celebrated for his deep knowledge in the learned languages which he taught in the college of Munich, where he died in the year 1635, after having publiſhed "Commentarii in Evangelia in Epiſt. Pauli ad Rom. et ad Corinth." 2 tom. folio. He wrote likewiſe

particularly to direct its treatment with propriety and ſucceſs, it is obviouſly neceſſary to inveſtigate its riſe, progreſs, duration, or recurrence, its preceding and accompanying ſymptoms, and its aſſigned or probable cauſes, with minuteneſs and accuracy. The diſeaſes which reſemble diarrhœa, in the leading characteriſtic, are dyſentery, and cholera; but they differ eſſentially.

Diarrhœa is to be diſtinguiſhed from dyſentery, by being generally without fever, and by the alvine evacuations conſiſting of the natural fæculent matter, though in a more liquid ſtate; and by the abſence of *teneſmus*, or violent bearing down, which attends dyſentery. There is alſo in the latter diſorder more ſevere griping, than in diarrhœa, but this occaſionally occurs in the diarrhœa, and therefore is not a deciſive diſtinction. There is, however, a mutual alliance between the two diſeaſes, which occaſionally paſs into each other; a diarrhœa, if neglected or improperly treated, ſometimes being converted into dyſentery; and a dyſentery, when its worſt ſymptoms have been ſubdued, ſometimes leaving a diarrhœa behind. Dr. Cullen mentions the contagious nature of the dyſentery, as another diagnoſtic ſymptom, but, in this country, and in ſporadic caſes particularly, the dyſentery is not contagious. See DYSENTERY.

A diarrhœa is to be diſtinguiſhed from cholera chiefly by the difference of their cauſes, which, in cholera, are of one peculiar kind, namely, a profuſe overflow of bile; but in diarrhœa, greatly diverſified. Hence the evacuations in the diarrhœa are very various; in cholera they conſiſt chiefly or ſolely of bilious matter, which is copiouſly diſcharged by ſtool, and alſo thrown upwards by vomiting. See CHOLERA.

The varieties in the colour, ſmell, and appearance of the dejections in diarrhœa, have not only given origin to particular denominations for certain forms of the diſeaſe, but they alſo afford very important inſtruction to the practitioner in his enquiry into their peculiar ſeat and cauſe. Thus, when the ſtools are of the proper ſtercoraceous quality, the diarrhœa, which often ariſes from an overgorging of the ſtomach with too much food, has been termed diarrhœa *crapuloſa*. When the food paſſes off by ſtool in an undigeſted ſtate, it is termed D. *lienteria*; this has been conſidered by moſt writers as a diſtinct diſeaſe, but Dr. Cullen has juſtly deemed it a variety of diarrhœa. The ſame obſervation applies to the D. *cœliaca*, or cœliac paſſion, when the ſtools are of a milky appearance, and are ſuppoſed to conſiſt chiefly of chyle, which paſſed the mouths of the lacteals without being abſorbed. When the ſtools conſiſt of a conſiderable portion of a glairy mucus, the D. *mucoſa* or *pituitoſa* is ſaid to exiſt: the ſecretion of the mucus of the inteſtines is particularly augmented by acrid ſubſtances paſſing through them, ſuch as draſtic cathartics, and alſo by the external application of cold, eſpecially to the feet. When very watery and thin, the D. *colliquativa* is produced; when black, the *melæna*, &c. See DEJECTION.

The eſſential part of this diſeaſe, then, conſiſts in a preternatural increaſe of the periſtaltic motion, and of the ſecretions, in the whole or a great part of the inteſtinal canal; and the prediſpoſing cauſe of the diſeaſe, is a peculiar irritability of the inteſtines, and of the ſecreting veſſels which open upon their internal ſurface.

The ſeveral exciting cauſes of diarrhœa may be referred to two different claſſes. The firſt compriſes diſorders of certain parts of the body, which, either from a ſympathy of the inteſtines with theſe parts, or from their connection with the ſyſtem at large, occaſion an increaſed action of the inteſtines, without the transference of any ſtimulant matter from the primary diſeaſed part to them. Thus, the general ſympathy of the inteſtines is often manifeſted in perſons under the influence of certain paſſions of the mind, as anger, fear, and ſome others, which occaſionally excite a diarrhœa. And among the diſeaſes of other parts of the body, which affect the inteſtines, the irritation of dentition, in infants, may be mentioned as a familiar illuſtration, as it is ſeldom difficult and painful without occaſioning diarrhœa. The ſympathy between the ſkin and the bowels is particularly great in many individuals, ſo that a chill, or the application of cold and moiſture, eſpecially to the feet, will generally excite a diarrhœa: and the ſame ſympathy is ſhewn in others, by the occurrence of diarrhœa from the ſuppreſſion of cutaneous eruptions, or the ſtopping of profuſe or habitual diſcharges from ſores, &c.

The ſecond claſs of occaſional cauſes of the increaſed action of the inteſtines, conſiſts of the ſtimuli which are applied directly to the inteſtines themſelves; and theſe are of various kinds. They may be ſubſtances introduced by the mouth; or poured into the inteſtines by the ſeveral excretories opening into them; or poured from certain preternatural openings made into them in certain diſeaſes.

Of the irritating matters introduced by the mouth, the aliments commonly taken in are the firſt to be mentioned; for, although when properly digeſted, they are reduced to a bland and unſtimulating matter; yet when too great a quantity is taken, ſo as to load the ſtomach, and prevent their due digeſtion, they are ſent in a crude and irritating ſtate to the inteſtines, and, ſtimulating the excretories and the ſurface as they paſs along, they excite a diarrhœa, by which the conſtitution rids itſelf of the irritation. Various ſubſtances are often mixed with the aliment, or taken as food, which are of a ſtimulant nature to the inteſtines, although taken in moderate quantity; ſuch as aceſcent fermenting liquors, vegetable acids, crude and ſour fruits; even the ſaline and ſaccharine parts of the food, if taken in an over-proportion, will excite diarrhœa. There are alſo peculiar idioſyncraſies in ſome individuals, in whom particular articles of food, which are altogether inoffenſive to people in general, excite diarrhœa whenever taken. A ſudden change of the diet, as from animal to vegetable matters, and the contrary, is liable to occaſion diarrhœa; as is alſo a change in the water, or bread, to which we have been accuſtomed.

The other matters introduced by the mouth, which may be the cauſes of diarrhœa, are thoſe which are taken as medicines, poſſeſſing the faculty of ſtimulating the alimentary canal. Thus in the liſt of the Materia Medica, we have a long catalogue of thoſe, named cathartics, or purgatives. Theſe, given in a certain quantity, occaſion a temporary diarrhœa, and given in very large doſes, or even moderately in very irritable habits, they may produce it in exceſs, and continue it longer than the uſual time, producing that ſpecies of diarrhœa, named a *hypercatharſis*.

The matters poured into the cavity of the inteſtines, from the excretories opening into them, and which may occaſion diarrhœa, are either thoſe from the pancreatic and biliary ducts, or thoſe from the excretories in the coats of the inteſtines themſelves. The changes in the pancreatic ſecretion cannot be exactly aſcertained; but it is probable that a morbid and acrid fluid may iſſue from it, even while ſtill entire in its ſtructure, but more eſpecially when it is in a ſuppurated, ſchirrous, or cancerous ſtate, and occaſion diarrhœa. We know well, that the bile is often poured out from the biliary duct, both in greater and leſſer quantity than uſual, and diarrhœa is often the conſequence of both; nor can it be doubted, that the bile is often poured out much changed in its qualities, if the condition of the ſtools can be aſſumed as affording evidence of ſuch change. (See DEJECTION.)

Where

Where the bile is increaſed in quantity, and the ſtools are extremely yellow with bilious matter, the diarrhœa, thus occaſioned, muſt be conſidered as a gentle cholera, differing from this diſeaſe only in the leſſer degree of its ſymptoms; and in hot weather, ſuch a diarrhœa *bilioſa* is not uncommon. But beſide bile, varying in quantity and quality, the biliary duct may pour out *pus*, or other matter, from abſceſſes in the liver, which may be the cauſe of a diarrhœa. Some practical writers take notice of a diarrhœa, in which a thin and bloody liquid is diſcharged; which they ſuppoſe to have proceeded from the liver, and have therefore given the diſeaſe the name of *hepatirrhœa;* but it is at leaſt a very rare occurrence. The black diſcharge by ſtool, termed *melæna*, which conſiſts principally of imperfectly coagulated blood, ſometimes, without doubt, proceeds from the liver; but occaſionally from the ſurface of the inteſtines themſelves, as mentioned in the article laſt referred to.

A ſecond ſet of excretories, from which matter is poured into the cavity of the inteſtines, comprehends thoſe from the coats of the inteſtines themſelves; which are either the exhalant extremities of the arteries, or the excretories from the mucous follicles; both theſe ſources occur in prodigious number over the internal ſurface of the whole inteſtinal canal. It is probable that it is chiefly the effuſion from theſe ſources, which, in moſt inſtances, conſtitutes the liquid matter of the ſtools occurring in diarrhœa. The effuſion from theſe excretories may be increaſed, not only by the increaſed action of the inteſtines from the ſtimuli before mentioned, but alſo from an increaſed afflux of fluid from other parts. Thus when the ſuperficial veſſels are contracted by external cold, a greater quantity of fluids may be determined to the inteſtines. In like manner ſerum or other fluids may be abſorbed from the cavities in which they have been ſtagnant, and be poured into the inteſtines, as frequently happens in particular in dropſies. Cullen, Firſt Lines, § 1483.

A third ſource of matter, poured into the cavity of the inteſtines, and producing diarrhœa, is from thoſe preternatural openings, occaſioned by diſeaſes in the inteſtines or neighbouring parts. Thus the blood veſſels on the internal ſurface of the inteſtines may be opened by eroſion, rupture, or anaſtomoſis, and pour into the cavity their blood, which, either by its quantity, or by its acrimony, whether inherent or acquired by ſtagnation, may give riſe to a diarrhœa, evacuating bloody matter. In this way, the *melæna* or *morbus niger*, before-mentioned, is ſometimes produced. The rupture of abſceſſes, ſeated in the coats of the inteſtines themſelves, or in the contiguous viſcera, which, during the inflammatory ſtate, had formed adheſions to the inteſtines, may likewiſe occaſion a diarrhœa, in which purulent or ſanious matter, mixed with more or leſs blood, will be diſcharged.

Diarrhœa, in one or other of the forms above deſcribed, not only occurs alone, as an idiopathic diſeaſe; but it alſo accompanies from time to time many other diſeaſes, of which it becomes a prominent ſymptom, and in which it ſometimes proves critical and ſalutary, but often ſo much the contrary, as to demand particular attention. In fevers, for example, it is not an uncommon occurrence; and if it appears late in the diſeaſe, when the debility is great, it is often a very unmanageable and dangerous ſymptom. After the meaſles a diarrhœa frequently appears, and is often ſalutary; but in many inſtances it has proved more fatal than the diſeaſe itſelf, as is ſaid to have been the caſe in the fatal epidemic meaſles in the iſland of St. Helena, in the year 1807. Diarrhœa is one of the moſt common diſorders attendant on difficult dentition in children; in fact, almoſt every irritation which excites feverishneſs in young children, is apt to occaſion diarrhœa. It is likewiſe a ſymptom of the preſence of worms in the inteſtines, which animals ought, perhaps, to have been enumerated among the morbid ſtimuli of the inteſtines, before detailed. In the laſt ſtage of pulmonary conſumption, a colliquative diarrhœa, which is liable to alternate with the colliquative ſweats, is an almoſt univerſal occurrence.

Our judgment as to the event of this diſorder, thus various in its nature and cauſes, muſt be deduced from a conſideration of the age, conſtitution, and previous ſtate of health of the patient; from the aſſignable cauſes of the diſeaſe, its duration, its concomitant ſymptoms, and its effects upon the general habit, and likewiſe from the operation of the remedies already employed.

Cure.—In conſequence of this great variety in the nature of the diſeaſe, the method of treatment in diarrhœa muſt be neceſſarily various; in many caſes, it can only be palliative; and where the diſcharge is obviouſly ſalutary, it muſt be encouraged under proper regulations. As it conſiſts eſſentially of a preternatural increaſe of the periſtaltic motion, and of the ſecretory actions of the inteſtines; ſo the leading indications of cure will turn upon one or other of the following circumſtances: whether it appear to ariſe from 1. A morbid irritability of the inteſtines; 2. A preternatural ſtimulus applied to them; or, 3. A combination of theſe two. The *firſt* indication will require the irritability to be allayed; the *ſecond*, that the offending matter be expelled, or its acrimony corrected; and the *third* will demand a mixed plan, conſiſting of the other two, either jointly or alternately, together with an attention to the ſtate of other functions and organs, which may affect that of the *primæ viæ*.

The means adapted to fulfil the *firſt* indication, or to allay the morbid irritability of the inteſtines, will conſiſt in the adminiſtration of opiates; and of aſtringents, ſuch as the Catechu, Hæmatoxylon, or logwood, and Kino; the tonic bitters, ſuch as Colombo, Simarouba, and others of that claſs. "There has been ſome heſitation," ſays Dr. Cullen, "about the employment of aſtringent medicines, in recent caſes, upon the ſuppoſition that they might occaſion the retention of an acrid matter that ſhould be thrown out. I cannot, however, well underſtand, or aſſign the caſes, in which ſuch caution is neceſſary; and I think that the power of aſtringents is ſeldom ſo great as to render their uſe very dangerous. The only difficulty which has occurred to me, with reſpect to their uſe, has been to judge of the circumſtances to which they are eſpecially adapted. It appears to me to be only in thoſe caſes, where the irritability of the inteſtines depends upon a loſs of tone: and this I think may occur either from the debility of the whole ſyſtem, or from cauſes acting on the inteſtines. All violent or long continued ſpaſmodic and convulſive affections of the inteſtinal canal neceſſarily induce a debility; and ſuch cauſes often take place, from violent irritation in colic, dyſentery, cholera, and diarrhœa. The ſame objection," Dr. Cullen adds, "has been made to the uſe of opiates, in recent caſes of diarrhœa, as to that of aſtringents; but on no good grounds: for the effect of opiates, as aſtringent, is never very permanent; and an evacuation, depending upon irritation, though it may be for ſome time ſuſpended by opiates, yet always returns very ſoon. It is only by taking off irritation that opiates are uſeful in diarrhœa; and, therefore, when the diſeaſe depends upon an increaſe of irritability alone, or when, though proceeding from irritation, that irritation is corrected or exhauſted, opiates are the moſt uſeful and certain remedy. And though opiates are not ſuited to correct or remove an irritation applied, they are often of great benefit in ſuſpending the effects of that irritation, whenever theſe are violent: and, upon the whole, it will appear, that opiates may be very frequently, and with great propriety, employed in the cure of diarrhœa."

hœa." First Lines, § 1502-3. In the cases of *lientery*, of the diarrhœa *mucosa*, especially when it has arisen from acrid purgation, constituting a *hypercatharsis*, and in all instances of colliquative diarrhœa, the administration of opiates is obviously requisite, and we apprehend there is no room for diversity of opinion on the subject; and these are the principal modifications of diarrhœa, to which this indication is applicable.

The means adapted to fulfil the *second* indication, of removing a preternatural stimulus from the intestines, consist in the administration of evacuants, or correctors of acrimony. Hence the use of emetics, of purgatives, of glysters, with the one view; and of mucilaginous diluents, alkalies, absorbents, antiseptics, with the other.

As indigestion and crudities present in the stomach, are frequently the cause of diarrhœa, so emetics have often been found serviceable in this complaint. Their utility may also extend, perhaps, beyond the mere evacuation of the stomach, as vomiting may occasion some inversion of the peristaltic motion, which is determined too much downwards in diarrhœa. But purging has been supposed more necessary, to remove the crudities that have passed into the bowels, and it is an almost universal practice among the people at large, to give a purge for the cure of a diarrhœa. But this practice, in the opinion of that able physician, whose name we have so often had occasion to quote, we mean Dr. Cullen, is founded on very mistaken notions respecting the disease, and seems to be for the most part superfluous, and in many cases hurtful. It rests upon the supposition of an acrimony present in the intestines, that ought to be carried out by purging. But from whatever source the acrimony, which can excite a diarrhœa, arises, it may be supposed, he says, sufficient to evacuate itself, so far as that can be done by purging; and as in cholera, so in the same kind of diarrhœa, it will be more proper to assist the evacuation by diluents and demulcents, than to increase the irritation by purgatives.

This opinion is extremely rational, and, when merely opposed to the indiscriminate use of purgatives in diarrhœa, its justness is undeniable. But we believe, that, in avoiding one extreme, the professor has given a sanction to another. In a recent case of idiopathic diarrhœa, such as the *crapulosa*, or that from cold, a gentle purgative is seldom, if ever, in the slightest degree hurtful; it expedites the irritating sordes from the bowels, which, however plausible the supposition of their invariably purging off themselves, we believe are frequently found, in fact, to be imperfectly carried off, and to remain partially behind, keeping up a degree of irritation, which continues the diarrhœa, and even converts it into dysentery. Wherever any material degree of tenesmus is observed, a purgative is generally indicated, and, if the bowels be very irritable, its irritating quality may be diminished by combining a small dose of an opiate with it.

The acrimony, which excites diarrhœa, especially in children, is most commonly of an acid nature, and is generated in the stomach, during the imperfect digestion of the food. Alkaline and absorbent medicines tend to neutralize it, and therefore to remove the irritation of this acrimonious cause of diarrhœa. Antiseptics have been recommended, for the purpose of correcting a putrid acrimony in the intestines, in malignant fevers. The theory is questionable; but those antiseptics which are at the same time powerful cordials and stimulants, such as wine, and alcohol, are useful auxiliaries in removing such a diarrhœa, together with other symptoms of those fevers.

When the *third* indication occurs; when there is, at the same time, a morbid irritability of the intestines, and an unusual stimulus applied to them, the latter must be removed or corrected, where that is practicable, by evacuants or other means, and the irritability moderated. Absorbents, such as preparations of chalk, testaceous powders, lime-water taken with milk, will tend to correct any acid acrimony, that may be formed in the canal; while gentle laxatives may be combined with them, such as rhubarb. These are principally indicated in cases of chronic diarrhœa, in debilitated habits. A determination of the fluids to the skin, by diaphoretics, by warm bathing, by restoring suppressed discharges, or substituting such as may be equivalent, by warm clothing, friction, and the exercise of gestation, will aid in fulfilling this indication; especially in cases where the occurrence of diarrhœa is obviously connected with the application of cold, the suppression of cutaneous excretions, or with a generally debilitated habit. This purpose is also more effectually accomplished, when a course of suitable diet is pursued at the same time; especially the use of milk, rice, the amylaceous parts of vegetables, such as arrow root, tapioca, sago, &c. with animal broths and jellies. Dr. Heberden recommends the combination of spices with the vegetable mucilages, as the nutmeg, cinnamon, &c.; or the combination of cretaceous medicines, with the spices, and opiates. He also advises the use of a spoonful of mutton suet dissolved in four ounces of warm wilk, twice a day, both as medicine and nutriment to a patient under chronic diarrhœa. See Commentarii de Morb. Curatione, p. 128. A similar remedy was recommended by sir John Pringle in the diarrhœa which succeeds to dysentery. Dis. of the Army.

Diarrhœa, in *Ancient Geography*, a port of Africa, in the Cyrenaica. Ptolemy.

DIARTHROSIS, in *Anatomy*, is a general term applied to all those conjunctions of bones, which are capable of motion. The various species of diarthrosis are named according to the figure of the united surfaces; or the degree of motion which they are capable of performing. 1. D. *planiformis;* in which the opposed superficies are nearly plain; *e. g.* in the oblique processes of the vertebræ, in the articulations of the carpus, tarsus, &c. 2. D. *orbicularis;* where a rounded head of one bone is received into a cavity of another. Of this there are two kinds; *enarthrosis*, where the head is large, and the cavity deep; as in the hip joint, which is the only specimen in the human body: *arthrodia*, where the convexity and concavity are not so considerable, as in the shoulder, lower joints, &c. The distinctions arising from the extent of motion performed are; 1. D. *laxa*, which admits of distinct motion, and *stricta*, in which the motion is very obscure. The diarthrosis planiformis is in all cases of the latter description; while the D. orbicularis may belong to either kind. The joints of the atlas and occiput, of the ribs and vertebræ, malleus and incus, &c. are cases of D. orbicularis stricta; *i. e.* the joint is formed by a convex head of bone received into a cavity of the other, and the motion allowed of is small in extent. Those examples of D. laxa, in which the bones admit only of flexion and extension, constitute the species *ginglymus*, or hinge-like joint: as in the elbow, second and third joints of the fingers, &c. In other instances one bone can move in a circular direction on the other; and this is called D. trocho-eides; it is exemplified in all the arthrodia articulations.

DIARY, a term sometimes used for a journal, or day-book, containing an account of every day's proceeding. Thus we say diaries of the weather, &c.

Diary *Fever*, is a fever of one day. See Diaria, and Ephemera.

DIAS, in *Ancient Geography*, a town of Asia Minor, in Lycia. Steph. Byz.

DIASCHISMA, in *Ancient Music*, an interval consisting of half a semitone minor. It is an interval so called by Pythagoras, Overend, &c. its ratio is $\frac{524}{531} : \frac{288}{441}$ and is the comma maximum or comma of Boetius, the ancient comma, and the quint-wolf of earl Stanhope; it is the difference between

the apotome and limma, its common logarithm being .9941148,6097, and in the logs. of Euler .0195500, being that decimal part of an octave: it is equal to 12 ſchiſmas and a minute, or $12\,\Sigma + m$. This interval may alſo be compoſed by the following additions of intervals, *viz.* ſchiſma and a major comma: or two ſchiſmas and a minor comma. The following differences of intervals alſo produce the diaſchiſma, *viz.* two minor commas from a ſemitone minimum; a minor comma from two major commas; a tone major from two apotomes; two limmas from a tone major; a medius reſidual from an hyperoche; three minor commas from two enharmonic dieſes; four enharmonic dieſes from three ſemitones minimum; a ſemitone minimum from four major commas; an octave from ſix tones major; ſeven octaves from 12 major fifths; five octaves from 12 minor fourths; and 5 major fifths from ſeven minor fourths. The three laſt give us practicable methods of tuning a diaſchiſma upon an organ, &c., which interval is the *leaſt ſum* that the temperaments of all the minor fourths, and all the temperaments of the major fifths, can amount to, in any douzeave or ſyſtem of 12 notes in the octave.

Diaschisma of Euler, is the minor comma, $\frac{2025}{2048}$, $= 1C\,\Sigma + m$. See Comma minor: this is alſo the major dieſis of Maxwell.

Diaschisma of Dr. Buſby (Mus. Dict.) is an interval, the half of the minor ſemitone, $= 18\,\Sigma + \frac{1}{2}m + 1\frac{1}{2}m$, which exceeds $1\frac{1}{2}$ times the true diaſchiſma by $\frac{1}{2}f$.

Diaschisma of Boethius, is an interval equal to half a limma $= 23\,\Sigma + \frac{1}{2}f + 2m$; this interval has alſo been called by the ſame author the half dieſis, or ſemitone minor.

DIASCORDIUM, in *Pharmacy*, a kind of electuary, firſt deſcribed by Fracaſtorius, and denominated from ſcordium, which is a chief ingredient therein. It is alſo called confectio Fracaſtorii.

The other ingredients are red roſes, bole, ſtorax, cinnamon, caſſia lignea, dittany, tormentil roots, biſtort, gentian, galbanum, amber, terra ſigillata, opium, long pepper, ginger, mel roſatum, and Malmſey wine.

DIASEBESTEN, a purgative electuary, made with ſebeſtens and other ingredients, but now obſolete.

DIASENNA, a ſoft, purgative electuary, thus called from ſenna, which is its baſe.

The other ingredients are ſugar-candy, cinnamon, lapis lazuli, ſilk, cloves, galanga minor, black pepper, nardus Indica, ſeed of baſilicum, flowers of cloves, cardamoms, ſaffron, ginger, zedoary, roſemary flowers, long pepper, lapis Armenus, and honey.

DIASHENKIR, in *Geography*, a town of Aſiatic Turkey, in the province of Caramania; 6 miles N. W. of Kir-Shehr.

DIASIA, Διασια, in *Antiquity*, a feſtival at Athens in honour of Jupiter, ſurnamed Μειλιχιος, i. e. the *propitious*. Pott. Archæol. lib. ii. chap 20.

DIAST, in *Geography*, a town of Egypt; 3 miles N. of Manſoura. This ſmall town is a day's journey diſtant from St. Gemiane, where the Copti go in pilgrimage. At the time of that feſtival the plain is covered with tents. The Chriſtians and Mahometans promiſcuouſly rejoice together for eight days. They have horſe-races; the dancing girls aſſemble in great numbers; and Bacchus and Venus preſide at the entertainment.

DIASTASIS, from διιστημι, *I ſet apart*, a word uſed by the writers in *Medicine* in many different ſenſes. It is frequently uſed as a name for that ſeparation of the bones, when they naturally recede from one another. Sometimes it is uſed as the term for an interſtice, as that between the ulna and radius, or between the tibia and fibula. Sometimes it is put for a diſtention of the muſcles in convulſions; and, when applied to the ſtomach, it is made to ſignify an inclination to vomit.

DIASTEM, Diastema, in *Muſic*, a name the ancients gave to a ſimple interval, in contradiſtinction to a compound interval, which they call a ſyſtem.

Ariſtoxenus enumerates many differences of intervals: ſuch as greater or leſs; conſonant or diſſonant; compounded or uncompounded; related to one genus or to another; laſtly, rational or irrational. Ariſtox. ap. Wallis. Append. ad Ptolem. Harmon. p. 154.

Muſicians divide intervals into two kinds: one of them called ſyſtem, which is to contain at leaſt two intervals in any kind of muſic whatever; but may contain more. The other, called diaſtem, is a mere, or ſingle interval; the proper ſignification of the Greek διαστημα, being *interval*.

DIASTOLE, in *Anatomy*, (from διαστελλω, *I ſeparate*,) is the dilatation of the cavities of the heart, or of the arteries, by the influx of blood *ſeparating* their ſides, which were previouſly in contact. It is oppoſed to *ſyſtole*, or the contracted ſtate of the ſame cavities and tubes. See Circulation.

Diastole, in *Grammar*, a figure whereby a ſyllable naturally ſhort is made long.

Thus it is that Virgil begins a verſe with the word *Italus*, the firſt ſyllable whereof is naturally ſhort.

DIASTYLE, from δια. and στυλος. *a pillar*, in the *Ancient Architecture*, an edifice, where the columns ſtand at ſuch a diſtance from one another, that three diameters, or ſix modules, are allowed for the intercolumniation.

DIASURMUS, Διασυρμος from δια, and συρω, *I draw*, in *Rhetoric*, a figure whereby we ſhortly anſwer, or rather evade, a thing which it would be tedious to reply to in form.

E. gr. "*What matters it to reply to an argument foreign to the purpoſe?*"

DIATESSARON, in the *Greek Muſic*, is the interval or concord of the 4th, which is the 3d conſonance in perfection. (See Fourth.) The Greek word is compoſed of δια τεσσαρων, as the interval conſiſts of 4 diatonic degrees.

DIATESSARONARE, a barbarous Latin word uſed by all muſicians, and other old writers on muſic, for diſcant in 4ths.

DIATHESIS, in *Medicine*, ſignifies any general condition of the habit of body: thus, phyſicians ſpeak of the phlogiſtic or inflammatory diatheſis, which conſiſts in a general fullneſs and ſtrength of the body, and of the arterial ſyſtem in particular, which renders a perſon liable to inflammatory diſeaſes,

DIATONIC, *Adj.* The diatonic genus is the moſt natural and ſimple in muſic; it conſiſts of tones and major ſemitones, and in the ſcale of which genus the ſmalleſt interval is a conjoint degree, which changes its name and place. The word comes from δια, *through*, and τονος. *tone*, that is, paſſing from one tone to another: "God ſave great George our King," and "Let ambition fire thy Mind," are almoſt the only two Engliſh airs that are ſtrictly diatonic: *i. e.* totally without modulation by an accidental ♭ or ♯.

DIATONICO-GENERE, one of the three genera in the ancient Greek muſic, and which in modern muſic implies a ſcale of ſounds, conſiſting of a mixture of tones and ſemitones.

The Greek diatonic genus, or tetrachord, proceeded by a ſemitone, and two tones, as B C D E and it was from the ſucceſſion of two tones, that this genus acquired the name of diatonic. As the term is derived from δια, *by*, and τονος, *tone*; that is, paſſing from one tone to another; which in the Greek muſic was never done but in the diatonic genus.

DIATONUM, Διατονον, is uſed for the diatonic genus. See Diatonic.

Diatonum, is a term uſed by M. Henſling for the ſemitone major $\frac{15}{16} = 57\,\Sigma + f + 5\,m$.

DIATRÆTA,

DIATRÆTA, a word uſed by Pliny, and other of the ancient Romans, to expreſs a ſort of cups and vaſes which were of great value, and only ſeen at the tables of the great. They were pellucid and colourleſs, and cut into various forms, and were often engraven upon with figures expreſſive of the deeds of honour of the family who poſſeſſed them. The firſt diatrætæ were made of pure cryſtal of the rock, and the working of theſe rendered them very expenſive; but afterwards they were made of common white glaſs, and ſunk greatly in their price and value. The ancients were very nice in their diſtinctions of the ſeveral kinds of cryſtal. They termed the pureſt and fineſt of all acentatum, and the others, which were ſubject to blemiſhes and foulneſſes of ſeveral kinds, they called by names expreſſive of them. There was nothing they ſo much feared in the pieces they ſelected for this work, as what they called an over-hardneſs, that is, a brittleneſs, which made the veſſel often fly under the engraver's tool, after it had been formed into ſhape at a great expence: for this reaſon they were cautious of uſing the very brighteſt and cleareſt maſſes; for they often found thoſe ſucceed beſt, which had ſome of thoſe flaws which we call hairs in them. Theſe they thought the toughеſt pieces of cryſtal, and theſe flaws they eaſily concealed among the ſtrokes of their work. See NUBES and SAL.

DIATRAGACANTH, in *Pharmacy*, an obſolete preparation with gum tragacanth and other emollients. It is now ſuperſeded by the pulvis tragacanthæ compoſitus.

DIATRIBE, from διατριβω, *I delay*, denotes a continued diſcourſe.

DIATYPOSIS, διατυπωσις, in *Rhetoric*, the lively deſcription of a thing, ſetting it, as it were, before the eyes of the audience. Thus Cicero, vii. in Ver. "Ipſe inflammatus ſcelere, & furore, in forum venit; ardebant oculi; toto ex ore crudelitas eminebat, &c."

DIAUGOPHRAGMIA, in *Natural Hiſtory*, a genus of ſeptariæ, whoſe ſepta are of ſpar, with an admixture of cryſtal, which being ſometimes alſo mixed among the matter of the tali, renders the whole more bright and gloſſy. See SEPTARIÆ.

Of this genus we have the following ſpecies: 1. The ferrugineous red diaugophragmium, with browniſh yellow partitions. 2. The browniſh yellow diaugophragmium, with whitiſh partitions. 3. The blueiſh white diaugophragmium, with ſtraw-coloured partitions. Vide Hill, Hiſt. Foſſ. p. 522.

DIAULION, from δια, and αυλος, a *flute*, in *Antiquity*, a deſignation given to a performance on the ancient ſtage with the flute alone.

DIAULODROMI, Διαυλοδρομοι, from διαυλος, and δρομος, thoſe racers who turned round the meta, or goal, and finiſhed their courſe at the career-barrier, or place of ſtarting. The diaulodromi always took a ſhort breathing or reſt, when they arrived at the meta, before they ſet out again for the career.

DIAULOS, from δις, *twice*, and αυλη, *ſtation*, the name of a particular kind of foot-race, wherein the racers always returned to the place from whence they ſtarted, and were called diaulodromi. This was added to the other games in the 14th olympiad.

DIAULOS is uſed to ſignify a diſtance of two ſtadia, which was the length of the courſe in the race of this name.

DIAVOLO, in *Geography*, an iſland in the Grecian Archipelago. N. lat. 37° 17'. E. long. 23° 12'.

DIAZ, BARTHOLOMEW, in *Biography*, a diſtinguiſhed Portuguese navigator, who claims a ſhort notice as the diſcoverer of the Cape of Good Hope. He was employed by king John II. of Portugal, in proſecuting diſcoveries on the coaſt of Africa, and in 1486 he had traced nearly a thouſand miles of new country, and after encountering violent tempeſts, and loſing the company of the victualling veſſel which attended him, he came in ſight of the Cape, that terminates Africa; but the ſtate of his ſhip, and the untoward diſpoſition of his crew, obliged him to return without going round it. He named it, on account of the troubles which he had undergone in the voyage, "Cabo Tormentoſo," or the "Stormy Cape." He returned to Liſbon in December 1487, and from his report the ſovereign foreſaw that the courſe to the Indies was now certainly pointed out, and he denominated the newly-diſcovered point "Cabo del Bueno Eſperanza," or the "Cape of Good Hope." Robertſon's America.

DIAZEUTIC TONE, in *Muſic*, ſignifies the interval of the major tone $\frac{8}{9}_1 = 104\,\Sigma + 2\,f + 9\,m$.

DIAZEUXIS, a Greek muſical term, which implies diviſion, ſeparation, disjunction.

The note which ſeparates two tetrachords was thus called in the ancient muſic, and which, added to either, formed a diapente. It is the tone major of the moderns in the ratio of eight to nine, and which is in effect the difference between the 4th and 5th of a key.

The diazeuxis, in the Greek muſic, was between the meſe, and parameſe: that is to ſay, between the higheſt note of the ſecond tetrachord, and the loweſt of the third; or between the note ſynnemenon, and the parameſe hyperbolæon; or between the 3d and 4th tetrachord, according to the place where the disjunction happens; for it is impracticable at the ſame time in both. The homologous ſtrings of the two tetrachords, between which the diazeuxis lies, form a 5th; whereas, they form a 4th when conjoined.

DIAZIMUM, in *Ancient Geography*, a part of Cappadocia, in which was ſituated the town of *Amaſia*.

DIB, in *Ichthyology*, a variety of the SCIÆNA *Ramak*, which ſee.

DIBBI, or DARK *Lake*, a lake of Africa, at the diſtance of two days journey beyond the town of Jenne; in croſſing which, from weſt to eaſt, the canoes are ſaid to loſe ſight of land for an entire day. From this lake the river runs in ſeveral ſtreams, forming two large branches, which join at Kabra, one day's journey ſouth of Tombuctoo, and the port of that city or town.

DIBBLE, in *Agriculture*, the name of an implement or tool made uſe of for the purpoſe of making holes in the ground for ſetting grain, plants, and other ſorts of crops in, which are planted in rows. They are formed of different materials, and in different ways, according to the nature of the crop which is to be put in or planted out by them, but for grain they are moſtly ſhod with iron. In ſome caſes they have likewiſe a ſort of ſtep for ſetting the foot upon, in uſing them. When employed, they are thruſt into the ground to a depth ſuitable to the crop which is to be put in by them, and holes thus formed, into which the ſeeds, ſets, or plants, are put by the hand.

DIBBLE, in *Gardening*, a ſort of tool which is made uſe of for ſetting and planting out different kinds of ſeeds, roots, plants, and cuttings. They are moſtly made of the handles of old ſpades, having the handle parts left entire, and the ſhanks twelve or fifteen inches in length, gradually tapering to points at the lower ends; and to render them more complete, they are often ſhod with a thin ſocket of iron, ſeven or eight inches in length, made tapering to the point. Dibbles thus ſhod are found to make the holes more eaſily, in a more clean manner, and with greater expedition, than thoſe which are wholly of wood, which are apt to clog with the earth, and retard the buſineſs of planting.

Theſe tools, when intended for planting broad beans, potatoes, and large ſorts of roots, ſhould be made with blunt points, as by being rounded at the ends the holes are ſo formed as to admit them to the bottom; while the narrow pointed ones, by making the holes deeper than are neceſ-

ſary, ſo as to leave vacancies or openings below the ſeeds or roots, they are liable to permit water to ſtagnate below them, and thus prove injurious, eſpecially in the winter ſeaſon. And beſides, where the ſeeds or roots reſt upon the bottoms of the holes, the growth of the plants is moſtly more perfect and complete.

All the different kinds of bulbs, as thoſe of the crocus, narciſſus, tulip, &c. require this form of dibble in planting them out.

DIBBLER, in *Agriculture*, a perſon who is employed in the buſineſs of dibbling or ſetting of crops by means of the dibble.

DIBBLING, the operation or proceſs of ſetting corn, ſeed, or other crops, by the dibble. It is chiefly practiſed in the putting in of wheat crops, and thoſe of the pulſe kind, in thoſe diſtricts in which labour is cheap. This practice was known at an early period, but was afterwards neglected, until the attention of the farmer was again drawn to it, by the writings of Mr. Varlo and ſome others.

The author of Modern Agriculture remarks, "that the method of dibbling, or ſetting wheat by the hand, was firſt introduced into Norfolk about twenty years ago, by a perſon who poſſeſſed a ſmall farm in the neighbourhood of Norwich; and that this practice, which gradually gained ground in that diſtrict, has now become pretty general in the adjoining counties of Cambridge and Suffolk. In both of theſe, as well as in the county of Norfolk, conſiderable quantities of wheat are annually ſet by hand; but, in the laſt, where the method was firſt adopted, the quantity of wheat now planted by hand is not nearly ſo conſiderable as it was a few years ago. The wheat is generally dibbled in October, on land newly broken up from clover-ley. When the ſoil is of a light nature, it is uſually rolled before the ſeed is planted; the method of which is as follows: a man with an iron dibble, about three feet long, in each hand, walking backward and making two rows of holes in each furrow, ſlice, or flag; they are made about four inches diſtant from each other, and from one to two inches deep. The dibbler is followed by two or three women, boys, or girls, who drop two or three grains into each hole. The field is afterwards buſh-harrowed, by fitting thorns to a gate, and drawing it by one horſe along the furrows. The uſual quantity of ſeed is about ſix or ſeven pecks, and the expence of ſetting from nine to ten ſhillings the acre. An experienced dibbler, with three active attendants, will plant half an acre a day, making ſix holes in every foot length along the furrow-ſlice. The advocates for dibbling wheat ſtate ſeveral advantages which, in their opinion, reſult from adopting this method in preference of the ordinary one, ſowing broad-caſt. They ſay a conſiderable quantity of ſeed is ſaved, that the grain is better, more equal in quality, and the increaſe greater; and further, that by the general eſtabliſhment of this practice the poor would find employment. There is no doubt but that a conſiderable ſaving muſt take place in the article of ſeed, when the grains are dropt at regular diſtances, in place of being ſcattered promiſcuouſly. The quantity is ſaid to be, in general, about a buſhel the acre. Were no other benefit derived from adopting this practice than ſaving a buſhel of ſeed on the acre, that, at the ordinary price of wheat, is more than counterbalanced by the extra expence incurred. The farmer, in order to ſave this buſhel of wheat, value five or ſix ſhillings, muſt pay his labourers nine or ten. On this principle, therefore, the practice cannot be defended. It is natural to ſuppoſe, and will be readily admitted, that a crop of planted wheat will always be to a certain degree better, and more equal in quality, and (although from that circumſtance probably, chiefly) greater in quantity, than that ſown broad-caſt. The crop, ſpringing up at regular diſtances, enjoys, during the whole period of its growth, a more free circulation of air, and derives greater benefit from the rays of the ſun, than when, by ſowing the ſeeds too thick or irregularly, the plants ſtand ſo cloſe together that both are in a great meaſure excluded. There is another reaſon why the grain ſhould be of a better quality. It was obſerved, that wheat is commonly dibbled on land broken up from one year's clover. When wheat is ſown broad-caſt on ſuch lands, a great many of the ſeeds fall naturally into the interſtices of the furrows, where they are either choaked, or retarded in their growth, by the weeds, which ſpring up there in greater abundance than in the other parts of the fields: whereas, when the ſeeds are ſet in the ſlice or flags, the plants cannot meet with any impediment to retard their growth. Although, for theſe reaſons it is highly probable that the produce of dibbled wheat muſt always be ſuperior in quality and quantity to that ſown broad-caſt; yet, without repeated experiments, or the eſtabliſhment of a law whereby all grain ſhall be ſold by weight, it is impoſſible to determine the extent of that ſuperiority, or whether ſo much advantage reſults therefrom as to encourage farmers in other parts of the kingdom, if practicable, to adopt the ſame method. Some people have gone ſo far as to aſſert, that dibbling wheat is one of the greateſt improvements in modern agriculture; and that owing chiefly to the circumſtances of its furniſhing work for the poor. In a populous diſtrict, where agriculture is almoſt the only employment of the inhabitants, and where the poor-rates have advanced to an extravagant height, the introduction of any practice whereby the poor can be uſefully employed, while the individuals who furniſh that employment, if they are not benefited, are not injured thereby, muſt be deemed a very eſſential improvement. Dibbling wheat, therefore, in diſtricts ſo ſituated, eſpecially if followed out by hand-hoeing, ſo as to afford ſtill longer work, may be a very proper way of furniſhing employment for the peaſantry. But the writer thinks, in a country like Great Britain, where the great body of the people are alternately employed in warfare, or in commerce and manufactures, and the ordinary operations of huſbandry, the impracticability of rendering this a general practice muſt be at once obvious. The population muſt, indeed, be amazingly increaſed before that can happen. Populous as this iſland now is, beyond what it was at any former period, yet, were a law enacted, that all grain ſhould be planted by hand, it would be neceſſary that all ranks, the governors as well as the governed, ſhould learn how to uſe the dibble. In a word, although the practice may be beneficial as well as laudable, in ſome particular diſtricts, no perſon in his ſober ſenſes will, he aſſerts, think of recommending the general eſtabliſhment of it, as an improvement in the national agriculture.

The author of the Report of Suffolk remarks, that "for wheat in ſome diſtricts a narrow-ſet plough of only ſeven inches width at bottom, is uſed to plough with; a one horſe roll then follows to level the flag, or furrow, for the dibblers who ſtrike only one row upon each: when the wheat is depoſited, two or three kernels in each hole, a two horſe-roll follows, and afterwards the harrows twice in a place; when the field is finiſhed in this manner, it is harrowed up again obliquely: by this method the wheat is depoſited in the middle of the flag, at the diſtance of nine inches in the row, and when come up, has the appearance of being drilled; the two-horſe roller is ſuppoſed of material uſe in cloſing up the holes, and preventing the wheat from being diſturbed by harrowing, and the land is made ſo ſolid by rolling, that very little apprehenſions are entertained about the ſlug or worm. If there ſhould be occaſion to hoe in the ſpring, the operation can

be eaſily and cheaply performed. Buſh-harrowing is ſuppoſed of very little-uſe, as it can only ſweep the duſt or light mould over the holes, and in the firſt ſhower of rain that follows, moſt of them will be ſeen, and much of the wheat be ſwelled out of them. In the practice of dibbling peaſe and beans as done in Glouceſterſhire and Middleſex, the method is chiefly this, the work being performed by women: as ſoon as the land can be got properly harrowed, and the ſurface ſmoothed, in the ſpring, that is, in the beginning and middle of February, the work of ſetting commences; in ſome places, in rows acroſs, but more frequently along the ridges. Some ſetters uſe a line to direct them in forming the rows at equal diſtances; others again, particularly thoſe who have been long uſed to the buſineſs, do not conſider the line as neceſſary. The ſetters begin each at the end of a row, and making holes at the diſtance of about two inches from each other, and about the ſame depth, depoſit one pea or bean in every hole, and thus proceed, till the work be compleated. The diſtance between the rows is ſeldom leſs than ten, and in few inſtances, more than fourteen inches. The quantity of ſeed neceſſary is from two and a half to three buſhels, according to the diſtance of the rows; and the price of ſetting, from *3s. 6d.* to *4s. 6d.* the acre. When the ſetting of the field is completed, it is gently harrowed, in order to cover the ſeed, and the crop is repeatedly hand-hoed afterwards, as occaſion requires. If," Mr. Donaldſon obſerves, "the object which the Glouceſterſhire farmers have in view in adopting this practice, be to furniſh employment for the poor, the crops being always repeatedly hand-hoed by the perſons who were employed in putting the ſeed in the ground, is a ſtrong additional circumſtance in ſupport of the juſtneſs of the principles on which it was adopted, and of which thoſe who are in the habit of ſetting wheat cannot avail themſelves. If an extraordinary number of people be not employed, theſe repeated hoeings muſt take up a conſiderable period, and will not, in ordinary caſes, be finiſhed before the commencement of the hay-harveſt; which being again ſucceeded by the corn-harveſt, the induſtrious poor are thus furniſhed with almoſt uninterrupted employment in the fields for ſix or ſeven months. In diſtricts where the poor, from long habits of idleneſs, have become numerous, profligate, and uſeleſs members of ſociety, this muſt be conſidered in every point of view advantageous; while, under other circumſtances, this method of managing bean-crops might be impracticable, from the rate of wages, and the people being fully employed in manufactures; or if practicable, neither beneficial to the community nor to individuals. Where theſe circumſtances occur, and thus fortunately do ſo over the greateſt part of this iſland where improved agriculture is practiſed, drilling beans, or dropping them in the bottom of every ſecond or third furrow, and afterwards horſe-hoeing the crop, will be found a method not leſs favourable for the ſoil: and it at all, but in a ſmall degree, leſs profitable to the farmer. It has been remarked, that it will obviouſly be neceſſary with theſe crops, to have larger ſpaces between the rows, and greater diſtances in them, which muſt render a larger portion of ground capable of being planted in a given time. When the children engaged in performing the work of dropping the ſeed into the holes, are only able to drop into one hole, ſix are required to follow one dibbler; when capable of dropping into two holes, three are ſufficient for one dibbler; and where they can drop into three holes, two are only requiſite for a dibbler. The wages are various, according to theſe circumſtances; for thoſe who perform in the firſt manner, it is generally three-pence a-day for each child; in the ſecond, it is ſeven-pence; and in the third, about ten-pence half-penny. Four men to perform the buſineſs of dibbling, with a ſuitable number of droppers, are conſidered as ſufficient to work in one party, which is a much better practice than that of allowing the whole to work together, as the ſeed is ſet with much greater regularity and exactneſs. The expence of performing the buſineſs is generally about nine or ten ſhillings an acre for wheat, eight for barley and oats, and ſeven for peaſe or vetches; but this muſt evidently be liable to conſiderable variation, according as the ſituation is populous, and the price of labour is cheap, or the contrary. In ſome of the dibbling diſtricts, the difficulty and expence of the hand method have been attempted to be leſſened by the uſe of machinery, ſuch as rollers of the dull, and ſpiked kind. The manual practice is, however, to be preferred, where labourers can be procured. This circumſtance of uſing implements for the purpoſe of putting in the corn, has probably led ſome to ſuppoſe that the practice of dibbling was more on the decline, than is perhaps really the caſe.

It may be obſerved that the kind of ſoils on which this method of putting in the ſeed has been practiſed with the moſt advantage, is the light and mixed ſandy, and thoſe of a loamy quality. On the deep ſtiff clays, it is ſeldom had recourſe to. The newly broken up lands of almoſt all deſcriptions may in ſome caſes be advantageouſly planted in this way. And various ſorts of crops have been found capable, in particular ſituations and circumſtances, of being put into the ground in this way with advantage, ſuch as thoſe of wheat, barley, oats, peaſe, beans, and vetches: the firſt is, however, the kind of crop for which it is moſt commonly employed. Oats may in many caſes be beneficially dibbled on ſuch lands as have been newly ploughed up from leys. But it is ſuppoſed by the author of the Suffolk Report, that barley can ſeldom be dibbled, by reaſon the land is ſo dry in April, that the holes will run in, and not ſtand open to receive the ſeed.

In the more ſouthern parts of the kingdom, the moſt favourable ſeaſon for putting in wheat in this mode has been found to be the latter end of September, or the beginning of October; the months of March and April for barley and oat-crops, and for peaſe and beans as early in the ſpring months as the nature of the ſeaſon will admit of its being done.

With regard to the quantity of ſeed that is required in this method of putting it into the ground, it is conſiderably leſs than where the broad caſt, or perhaps even the drill-ſyſtem is followed; but the ſavings muſt conſtantly depend in a great degree upon the ſteadineſs and accuracy of the perſons employed in dropping the ſeed, and the number of the ſeeds that are put into each hole. It has been ſuggeſted by an experienced cultivator in this way, that where the droppers are properly attended to, the ſaving in wheat may be about ſix pecks in the acre, in barley eight, and in peaſe and vetches about four.

It is ſtated that the number of grains that are depoſited in each hole is different, in different circumſtances, but the moſt general practice, and that which has been found the moſt ſucceſsful, is, three or four for grain-crops, and one or two for thoſe of peaſe, beans, and others of the ſame kind. It is evident, however, it is ſuppoſed, that they ſhould neither be ſet too thickly, nor in too thin a manner; as in the former caſe, the plants may be drawn up, and the crops, in conſequence, become weak and unproductive: and in the latter, as where only one grain is placed in each hole, they may be ſo thin as to afford but a ſcanty produce from the want of plants. Where due care has been taken in the putting in of the ſeed, there is moſtly a conſiderable increaſe of produce in this way of ſowing over the others.

The exact amount of the additional produce that is thus obtained,

obtained, has not, however, been fully ſhewn by the experiments of intelligent cultivators; but it has been ſuppoſed in reſpect to wheat, to be from four to ſix buſhels in the acre, in the Report of Agriculture for Norfolk, and the reſult of an experiment, made with the view of aſcertaining the difference in the produce between ſowing and ſetting barley, proves it to be ſtill greater in that ſort of grain, the experimenter having had twelve buſhels on the acre more in the land that was dibbled, than that which was ſown. Concluſions drawn from looſe eſtimates, or ſingle experiments, ſays the author, cannot, however, be depended upon; but it can ſcarcely be doubted, that the quantity of produce is greater in the method of dibbling the ſeeds, than ſowing it broad-caſt. In the quality of the grain, there is likewiſe a ſuperiority: the wheat and barley produced in this way are ſaid to be not only more free from droſs, but larger in the kernel, and conſequently weighing conſiderably heavier. It is eaſy to perceive, that when the ſeed is put into the ſoil in the regular and equal manner that is the caſe in ſetting with the hand when well performed, the crops, of whatever kind they may be, may have a ſuperiority in theſe different reſpects, both from the plants, in ſuch inſtances, being leſs crowded together, and their becoming, in conſequence, more ſtrong and vigorous, and from the air and ſun being more fully admitted, by which they become more equally, as well as more perfectly, ripened. It is probable too, that in ſuch caſes, from the greater regularity of the plants, the hoeing or after-culture of the crops, where it is practiſed, may be more effectually, and more fully performed. There is alſo another reaſon, that, in particular inſtances, has been ſuggeſted as the cauſe of the quality of the grain in this mode of ſowing being ſuperior; which is that of wheat being frequently dibbled upon ſuch land as has been broken up from a new clover-ley, in which caſe, the ſeeds being ſet in the furrow ſlice, or flag, the plants are not liable to be obſtructed in their growth: whereas, when ſown in the uſual broad-caſt method, much of the ſeed muſt of courſe fall into crevices and openings between the furrow-ſlices, where they muſt be greatly impeded in their vegetation by weeds and other cauſes. This ſhews likewiſe the abſurdity of putting wheat crops in by the broad-caſt method upon ſuch preparations of the land."

In the Norfolk Report on the ſtate of agriculture, ſeveral minutes on this practice are introduced by Mr. Young, by which it would ſeem that there are two methods of performing the buſineſs; thoſe of putting one, and two rows on each flag or furrow-ſlice. About Brandon and Old Buckingham, &c. in that diſtrict one row on an eight inch flag, or even a narrower one, is preferred. At Oxborough, and its vicinity, they put in, of wheat, in this way, ſix pecks to the acre. This they find better than two rows; and to be much ſuperior to drilling. The crops are afterwards well hoed, and generally prove very beneficial. It is ſuggeſted by ſome farmers that this practice ſhould only be had recourſe to while the ſeaſon ſuits, either for wheat or oats, both of which are there dibbled, as when the land is wet and cold, the water is apt to lodge in the holes, and deſtroy the vegetative power of the ſeed.

In many other places in the county, two rows on the flag, often as near as they can be put, are, however, held in preference. In this manner, from ſix to ſeven pecks, but in ſome caſes, nine are put in, to the acre. The work is ſuppoſed by ſome to be beſt performed by women with a proper perſon to ſuperintend them, as they are more obedient and manageable. The expence is uſually from nine ſhillings to ten ſhillings and ſixpence the acre.

It is ſuppoſed by Mr. Everit, that one buſhel of ſeed would be ſufficient. He made an experiment in the view of forming a compariſon of the beſt manner of executing the buſineſs. The uſual mode is, to ſpread the two rows on the flag in ſuch a manner, that they are liable to be too near the ſeams; but he directed the dibblers to keep their hands as cloſe together as they could work them, ſetting the two rows very near each other in the centre of the flag. And the reſult, he ſays, proved the excellence of the practice, the crop having a very beautiful appearance. Mr. Crow is, however, inclined to ſuppoſe a good proportion of ſeed neceſſary, as he has never ſeen a good crop of wheat that was thin; beſides its being more liable to the attacks of the mildew.

The whole of the obſervations would appear to ſhew, that the practice is not to be purſued merely as ſaving ſeed, as was at firſt ſuggeſted; but from the buſineſs being performed in a more advantageous way than by other methods. It is, indeed, remarked by Mr. Johnſon, that it is a practice of ſuch excellence, "that equal crops are not to be gained in any other way;" but that "three grains ſhould always be put in every hole; for, on various examinations, he has found, that a ſingle kernel in a hole, has almoſt always produced a faint ear, ſcarcely ever a good one."

It is probable, from what has already been remarked upon this ſubject, that a ſingle row on a flag may be the moſt proper where hand-weeding is afterwards practiſed; but that where this is neceſſary, two rows on the flag may be a more advantageous method, and that more than one grain ſhould, in general, be put in each hole.

The advantages which have, on the whole, been chiefly looked to in this mode of putting in crops, are thoſe of ſaving ſeed; having the lands, where inclined to be light, ſufficiently trodden; the keeping of the crop clean, rendered leſs difficult; and the employing of a number of women and children, who would otherwiſe be out of work. Beſides, it is ſuppoſed that the crops are not ſo liable to lodge in bad ſeaſons, from their having better hold of the ground, and the ſtraw being more ſtiff, and in reaping the grain being leſs apt to ſhed or drop out of the ear. See DRILL and DRILL-*huſbandry*.

DIBE, or PESCHIERA, in *Geography*, a town of Egypt, on the coaſt of the Mediterranean: 18 miles S.E. of Damietta.

DIBI, a town of Egypt, on the W. ſide of the Nile; 8 miles S.E. of Roſetta.

DIBLATHA, or DIBLATHAIM, in *Ancient Geography*, a town beyond Jordan, at the foot of mount Nebo or Piſgah. Jer. xlviii. 22.

DIBOMA, a town of Macedonia, in the country of the Eordites. Ptolemy.

DIBON, a town of Judea, in the tribe of Gad, given to this tribe by Moſes, and afterwards ſurrendered to Reuben. (Numb. xxii. 3. 33, 34.) Euſebius ſays, that it was a large town on the river Arnon. It was probably the ſame with Dibon-Gad, an encampment of the Hebrews. (Numb. xxxiii. 45.)—Alſo, a town in Judah, the ſame, perhaps, as Debir, or Kirjath-Sepher. Nehem. xi. 25.

DIBRA, in *Geography*, a town of European Turkey, in Macedonia, on the confines of Albania. It was beſieged by the Turks in the year 1442, who, by conveying a dead dog into the only ſpring which ſupplied the town with water, obliged the inhabitants to ſurrender: 30 miles N. of Ackrida.

DIBS, a name given at Aleppo to the inſpiſſated juice of the grape, which has much the appearance, ſays Ruſſel, (vol. i. p. 82.) of coarſe honey, but is of a finer conſiſtence. It is much uſed by the inhabitants of Aleppo; is brought

to town in large goat-ſkins, and retailed in ſmall quantities in the bazars. This is ſuppoſed by Dr. Geddes to be the honey, דבש, mentioned Gen. xliii. 11. Neither common honey nor palm-honey, he ſays, (Crit. Rem. p. 135.) could have been conſidered as a rare gift to a governor of Egypt, where palms and bees were ſo abundant; whereas raiſin-honey, or a ſyrup made out of the grapes, which did not grow in Egypt, might be deemed even a royal preſent.

DICA, in *Law*, a tally for accounts, by the number of tallies, cuts, or notches.

DICACITAS, in *Oratory*, the name given by Cicero (De Oratore, l. ii. c. 54.) to that kind of wit which uſually lies in a ſingle ſentance or word, and which may be termed "conciſe wit or jeſting." The other kind he calls *cavillatio*, which is confined within no certain limits, and which, in our language, may be called "continued wit or humour."

DICÆA, in *Ancient Geography*, a town of Thrace, in the territory of the Biſtonians, and near the Biſtonide Marſh. It was alſo named *Dicæopolis*.—Alſo, a town of Greece, on the Thermaic gulf.—Alſo, an epiſcopal town of Africa, in Bizacium.

DICÆARCHA, a place in Italy, ſo called by the Greeks, and named by the Latins *Puteoli*, which ſee.

DICDICA, a town of Africa Propria, according to the Itinerary of Antonine.

DICE, among *Gameſters*, certain cubical pieces of bone or ivory, marked with dots on each of their faces, from one to ſix, according to the number of their ſides.

Sharpers have ſeveral ways of falſifying dice: 1. by ſticking a hog's briſtle into them, ſo as to make them run high or low as they pleaſe; 2. by drilling and loading them with quickſilver; which trick is diſcovered by holding them gently between two diagonal corners; when, if falſe, the heavy ſide will turn always downwards; 3. by filing them. But all theſe methods fall far ſhort of the arts of the dice-makers, ſome of whom are ſo dextrous, that ſharping gameſters will give any money for ſuch dice. Dice are ſaid to have been invented by Palamedes at the ſiege of Troy, for the amuſement of the officers and ſoldiers.

Dice pay a large ſtamp-duty, and are prohibited to be imported.

Dice *Marle*, in *Huſbandry*. See Marle.

DICEARCHUS, in *Biography*, a follower of Ariſtotle, was a native of Meſſenias, and acquired diſtinction by his philoſophical diſputations, and hiſtorical writings. Cicero (Tuſc. Quæſt. l. i. c. 10.) ſpeaks of him as a learned and eloquent writer. His tenets were that there is no ſuch thing as mind, or ſoul, either in man or beaſt; that the principle, by which animals perceive and act, is equally diffuſed through the body, is inſeparable from it, and expires with it; that the human race always exiſted; that it is impoſſible to foretel future events; and that the knowledge of them would be an infelicity. He was an eminent geographer, and took great pains, to meaſure the height of mountains, and to conſtruct accurate maps of countries. Plin. l. ii. c. 65. Fabr. Bib. Græc. v. ii. p. 295.

DICERA, in *Botany*, (from δις and κερας, alluding to the two horns of the anthers,) a genus of Forſter's, referred by Linnæus the younger to *Elæocarpus*. See Elæocarpus *Dicera*.

DICERATION, in the *Writers of Medicine*, a name given to a collyrium mentioned by Celſus, and thus named from κερας, a *horn*, burnt hartſhorn being a principle ingredient in it.

DICHONDRA, in *Botany*, (from δις, and χονδρος, *a grain*, on account of the form of the capſule, reſembling two grains or berries.) Forſt. Gen. Pl. 20. t. 20. Schreb. 176. Swartz. Prod. 54. Willd. Sp. Pl. v. 1. 1353. Juſſ. 129. Claſs and Order, *Pentandria Digynia*. Nat. Ord. *Convolvuli*, to which it is now removed by Juſſieu himſelf from his *Borragineæ*, where he had firſt placed it.

Gen. Ch. *Cal.* Perianth inferior, in five deep, regular, obovate, many-ribbed, ſomewhat ſpreading ſegments. *Cor.* of one petal, wheel-ſhaped, regular, in five deep lanceolate ſegments, as long as the calyx; with a very ſhort tube. *Stam.* Filaments five, awl-ſhaped, equal, ſhorter than the corolla, and inſerted into its tube; anthers ovate, blunt, of two lobes. *Piſt.* Germen ſuperior, double, hairy; ſtyles two, as long as the ſtamens, awl-ſhaped, divaricated, originating, according to Forſter, from the inner ſide of each germen at the baſe; ſtigmas capitate. *Peric.* Capſules two, accompanied by the permanent enlarged calyx, each nearly globoſe, of one cell. *Seeds* ſolitary, globoſe.

Eſſ. Ch. Calyx in five deep ſegments. Corolla inferior, wheel ſhaped, in five deep ſegments. Capſules two. Seeds ſolitary. D. *repens* of Forſter, Smith Plant. Ic. t. 8. (Sibthorpia evolvulacea; Linn. Supp. 228.) is eſteemed by Dr. Smith the only ſpecies. It was ſent by Mutis to Linnæus from New Granada, and was found by Commerſon at Buenos Ayres, and the iſland of Mauritius. It is alſo known to grow in Jamaica, Peru, and New Zealand. The ſtems are proſtrate, creeping, ſlender, branched, round, and leafy. Leaves alternate, on long ſilky ſtalks, upright, kidney-ſhaped, more or leſs emarginate, entire; ſmooth, or ſlightly hairy above; more or leſs ſilky beneath, and marked with radiating ribs. Flower-ſtalks axillary, moſtly ſolitary, ſimple, ſilky, ſhorter than the leaves. Flowers very ſmall, a little drooping, white. Calyx externally hairy, internally ſmooth. Fruit much larger than the flowers. When very ſilky and ſilvery in the aſpect of its leaves, it is the D. *ſericea* of Swartz., Willd. Sp. Pl. v. 1. 1353; but there ſeems to be no permanent ſpecific diſtinction. Poſſibly, if the ſuppoſed varieties were compared in a living ſtate, ſome certain marks of diſcrimination might be obſerved, but no botaniſt has yet had ſuch an opportunity. The Jamaica variety only has hitherto been brought into the more curious gardens of Europe. According to Mr. Donn, it was introduced here in 1786, and is perennial, flowering in the ſtove in July.

DICHORÆUS, in *Poetry*, the foot of a Latin verſe conſiſting of four ſyllables; of which the firſt is long, the next ſhort, the third long, and the laſt ſhort. It is a double *choræus*, as *cōmprŏbārĕ*.

DICHOTOMOUS, in *Botany*, is applied to a ſtem regularly and repeatedly cloven, or forked; more eſpecially if, as uſually happens, a ſolitary flower ſprings from each fork or divarication. Inſtances are found in the genus *Ceraſtium*, and many of its allies, and in *Chlora perfoliata*, Engl. Bot. t. 60. Some leaves are formed in a dichotomous manner, as thoſe of *Ceratophyllum*, and of a ſpecies of Sun-dew from New Holland, thence denominated *Droſera dichotoma*.

DICHOTOMY, *biſection*, a term uſed by aſtronomers for that phaſis, or appearance of the moon, wherein ſhe is biſected, or ſhews juſt half her diſk, or circle; or when ſhe is in the beginning of her firſt and laſt quarter.

The word is Greek, formed of διχοτομεω, *I biſect*, or *cut into two*; of δις, *twice*, and τεμνω, *I cut*.

The time of the moon's dichotomy is of conſiderable uſe in fixing the ſun's diſtance from the earth: and it was anciently applied by Ariſtarchus for this purpoſe. In order to underſtand his method of doing this, we have only to conſider that the phaſes of the moon are produced by the different poſitions of its illuminated hemiſphere with regard

to an obſerver on the earth. Conſequently, when one of theſe poſitions is ſuch that the plane of the circle which ſeparates the enlightened from the dark part, paſſes through the eye of the ſpectator, then the confines of the light and ſhade on its diameter will form a right line: at this time we may ſuppoſe three right lines, *viz.* one drawn from the eye of the ſpectator at T, (*Plate* IX. *Aſtronomy, fig.* 67.) to the centre of the moon, L, another from this centre to that of the ſun S, and a third from the centre of the ſun to the obſerver's eye, at T, to form a triangle T L S, having a right angle at the centre of the moon, a very acute angle at the ſun, and the third approaching to a right angle at T. Ariſtarchus propoſed to obſerve the inſtant that the moon appears dichotomized, and at the ſame inſtant to obſerve the magnitude of the arc intercepted between the ſun and moon, whence he obtained the angle L T S, and thus he found the proportion of the ſides of the triangle, one of which is the diſtance of the moon from the earth, and another that of the ſun; ſo that he hence obtained the proportion of one of theſe diſtances to the other. Ariſtarchus found that this angle was not leſs than 87°, and hence concluded that the diſtance of the ſun from the earth was from 18 to 20 times that of the diſtance of the moon from the earth. He found alſo, by a proceſs of reaſoning, that the diameter of the moon was to that of the earth in proportion greater than that of 43 to 108, and leſs than that of 19 to 60; or ſomewhat leſs than a third of that of the earth. See ARISTARCHUS.

But it is very difficult to fix the preciſe moment when the moon is biſected, or in her true dichotomy. Obſervation informs us, that when ſhe is thirty minutes diſtant from the quadratures, ſhe appears biſected; but ſhe appears ſo too in the quadratures themſelves, and ſome time afterwards, as Ricciolus acknowledges in his Almageſt. So that ſhe appears dichotomized at leaſt for the ſpace of a whole hour: in which time any moment may be taken for the true point of the dichotomy, as well as any other. But the infinite number of moments of time give an infinite diverſity of diſtances. The moment in which the true dichotomy happens being thus uncertain; but it being granted withal, that it happens before the quadrature; Ricciolus takes the middle point between the quadrature, and the time when it is firſt dubious, whether the moon be dichotomized, or not, for the true dichotomy. Keil.

DICHOTOMY, in *Botany*, a term uſed to expreſs that diviſion of the branches, which we ſee in miſletoe, and in the greater part of the ſea-fucuſes, in which each branch is divided into two. See DICHOTOMOUS.

DICHOTOPHYLLUM, the name by which Dillenius, and ſeveral others, call the hydroceratophyllum of Vaillant, and ſome other writers; a genus of plants characterized by Linnæus in his Genera Plantarum under the name of ceratophyllum.

DICHROMENA, (from δι or δις, and χρωμα, *colour*, alluding to the variegation of white and green in its involucrum.) Michaux Fl. Boreal-Amer. v. i. 37. Vahl. Enum. v. 2. 240. Claſs and order, *Triandria Monogynia*. Nat. Ord. *Cyperoideæ*.

Gen. Ch. *Spikelet*, compoſed of ovato-lanceolate concave glumes, imbricated in all directions, and ſeparating the florets. *Cor.* none. *Stam.* Filaments 3, very rarely 1 only, elongated after flowering; anthers linear. *Piſt.* Germen minute; ſtyle capillary, elongated; dilated and compreſſed at the baſe; ſtigmas 2, capillary, the length of the ſtyle. *Peric.* none. *Seed* ſolitary, ſomewhat lenticular, tranſverſely rugged and undulated, crowned with an obtuſe beak originating from the permanent bottom of the ſtyle; and deſtitute of briſtles at its own baſe. *Vahl.*

Eſſ. Ch. Glumes imbricated every way. Corolla none. Stigmas 2. Seed ſomewhat lenticular, tranſverſely rugged and undulated, crowned with a blunt point, and without briſtles at the baſe.

This genus, founded by Michaux and adopted by Vahl, conſiſts of five known ſpecies, one of which is *Schoenus ſtellatus* of Swartz and Lamarck, and another *Scirpus reptans* of Richard. *Actes de la Soc. d' hiſt. nat. de Paris*, v. i. 106. Their common habit is thus deſcribed by Vahl.—"They have the aſpect of *Kyllingiæ*. The culms are ſeveral, without joints, triangular in the upper part, ſtriated, clothed at the lower part with the ſheaths of the leaves, which are numerous, undivided, and very minutely ſtriated, like the leaves themſelves, which are linear. Involucrum widely ſpreading, compoſed of ſeveral leaflets, reſembling the proper leaves, one of which only is ſhorter than the head of flowers, the others gradually longer. Spikelets ſeſſile, forming a head, oblong. Glumes membranous, whitiſh, pellucid, ſomewhat keeled, acute." The ſpecies are all natives of South America, Carolina, or the Weſt Indies.

DICK, in *Agriculture*, a term provincially employed to ſignify the mound or back of a ditch. See FENCE.

DICK-*Hole*, a word ſignifying the hollow excavation or ditch itſelf. See FENCE.

DICK, in *Geography*, a town of America, in the ſtate of South Carolina; 16 miles W. of Queenborough.

DICK's *river*, a river of America, in Kentucky, which is a branch of Kentucky river, joining it in a N. W. direction. It is about 50 miles long, and 45 yards wide at the mouth. It has upon it a number of excellent mill-ſeats, and runs through a tract of valuable land.

DICKER, or DICRE, *Dicra* in our *Old Writers*, a quantity of leather conſiſting of ten hides.

Some derive the word from the Greek δεκα, ten.

We find the word dicra applied to other things beſides leather; thus, "Civitas Glouceſtriæ reddebat xxxvi. dicras ferri;" which is interpreted thirty-ſix dickers of iron, ten bars to the dicre. Gales's Hiſt. Brit. 766. ap. Blount.

DICKINSON, or DICKENSON, EDMUND, in *Biography*, a celebrated Engliſh phyſician and chemiſt, in the 17th century, was born at Appleton, in the county of Berks, in the year 1624. From Eton ſchool he was removed in 1642, to Merton college, Oxford. After taking his degree in arts, he was entered in the medical line in 1649, and admitted to the degrees of bachelor and doctor in phyſic, in the year 1656. In 1655, he publiſhed a work, entitled "Delphi Phœnicizantes," &c. deſigned to prove that the Greeks borrowed the ſtory of the Pythian Apollo, and whatever rendered the oracle of Delphi famous, from the Holy Scriptures, and, particularly, from the book of Joſhua. This work, which diſplayed ſingular ſkill in the Oriental and Greek languages, and a profound knowledge of antiquity, procured for the author a high degree of reputation, both at home and abroad, and, induced Dr. Shelden, afterwards archbiſhop of Canterbury, to perſuade him to take orders, and to devote his talents to the ſervice of religion. But he declined a change of his profeſſion. Anthony Wood has ſuggeſted, that the real author of the above mentioned work was Henry Jacob, a prodigy of learning, but a careleſs man, who ſuffered others to obtain that fame, which belonged to him, by ſurrendering to their uſe his laborious productions. But though the evidence adduced by Wood is ſtrong, it is not ſufficient to determine a point, which muſt impeach the character of Dr. Dickenſon, and evince him to be altogether deſtitute of integrity. He, however, had the reputation of being the author, and derived benefit from the opinion that was entertained, in conſequence of it, of his learning,

lage lands are expoſed in times of rain, is, he ſuppoſes, completely ſuſpended, and the water flows away limpid. While the ground continues covered with a cloſe turf, the root-leaves of the herbage ſpreading over the ſurface, abſorb and digeſt the carbonic acid of the atmoſphere, and perhaps, alſo, earthy particles which probably float continually in the air, as before ſtated. As thoſe leaves are ſmothered and decay, they are perpetually increaſing the ſtock of carbon and vegetable mould. The celebrated Mr. Kirwan, indeed, is, he ſays, of a different opinion. He ſuppoſes, that ground lying in paſture is annually diminiſhing in fertility, though in a leſs degree than that from which a vegetable crop is carried off, becauſe a part is reſtored in the excrements of paſturing animals. But though poor ſoils which are incapable of producing a cloſe turf over their ſurface, gain little by lying at reſt, it is evident, that every ſoil, which either from its natural conformation, or from the improvements made on it by proper culture, has attained a cloſe cover of ſweet herbage, is perpetually gaining. Whenever the temperature is mild, a continual reproduction is taking place; and all the horizontal foliage, which eſcapes the mouths of paſturing animals, falls into decay and accumulates on the ſurface. On breaking up ſuch old paſtures a ſurfaced ſtratum may be obſerved, differing in colour and conformation from that which lies under it, the thickneſs of which is in proportion to the time the ground has lain at reſt. What is here ſtated, is, he thinks, corroborated by the following experiment. Having ſometimes obſerved a kind of turf formed over the hardeſt ſtones in certain ſituations, he collected ſome of it which had grown to more than an inch thick on ſome flat ſtones, lying in a damp place, at the foot of a northerly declivity under ſome trees. It ſeemed to have commenced with the growth of ſome of the ſmaller *muſci* and *algæ*. On this ground the *feſtuca ovina* and *poa glauca* had taken root, and formed a ſtrong turf. After it was dried, he ſubjected a pound of it to combuſtion on an iron ſhovel over a fire till it was reduced to black duſt. The reſidue weighed half an ounce, whereas the greateſt reſidue he ever obtained from a pound of dried peat burnt, was not more than five drams. If ſuch a quantity of mould could thus be accumulated by the graſſes growing on a naked rock, may it not accumulate at leaſt in as great a proportion on the ſoil where the ſucceſſion of growth is incomparably greater?

"It is true, he obſerves, that ſome ſoils by long lying at reſt, condenſe ſo much as to incommode the roots of the graſſes, and on others the moſſes prevail ſo much as to overcome the eſculent herbage, but the fertility of the ſoil is not thereby diminiſhed. Its preſent energy is only ſuſpended, while it is acquiring additional vigour for future exertions. When ſuch land is again employed in tillage, the ſpoils of the turf, together with a great part of what has been conſumed by paſturing animals reſtored in excrements, are turned down and mixed with the ſoil, by which its conformation is improved, and its thickneſs and principle of fertility augmented. Hence the tillage crops are plentiful—the ears large and plump—and the produce of one year equal to two or more on land wearied out by perpetual turning.

"It muſt not be underſtood, by what is here or formerly ſaid, that he means to undervalue the operation of the plough. But, as we are ſtudying in what manner the fertility of the country may be preſerved and improved, and the greateſt quantity of diſpoſable produce obtained at the leaſt poſſible expence, it is neceſſary to examine how all thoſe aids which nature offers may be made to co-operate with the artificial means of agricultural improvement, and not blindly expect from mechanical labour, more than it can poſſibly produce. When barren ſoils are to be brought from a wild ſtate, it is by mechanical labours only that their obſtinacy can be ſubdued, and the different ingredients properly blended. The turf of old graſs ground will frequently require a good deal of mechanical operation to mix it with the earths, and facilitate its putrefaction. But when theſe, and ſuch other aids as mechanical labour is adapted to accompliſh, are obtained, that medium of conſiſtence on which fertility depends will be beſt preſerved by alternate ſucceſſions of labour and reſt. The proportion and order of thoſe ſucceſſions muſt no doubt vary greatly according to circumſtances. While thoſe where the ſoil is deep and of the moſt favourable conſtruction, and where adventitious manure is attainable, may be much occupied in tillage crops, without ſuffering great deterioration; in the more elevated grounds, where the ſoil is generally leſs happily conſtructed, expoſed to ſeverer waſhings and manure leſs abundant, a greater proportion of the farm ought always to be in paſture. But in all ſituations and circumſtances, the ſoil will be benefited by being occaſionally at reſt, provided care has been taken to lay it down unexhauſted, free of weeds, and well ſtocked with proper graſſes. By this ſyſtem of alternations of tillage and graſs crops, the attention of the huſbandman is leſs diſſipated, and his labours more regularly diſtributed. The live ſtock fed on his paſture, furniſh him with manure to enrich his tillage fields, and the more they are enriched, they are the better fitted to yield an abundant return of graſs, when they come in courſe to be laid to reſt. When ground is brought to yield abundance of ſweet graſs it is profitable in paſture, and while it continues ſo is ſtill improving in fertility, and becomes more and more adapted to yield plentiful tillage crops. Thus under good management, the fertility of the country may progreſſively advance, and the diſpoſable quantity of proviſions for the uſe of the conſumer, and the net return to the huſbandman, perhaps, exceed what the operoſe and expenſive ſyſtem of perpetual fallowing, and crops without reſt, could produce.

"Convertible huſbandry is not leſs ſuperior to perpetual graſs. Land which lies perpetually in graſs, is deprived of the advantage of having the vegetable ſubſtance accumulating on the ſurface from time to time mixed into the ſoil. By the working of moles, ants, and other vermin, by the condenſation of the ſoil, by the prevalence of moſſes and uſeleſs weeds, the turf is deformed and the reproduction of ſweet paſture diminiſhed. Water is frequently detained on the ſurface, and chills the growth of eſculent herbage, and thus the growth becomes more feeble and ſlow. In proportion to the decay of eſculent herbage, plants which are noxious or unprofitable prevail; the paſture becomes gradually leſs, and the fertility of the ſoil is almoſt uſeleſs to the owner and to ſociety, while it remains in that ſtate."

The practice of this huſbandry muſt of courſe in many inſtances be highly profitable to the cultivator. See TILLAGE and GRASS.

CONVEX, bending down on every ſide, as the outſide of a globular body.

CONVEX *freeze*, *leaf*, *lens*, *mirror*, *ſuperficies*. See the ſeveral ſubſtantives.

CONVEXITY, the exterior ſurface of a *convex*, *i. e.* gibbous and globular thing; in oppoſition to *concavity*, or the inner ſurface, when hollow or depreſſed.

The word is of particular import in catoptrics, and dioptrics; where it is applied to *mirrors* and *lenſes*; which ſee. See alſo REFRACTION.

CONVEYANCE, in *Law*, a deed, or inſtrument, by which lands, &c. are *conveyed*, or transferred, by the proprietor, to ſome other perſon. In the diſcuſſion of this ſubject, it is proper to inquire *who* may thus aliene and to *whom*; and then *how* a man may aliene, or the ſeveral modes of

ma. (Polypodium globuliferum ; Lamarck Encycl. v. 5. 554 ; Filix altiſſima et globuligera major ; Plum. Fil. t. 30.) Fronds twice or thrice pinnate, pointed ; leaflets elliptic-oblong, decurrent, obtuſe, pinnatifid, crenate. Fructification in the ſinuſes, globoſe. Veins wavy. Gathered by Thierry in St. Domingo. A very handſome ſpecies, whoſe ſtalks are roughiſh. Pinnæ taper-pointed with a regularly winged ſtalk ; pinnulæ or leaflets alternate, decurrent, three quarters of an inch long and about half as much in breadth, oblong, ſomewhat elliptical, obtuſe, ſharply crenate at the top, deeply pinnatifid, furniſhed with zig-zag hairy ribs and veins. Fructifications pale, globoſe, each ſolitary in the ſinuſes of the leaflets. Inner involucrum membranous and almoſt white. This ſeems undetermined by Dr. Swartz, unleſs it be his *apiifolia,* which we have not ſeen. The ſynonym of Plumier, unqueſtionably belonging to our plant, he places among the doubtful ſpecies, accidentally writing *minor* for *major.* D. *ſorbifolia* Fronds bipinnate : leaflets ſeſſile, linear-lanceolate, acutely ſerrulated, tranſverſely veiny. Fructifications numerous, globoſe. Inner involucrum very ſhort. Gathered in the iſland of Honimoa in the Eaſt Indies, in July 1797, by the late Mr. Chriſtopher Smith, to whom the author of the preſent article is indebted for moſt numerous and valuable additions to his herbarium. The preſent fern ſeems entirely non-deſcript. It appears to be four or five feet high, of a ſomewhat glaucous green. Frond alternately bipinnate ; its ſtalks pale and ſmoothiſh beneath, ſingularly hairy above. Pinnæ long and taper-pointed, each compoſed of 60 or more leaflets, which are about an inch long, perfectly ſeſſile but not decurrent, linear-lanceolate, acute, finely and ſharply ſerrated, ſmoothiſh above, minutely punctate beneath, and furniſhed with a hairy rib and numerous parallel veins. Fructifications numerous, in a tolerably regular marginal ſeries, ſmall ; their outer involucrum green, cup-ſhaped, crenate, rugoſe when dry, cloſely inflexed ; the inner ſo ſhort as to be not diſcernible till the ball of capſules is removed. D. *glauca.* Fronds bipinnate : leaflets ſeſſile, crowded, oblong, falcate, crenate, glaucous beneath. Fructifications numerous, globoſe. Involucrums equal, entire. Of the height of this fern we know nothing, being poſſeſſed of only a portion of the middle part of its frond, brought by Mr. Menzies from the Sandwich iſlands. The pinnæ are numerous, crowded, a ſpan long, ſmooth, linear-lanceolate, compoſed of very numerous, crowded, ſeſſile, linear-oblong, falcate, convex, obtuſe, crenate leaflets, which are veiny, and very glaucous beneath, each being half an inch, or rather more, in length. The veins are branched and ſmooth. Fructifications in an uninterrupted ſeries on the lower part of each leaflet, at each margin, pale brown when ripe. Outer involucrum truly originating from the margin of the leaflet, though different in texture and colour, concave, kidney-ſhaped, ſmooth and quite entire, embracing the inner involucrum, which is exactly like it, only ſomewhat longer and narrower. We have thought it more uſeful to deſcribe theſe three new ſpecies than to copy the definitions of the remaining 10 in Swartz, among which are *Polypodium nudum* and *Trichomanes flaccidum* of Forſter, *Cænopteris japonica* of Wildenow ; *Polypodium marginale* and *Trichomanes ſtrigoſum* of Thunberg, Fl. Jap. with *Davallia linearis* of Cavanilles, and *repens* and *abrupta* of M. Bory de St. Vincent ; the three laſt equally unknown to Dr. Swartz and to ourſelves, except from deſcriptions. S.

DICKVEL, in *Geography*, a town of the iſland of Ceylon, near the South coaſt ; 102 miles S. of Candy.

DICKWASSET, or DIGDEGUASH, a river of America, in the province of New Brunſwick, which diſcharges itſelf into Paſſamaquoddy bay.

DICLINIA, in *Botany*, (from δις, *double*, and κλινη, *a bed,*) is uſed by Linnæus in his *Syſtema Vegetabilium*, p. 21, for ſuch claſſes or genera of plants as have ſeparated flowers, the ſtamens being in one bloſſom, the piſtils in another. This ſeparation is either complete, as in the claſſes *Monoecia* and *Dioecia* ; or incomplete, as in *Polygamia* ; ſome flowers of the latter claſs having the ſtamens and piſtils together, while in others they are ſeparate. The writer of the preſent article has firſt ſuggeſted, that ſuch ſeparation of the eſſential organs of impregnation in flowers, is of material importance or convenience, either in natural, or even artificial, claſſification, only when it is accompanied by a concomitant difference in the other parts of the flower, as in the Oak, Walnut, Hazelnut, &c. In theſe and ſimilar inſtances the two organs are not liable to meet in the ſame flower. By attention to this circumſtance, the Linnæan claſs *Polygamia*, the burthen and opprobrium of the ſexual ſyſtem, on account of the uncertainties and difficulties which attend its determination, among the trees of tropical climates more eſpecially, will be brought into very narrow limits. If the ſame rule be extended to the claſſes *Monoecia* and *Dioecia*, they will alſo be delivered from numerous genera and ſpecies, whoſe allies or whoſe congeners are in other parts of the ſyſtem. Hence the whole arrangement will become more natural, as well as more eaſy and certain, and the three claſſes in queſtion will be ſo much diminiſhed, that it may be expedient to unite them into one, under the title of *Diclinia.* See Itroduction to Botany, 395, 470, 485, &c. S.

DICOCCUS, FRUCTUS, a two grained fruit or ſeed-veſſel, technically applied to that particular kind of capſule which has the appearance of being compoſed of two roundiſh combined capſules, as in the genus *Dichondra,* ſo named from that very circumſtance. A three-grained, or tricoccous, capſule is much more frequent ; and a whole natural order of plants, to which the *Euphorbia* belongs, derives its character and name from having ſuch a fruit. See TRICOCCÆ.

DICOTYLEDONES, (from δις, *double,* and κοτυληδων, a *cotyledon ;* which laſt word is technically applied to the ſeminal leaf of a plant, apparently becauſe its roundiſh form and fleſhy texture reſembles the herb *Cotyledon* or Navelwort,) is a term uſed for all ſuch plants as have two cotyledons or ſeed-lobes. See COTYLEDON. This vaſt and diſcordant tribe makes up the chief part of a natural ſyſtem of arrangement, though indeed the families which have only one cotyledon, or, more properly, for the moſt part, none at all, are likewiſe conſiderable in number and importance, as the natural orders of Palms, Lilies, Orchiſes, Graſſes with their allies, and perhaps all the Linnæan claſs *Cryptogamia,* Moſſes excepted. The latter have numerous and compound cotyledons, though otherwiſe cloſely related to plants that have none. So alſo the Fir tribe, *Pinus*, &c. have numerous cotyledons, though in every other point agreeing with genuine *dicotyledones.* No natural ſyſtem of botanical arrangement can therefore in future ſet out, as they have all hitherto done, with making the diſtinction abſolute between *Acotyledones*, *Monocotyledones*, and *Dicotyledones ;* ſtill leſs can the *Polycotyledones* form a ſeparate aſſociation together ; indeed this laſt has never been attempted.

The two-ſeed-lobes of the *Dicotyledones*, like the numerous ones of firs and moſſes, uſually riſe out of the ground as ſoon as the root has fixed itſelf in the earth, witneſs the Lupines ; but ſome other plants, even of the ſame natural order, as many Vetches, never raiſe their cotyledons above the ſurface. Thoſe cotyledons which appear above-ground aſſume the colour and functions of leaves, of which the Radiſh, Parſley, and French-bean are inſtances ; while others remain but little altered

altered in the earth till they decay, as may be ſeen in the Horſe-cheſnut and Garden Naſturtium or *Tropæolum*. Whatever difficulties may exiſt in a claſſification founded on the organs in queſtion, the diſtinction between plants furniſhed with two cotyledons and thoſe that have only one or none, is, to all intents and purpoſes of arrangement or phyſiology, more abſolute and deciſive than any other general character hitherto detected. S.

DICRANUM, (διχρανον, a *fork*, from δις, *double*, and κερας, *a horn, ſummit*, or *point*, expreſſive of the two ſharp points into which each tooth of the fringe ſurrounding the mouth of the capſule is cloven.) Fork-moſs. Hedw. Fund. v. 2. 91. t. 8. f. 41, 42. Schreb. 759. Sm. Fl. Brit. 1201. Swartz. Muſc. Suec. 31. (Fiſſidens; Hedw. Fund. v. 2. 91. Bryi Mnii et Hypni ſpecies variæ, Linn.) Claſs and order, *Cryptogamia Muſci*. Nat. Ord. *Muſci*.

Eſſ. Ch. Capſule oblong. Fringe of ſixteen flat cloven teeth, a little inflexed.

The Hedwigian ſyſtem of moſſes, by taking into conſideration the ſtructure of their fringe or *periſtomium*, has very happily ſeparated from thoſe which have a double fringe, ſuch as have only a ſimple one, and is in no reſpect more happy than in the eſtabliſhment of genera on the number and ſtructure of the teeth which compoſe that ſimple fringe. Among the reſt *Dicranum* is diſtinguiſhed from all the reſt by its teeth being all cloven about half way down, regularly and uniformly for the moſt part; for there are ſcarcely two or three ſpecies in which ſome of the teeth are found unequally three-cleft. Such exceptions by no means invalidate the generic character. By this mark are brought together from the *Bryum* and *Mnium* of Linnæus principally, and more ſparingly from his *Hypnum*, a great number of moſſes, much more naturally allied to each other than to any with which they had previouſly been aſſorted, and now conſtituting by themſelves, and their recently diſcovered allies, ſo vaſt a genus, that the moſt able cryptogamic botaniſt muſt ſtand appalled at the number and intricacy of its ſpecies. Of theſe about 100 may be collected from various authors, but poor muſt be the herbarium which cannot ſupply ſeveral that are nondeſcript. We ſhall not bewilder the reader in this labyrinth, from which without the help of elaborate and numerous figures we could not extricate him. We ſhall attempt only a view of the leading features of this genus, and of its principal ſpecies.

The uſual habit of a *Dicranum* is marked by crowded ſlender or awl-ſhaped, moſtly ſingle-ribbed and entire, leaves, thoſe ſpecies which compoſe the genus *Fiſſidens* of Hedwig chiefly having two-ranked compreſſed and dilated foliage. In theſe the female flower is often lateral, but in the bulk of the genus terminal, the fruit-ſtalk becoming lateral in conſequence only of the ſubſequent extenſion of the ſtem beyond it. The capſule is often ſmooth, in ſome inſtances deeply furrowed longitudinally. Lid various in length. Teeth ſtrong, frequently very red, ſtrongly furrowed tranſverſely, their tips ſlender and pale. The male flowers in the *Dicranum* of Hedwig are, according to him, on a diſtinct plant from the female, in the form of little round terminal heads; in his *Fiſſidens* they are axillary on the ſame plant with the capſules, and reſemble buds. The habits of theſe two genera are ſo different, that in this caſe, if in any, the Hedwigian principle, of taking the male flowers into conſideration for the generic characters of moſſes, might be admitted; but the difficulty of examining thoſe parts in all the ſpecies of ſo vaſt a genus, at that early period of growth when alone they are to be met with, is inſurmountable, nor can Hedwig be ſuppoſed to have ſeen them in a fifth part of his ſpecies, any more than Fabricius could examine the organs of the mouth in a fiftieth part of his inſects. Both of them muſt, after all, have frequently truſted to habit, general configuration, or to the more obvious Linnæan principles.

The 1ſt ſection of *Dicranum* in the *Species Muſcorum* of Hedwig, has the capſule without any *apophyſis* or pedeſtal, the fruit-ſtalks ſtraight, and the leaves curved to one ſide. Of this the chief are D. *ſcoparium*, Engl. Bot. t. 354, common on heaths and in woods; the more rare D. *majus*, t. 1409, found on rocks by the ſea near Bangor; the common but elegant little D. *heteromallum*, t. 1272, which makes a green velvet carpet on the ſhady paths of woods on a gravelly or ſandy ſoil.

The 2d ſection has leaves leſs accurately inclining to one ſide, in which we find D. *criſpum*, Engl. Bot. t. 1151; D. *varium*, t. 1215, and *rufeſcens*, t. 1216. The latter ſeems not to be known out of Britain. D. *aciculare* alſo ranges here, whoſe leaves are broader and more obtuſe than in moſt of the genus.

The 3d ſection has leaves ſpreading every way, and not curled by drying; their tips without hairs. To this belongs D. *purpureum*, abundant on walls and gravelly hills, (where its innumerable crimſon ſtalks are conſpicuous in the ſpring;) as well as ſeveral other European or American ſpecies partly akin to it.

The 4th has ſpreading leaves with hair-like points, as D. *latifolium*, Hedw. Crypt. t. 33, a native of North America, given by Mr. Dickſon to the younger Linnæus, and by him to Hedwig, who celebrates the gift and the donor in high terms.

Section 5th has ſpreading leaves, becoming curled or criſped when dry. The chief of theſe is the large and rare D. *ſpurium*, found, but without fruit, by the late Mr. Teeſdale, an able cryptogamiſt, on turfy moors in Yorkſhire. It is figured in Hedw. Crypt. v. 2. t. 30, and was thus named on account of its male flowers being thoſe of a *Fiſſidens*, gemmiform, though the habit is that of a true *Dicranum*. The teeth of the fringe are ſome of them occaſionally three-cleft. D. *polycarpum*, another *Fiſſidens* of Hedwig, Crypt. v. 2. t. 31. likewiſe ranges here.

In ſection 6th the fruit-ſtalks are incurved, the capſule, as before, without an apophyſis. Among which are D. *flexuoſum*, Engl. Bot. t. 1491, (Bryum flexuoſum of Linnæus,) frequent in alpine ſtations; the elegant Weſt-Indian D. *cygneum*, Hedw. Sp. t. 37, and *introflexum*, t. 29.

Section 7th has an *apophyſis* or gland-like baſis to the capſule, as D. *cerviculatum*, Engl. Bot. t. 1661, found on turfy heaths in England, Germany, and Switzerland, a very elegant little moſs; D. *Celſii*, Hedw. Sp. t. 33, (Bryum Celſii of Linnæus,) found in Sweden, and very rarely in Scotland.

Theſe ſections not being altogether natural, nor always eaſy to define, they have not been attended to in the Flora Britannica, but the ſpecies have been attempted to be diſpoſed more naturally, not however with perfect accuracy, for ſuch muſt be the fruit of time and repeated enquiries.

The 8th ſection of this genus, the Fern Fork-Moſſes, may be defined, as in Fl. Brit., with compreſſed leaves, ſpreading in two ranks; and theſe form a very natural and beautiful family. The chief are; D. *viridulum*, Engl. Bot. t. 1368, the ſo much diſputed *Bryum viridulum* of Linnæus, one of the ſmalleſt of moſſes; D. *bryoides*, t. 625, which ſome able botaniſts ſtill confound with D. *oſmundioides*, t. 1662; D. *taxifolium*, t. 426, which is not uncommon in moiſt ſhady places, old gardens, &c.; and the larger more

conſpicuous D. *adiantoides*, t. 264, found in watery boggy ground.

From this genus the learned Mr. Turner has removed D. *ſciuroides* of Fl. Brit. to *Pterogonium*, on account of its lateral fruit-ſtalks and their ſcaly ſheaths; and he is followed in Engl. Bot. t. 1903. D. *pulviniatum* of Swartz and Fl. Brit. is alſo removed to *Grimmia* in Engl. Bot. t. 1728; and D. *viridiſſimum* proves to be a *Gymnoſtomum*; ſee Engl. Bot. t. 1583. It is proper alſo to mention that D. *calliſtomum*, Fl. Brit. and of Dickſon, is found not to differ from *rigidulum*, Engl. Bot. t. 1439; while the Angleſea plant of the Rev. H. Davies, from which the full deſcription was made, is D. *varium*.

To compenſate in part for theſe defalcations, we have to announce, that D. *longifolium*, Hedw. Crypt. v. 3. t. 9, is found in Scotland by Mr. George Don; a ſpecies of which we had no certain intelligence, as Britiſh, when the 3d vol. of Fl. Brit. was publiſhed. S.

DICRICH. See DIECKIRCH.

DICROTUS, in *Natural Hiſtory*, a word uſed by the ancients to expreſs the deer or ſtag when in its third year's growth. It was called nebus by the ancient Greeks in the firſt year, puttolea in the ſecond, dicrota in the third, and in the fourth, and all its life afterwards, ceraſtes.

DICROTUS, from δις, *twice*, and κρεω, *I ſtrike*, in the *Medicinal Writings of the Ancients*, the epithet given to a peculiar ſort of pulſe, which Dr. Nihill calls very properly in Engliſh the rebounding pulſe. In this kind of pulſe the artery beats as it were double; and is eſteemed a certain ſign of a future critical hæmorrhage by the noſe. See PULSE.

DICTAMNUS, in *Botany*, (ſo called by Linnæus after the διϰταμον or διϰταμνος of Theophraſtus and Dioſcorides, which is moſt aſſuredly a different plant; neither does his derivation of the name in the Philoſophia Botanica, from τιϰτειν, to bring forth, confirm the propriety of his application of it. However ſuitable that explanation might be to the real Dittany of Crete, *Origanum Dictamnus*, and the hiſtory of its expelling arrows from the wounded goats, it has no reference to our plant. Hence Tournefort, and of late Gærtner, have called the latter *Fraxinella*, a word intolerable, as a generic name, to Linnæan ſcholars. Some have taken the plant in queſtion for the ἱερακιον of Dioſcorides, but with no great appearance of probability; nor has Dr. Sibthorp, though he gathered it in Greece, left us any information concerning its Greek name, antient or modern.) Fraxinella, or Baſtard Dittany. Linn. Gen. 209. Schreb. 287. Willd. Sp. Pl. v. 2. 541. Juſſ. 297. (Fraxinella; Gærtn. t. 69.) Claſs and Order, *Decandria Monogynia*. Nat. Ord. *Multiſiliquæ*, Linn. *Rutaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of five ſmall oblong pointed leaves, deciduous. *Cor.* Petals 5, ovato-lanceolate, pointed, furniſhed with claws, unequal; two of them twiſted upwards; two ſtanding obliquely at the ſides; and one bent downwards: all dotted with reſinous points. *Stam.* Filaments 10, unequal, awl-ſhaped, about as long as the petals, and bent downwards below, the two lateral ones, ſprinkled with reſinous glands; anthers ſquare, aſcending, ſimple. *Piſt.* Germen ſuperior, ſlightly ſtalked, with five angles, depreſſed at the top; ſtyle ſhort, declining, recurved; ſtigma acute, aſcending. *Peric.* Capſules five, connected by their inner margin, compreſſed, pointed, radiating, each of two valves. *Seeds*, two in each cell when ripe, ovate, poliſhed, lodged in a common, bivalve, elaſtic, notched arillus.

Eſſ. Ch. Calyx of five leaves. Petals five, unequal, ſpreading. Filaments beſprinkled with reſinous glands. Anthers terminal, ſimple. Capſules five, conjoined.

The only ſpecies is D. *albus*. Linn. Sp. Pl. 548. Willd. Sp. Pl. v. 2. 541. Jacq. Auſtr. t. 428. Bauh. Pin. 222. (Fraxinella; Ger. em. 1245.) A native of ſhady ſomewhat mountainous places in Germany, France, Switzerland, Italy, and Greece, commonly cultivated in the open borders of our gardens without any particular care, flowering in June and July. The roots are perennial. Stems annual, a foot or two high, ſimple, leafy in their middle part, each terminating in a large upright rigid panicle of very handſome roſe-coloured flowers, occaſionally white. The leaves are pinnate, ſomewhat reſembling thoſe of the aſh, whence the name *Fraxinella*. The ſpecific name *albus* alludes to the whiteneſs of the root. The whole plant abounds with a ſtrong aromatic eſſential oil, ſmelling like lemon peel, with a reſinous flavour, to many perſons very agreeable. In hot dry weather, a highly inflammable vapour is emitted by the flowers or their viſcid ſtalks, which explodes on the approach of a flame. S.

DICTAMNUS *capenſis*. See CALODENDRUM.

DICTAMNUS *creticus*. See ORIGANUM.

DICTAMNUS *falſus*, or *Pſeudodictamnus*. See MARRUBIUM.

DICTAMNUS, in *Gardening*, comprizes a plant of the herbaceous, hardy, perennial, flowering kind; the Fraxinella, or White Dittany, (D. *albus*). It riſes from one to two feet in height, with ſeveral ſtems, and the whole plant, when gently rubbed, emits an odour ſimilar to that afforded by lemon-peel, but when bruiſed, has ſomething of a balſamic ſmell.

It has varieties with white flowers, with red and purple ſtriped flowers, and with ſhort ſpikes of flowers.

Method of Culture.—Theſe plants may be increaſed by ſowing the ſeeds in the beds, borders, or other parts of pleaſure-grounds or gardens, where they are to remain, in the beginning of the Autumn, ſoon after they become ripe, or in the Spring; but the former is the beſt ſeaſon, as the plants riſe ſtronger, and with more certainty. The plants ſhould afterwards be kept perfectly clean from weeds, and have their ſtems cut down and cleared away every year in the Autumn, as well as the earth dug round them in the early Spring. Some, however, adviſe the roots of the plants, in the firſt Autumn, to be taken up and planted out in ſmall beds, at ſix or eight inches diſtance each way, to ſtand two or three years, till they are ſtrong enough to flower, when they are to be carefully taken up in the Autumn, and placed where they are to remain. They continue for a great length of time, and require little culture, except that of being kept free from weeds, and trimmed as above in the Autumnal ſeaſon.

They are plants which are well ſuited to the middle parts of beds, borders, clumps, and other compartments of ornamented grounds.

DICTATE, DICTAMEN, in the *Schools*, a ſuggeſtion, motion, or ſentiment of a man's conſcience. A good action becomes evil, if done contrary to the dictates of one's own conſcience.

DICTATE, *Dictata*, is likewiſe uſed in the *Schools* for a leſſon, or exerciſe, wherein the maſter reading, or ſpeaking ſomething, the ſcholars take it down in writing after him. Here the act of the maſter is likewiſe called dictating.

DICTATOR, a Roman magiſtrate, created by the ſenate, or people, on ſome extraordinary and eminent occaſion, to command, with ſovereign authority, for a certain time, ordinarily limited to ſix months, though the office was ſometimes continued to twelve.

The nomination of this magiſtrate appears to have been aſſigned by law to either of the two conſuls; but the choice

which they were taxed in the ſame manner and conjointly with the reſt of the commons; and have ever ſince been repreſented in parliament by the ſame perſons, which has more *embodied* them with the laity, and prevents the ſetting up of a church intereſt diſtinct from that of the people. It is remarkable, that this very important alteration in the ſtate of the kingdom was made *without any law*, by agreement with the clergy. (Littleton's Hiſt. Hen. II. vol. iii.)

In the parliament of Ireland, originally formed on the model of that of England, the clergy continued to be members of the houſe of commons, till they were excluded by an act of parliament, 28 Hen. VIII. A. D. 1536, becauſe they ſupported the authority of the pope, and obſtructed the reformation of the church. Whilſt the clergy continued to grant their own money in their convocations, their grants were not effectual till they were confirmed in parliament. In the 15th century the clergy of England had great influence in all the public councils of the kingdom, and particularly in parliament: they conſtantly reſided in the kingdom, and were preſent in theſe councils; while the nobles and great men were engaged in warlike expeditions into France or Scotland. Beſides all the archbiſhops and biſhops, twenty-five abbots and two priors were ſummoned to every parliament, and ſometimes many more; ſo that the ſpiritual lords were generally double the number of the temporal lords in the houſe of peers. (Prynne's regiſter of writs, vol. i. & iv.) This enabled the prelates to procure ſanguinary laws againſt heretics, and to ſecure the immenſe poſſeſſions of the church, together with all her abſurd errors and wretched ſuperſtitions, from all attacks. 1 Hen. IV. c. 15. 2 Hen. V. c. 7.

CONVOLVULI, in *Botany*, the tenth natural order of dicotyledonous hypogynous plants, in the ſyſtem of Juſſieu, with the following character. *Calyx* five-cleft, moſt frequently permanent. *Corolla* regular, commonly with a five-cleft border. *Stamens* generally five, inſerted at the baſe of the corolla, and alternating with its ſegments. *Style* one, or definitely divided; when one, with a ſtigma either ſimple or divided; when more than one, with as many ſimple ſtigmas as there are diviſions. *Fruit* capſular, often three-celled, more rarely two or four-celled; cells with one or more ſeeds. *Seeds* marked with an umbilical eye at the baſe, ſomewhat oſſeous, and affixed below to the central partition; valves free, with their edges adjoining to the angles of the partition; radicle of the arched corculum inferior. (Corculum ſhut up by the periſperm?) *Stems* ſhrubby, or more frequently herbaceous; many twining; many lacteſcent. *Leaves* alternate, very rarely almoſt oppoſite, (always ſimple, Vent.). This order is nearly allied to the Borragineæ and Polemonia, in its regular five-cleft pentandrous corolla, and alternate leaves; but differs from the latter, in having the partition adjoining to the edges, not to the middle of the valves; and from the former, in the fruit not being gymnoſpermous. Juſſieu aſſigns to it the following genera: 1. With a ſingle ſtyle. Maripa, Aubl.; mouroucoa, Aubl.; retzia, Thunb.; endrachium, (humbertia, Commers.); convolvulus, Linn.; ipomæa, Linn. 2. With ſeveral ſtyles. Evolvulus, Linn.; nama, Brown and Linn.; hydrolea, Linn.; ſagonea, Aubl.; creſſa, Linn. 3. Allied to the convolvuli. Cuſcuta, Linn.; diapenſia, Linn.; loeſelia, Linn.

Ventenat has changed the name of the order to convolvulaceæ, and has included in it only convolvulus, ipomæa, evolvulus, and creſſa; entirely omitting marupa, mouroucoa, retzia, endrachium, nama, hydrolea, and ſagonea; and removing cuſcuta to his undetermined plants, and diapenſia and loeſelia to the polemonia, his polemonaceæ. La Marck's natural family of liferons correſponds exactly with the firſt two ſections of Juſſieu.

CONVOLVULUS, (ſo called, *a convolvendo*, becauſe many of the ſpecies are twining). Linn. Gen. 215. Schreb. 287. Willd. 323. Lam. Illuſt. 296. Gært. 780. Juſſ. 133. Vent. ii. 396. Claſs and order, *pentandria monogynia*. Nat. Ord. *Campanaceæ*, Linn. *Convolvuli*, Juſſ. *Convolvulaceæ*, Vent.

Gen. Ch. *Cal.* perianth five-cleft. *Cor.* monopetalous, bell-ſhaped or funnel-ſhaped, plaited; border generally ſpreading, more or leſs five-lobed. *Stam.* filaments five, awl-ſhaped, ſhorter than the corolla, approximating at the baſe. *Piſt.* germ ſuperior, roundiſh; ſtyle filiform; ſtigma ſimple or bifid. *Peric.* capſule ſurrounded by the calyx, roundiſh; one, two, three, or four-celled; one, two, three, four, or many-valved. *Seeds* one or two in each cell.

Eſſ. Ch. Five-cleft. Corolla bell or funnel-ſhaped. Stigmas one or two. Pericarp a capſule, or dry berry. Seeds one or two in each cell.

Obſ. Authors often call the calyx five-leaved, when it is very deeply five-cleft.

* *Stems twining.*

Sp. 1. C. *arvenſis*. Linn. 1. Mart. 1. Deſrouſſeaux, Encyc. 2. Lam. Ill. 2001. Willd. 1. Bauh. Pin. 294. Flor. Dan. tab. 459. Curt. Flor. Lond. 2. 13. Eng. Bot. 312. (C. minor; Bauh. Hiſt. 2. 157. C. purpureus; Lob. Obſ. 340. fig. 2. C. minor arvenſis, flore roſeo; Tourn. Inſt. 83. Smilax levis minor; Ger. Emen. 861. Helxine foliis ſagittatis; ciſſampelos; Mat. 1011. Camer. Epit. 753.) "Leaves arrow-ſhaped; lobes acute; flowers generally ſolitary; bractes minute, awl-ſhaped, remote from the flower." *Root* perennial, creeping, ſtriking deeply into the ground, not eaſily extirpated. *Stems* numerous, angular. *Leaves* alternate, petioled, ſmoothiſh. *Flowers* fleſh-coloured, ſometimes white, ſweet-ſcented, opening only in clear weather; peduncles axillary, generally one-flowered, thickened above. A troubleſome weed in cultivated ground, twining cloſely about the culms of wheat, and other kinds of corn, and thence in many parts of England called bind-weed. Its juice is ſlightly purgative. The bloſſoms give a deep yellow or orange tincture to water, which is heightened by alum and alkalis. A native of Great Britain, and moſt parts of Europe. 2. C. *auriculatus*. Deſr. 3. Lam. 2002. (C. arvenſis β; Linn. C. minimus, anguſto auriculato folio; Bocc. Muſ. tab. 33. Pluk. Alm. 116. tab. 24. fig. 3. C. arvenſis minimus; Rai. Syn. 276.) "Leaves linear, haſtate-acuminate; lobes entire." Diſtinguiſhed from the preceding by its narrow elongated leaves, longer petals, and bractes placed nearer the flower. A native of Great Britain, and other parts of Europe: found by Commerſon in the Iſle of France, where it is ſuppoſed to have been brought with wheat from Perſia. 3. C. *ſepium*. Linn. 2. Mart. 2. Deſr. 1. Lam. 1. Willd. 2. Flor. Dan. tab. 458. Curt. Flor. Lond. 1. tab. 13. Eng. Bot. 313. (C. major, albus; Bauh. Pin. 294. Tourn. Inſt. 82. Smilax lœvis major; Ger. Emen. 861.) "Leaves arrow-ſhaped; lobes truncate; peduncles ſquare, one-flowered; bractes larger than the calyx, and cloſe to it." β americanus; with a fleſh-coloured flower. Bot. Mag. 732. *Root* perennial, about the thickneſs of a gooſe-quill, white, creeping, not eaſily eradicated. *Stems* numerous, from ſix to ten inches high, or more, angular, ſmooth, not much branched. *Leaves* alternate, petioled, dependent. *Flowers* large, generally white, ſometimes fleſh-coloured; nectary a yellow gland, ſurrounding the baſe of the germ. A native of Great Britain,

From the circumſtance above mentioned, the cuſtom was probably derived of declaring the dictator in the night, which is often mentioned by Livy (lib. iv. c. 21. lib. viii. c. 23, lib. ix. c. 38.)

The conſtitution of the Roman republic is praiſed by Polybius (l. vi.) as a happy mixture of monarchy, ariſtocracy, and democracy; but the dictatorſhip reduced it under a kind of domination more properly tyrannical than regal. In Rome, a ſingle conſul, agreeing with the ſenate to name a dictator, without the concurrence, and againſt the will of the people, might ſubject, at any time, the liberty and the life of every Roman citizen, to the arbitrary power of one man, ſet above all the laws, and in no way reſponſible for the exerciſe of his ſovereignty, to the juſtice of the ſtate. Indeed, after the end of the ſecond Punic war, the ſenate itſelf became ſo jealous of the danger of this office, that, for 120 years before Sylla took it, no dictator was appointed. The manner in which he choſe to have it conferred on him was as follows: both the conſuls of the year of Rome 670, B. C. 84, having periſhed in the war which Sylla and his friends made againſt them, he notified to the ſenate, that agreeably to the cuſtom of their anceſtors, in ſuch caſes, they ſhould create an *interrex* to hold the *comitia* for electing new conſuls. They named to that office the preſident of the ſenate, Lucius Valerius Flaccus; to whom Sylla wrote, and bade him report his opinion to the people, that the preſent ſtate of affairs required the appointment of a dictator; not for the term of ſix months, but till the whole commonwealth, and every part of the empire, which the civil wars had ſhaken, ſhould be more firmly ſettled, and brought into better order; adding, at the end of his letter, that, if the ſenate approved it, he offered himſelf to do the republic this ſervice. His offer was underſtood to be a command; he therefore was named dictator by the *interrex*, without any term being fixed for the expiration of his office; and thus, ſays Appian (De Bell. Civ. l. i.) "the dictatorſhip, which had before been a tyranny limited to a ſhort time, this reſtraint being taken off, the tyranny became compleat." The dictator was not content with this indefinite prolongation of his power; but cauſed a law to be propoſed by the *interrex* to the people, which "ratified all his acts, whatever they might be, and authoriſed him to put to death, without a trial, any citizen of Rome, according to his pleaſure." Cicero calls this "the moſt unjuſt, and the moſt unlike a law, that had ever been made," and he conſiders it "as null and void in itſelf." Yet to ſuch an extreme degree of ſervility were the people and the ſenate reduced, that it was enacted without the leaſt oppoſition; and Sylla rewarded Flaccus for having been the propounder of it, by naming him to the dignity of his general of the horſe. Cæſar was the next perpetual dictator to Sylla. After Cæſar there were no more dictators; for Antony, in the year of Rome 710, B. C. 44. aboliſhed this office; and in doing it, he reſerved the honour of this action entirely to himſelf. For he did not propoſe the affair, according to uſual cuſtom, to the deliberation of the ſenate, but he brought the decree with him ready drawn up. On which the title and office of dictator were for ever aboliſhed, with imprecations againſt any one who ſhould attempt to revive them, and a power for any citizen to attack and kill him with impunity. This, as may be evidently perceived, was indirectly caſting a ſlur on Cæſar's memory, and not only eſtabliſhing and confirming the preſent liberty, but ſecuring it againſt any future attempts.

After the famous battle of Thraſymenus, an. U. C. 537, B. C. 217, which was the third defeat of the Romans, in leſs than a year after Hannibal had entered Italy, the Romans were in great conſternation, and entertained apprehenſions for the city itſelf. But becauſe the conſul to whom alone it appertained to nominate a dictator, was abſent, and it was not eaſy to carry any meſſage to him, as the Carthaginians occupied all the paſſes, Q. Fabius Maximus was elected *Prodictator*. He was allowed to be the only perſon whoſe greatneſs of ſoul, and gravity of manners, correſponded to the dignity and majeſty of that office; and the more, as he was ſtill of an age, in which the mind is of ſufficient vigour to execute the deſigns it has formed, and in which reſolution and boldneſs are tempered with prudence. Fabius demanded permiſſion of the people to ride in the army; which, by an ancient law, the dictator was expreſsly forbidden to do.

Dionyſius Halicarnaſſeus derives the word dictator *ab edicendo*, becauſe they ordained or appointed what they pleaſed. But Varro will have the word taken hence, that the conſul named him, which the Latins call dicere, lib. iv. De Lingua Latina. "Dictator quod a conſule dicebatur, cujus dicta audientes omnes eſſent."

DICTE, in *Ancient Geography*, a mountain of the iſland of Crete, now called *Sethia*, and alſo *Laſthi*, next in height to mount Ida, and covered for a great part of the year with ſnow; whence it is denominated by Strabo, Pliny, and Ptolemy, the white mountain. However, cypreſs-trees grew there anciently amidſt the ſnow, and throve as well as in the vallies. This mountain obtained its name from Dictynna, a nymph of Crete, who is ſuppoſed firſt to have invented hunting-nets, and to have been called Dictynna on that account; having before been named Brito-martis. This mountain was conſecrated to Jupiter; and hence he obtained the appellation of DICTÆUS, as well as from a cave of this name in the iſland in which he had been concealed.

DICTIDIUM, a town of Greece, ſituated near mount Athos.

DICTION, the phraſe, elocution, or ſtyle of a writer or ſpeaker.

The diction or language of an orator ſhould be pure, proper to the ſubject, rich without affectation, ſtrong and cloſe without dryneſs, and ſuitable to the perſon, time, place, and audience. See ELOCUTION, and STYLE.

The diction of a drama is accounted the fourth of the eſſential parts thereof, the other three being the fable, the manners, and the ſentiment; it is of the leaſt importance of any; yet muſt peculiar care be taken herein to make every paſſion ſpeak its proper language. See DRAMA.

DICTIONARY, a collection, or catalogue of all the words of a language, or art, with their ſignifications, ranged in order of the alphabet.

What the Latins, and we after them, call dictionary, the Greeks call Lexicon.

For the proper character, nature, office, &c. of a dictionary, ſee the preface to this work. See alſo VOCABULARY.

The moſt ancient dictionaries for the Latin tongue, are, that called Papias, compiled by Solomon, abbot of St. Gall, biſhop of Conſtance, who lived about the year 1409; another made in 1469, called Gemma Vocabulorum; a third in 1502, called Gemma Gemmarum: and a fourth by Dionyſius Neſtor, a Cordelier.

The moſt celebrated old Latin dictionary is that of Ambroſe Calepine, a hermit of St. Auguſtine at Bergamo, and ſon of the count of Calepine. Conrad Geſner is ſaid to have augmented this with four thouſand words. Paulus Manutius increaſed it ſtill more; and Paſſerat after him; and yet Matthias Martinius made two volumes of their omiſſions.

There is another noted Latin dictionary of Criſpinus: to ſay nothing of Cowper, Holyoake, Gouldman, Littleton, Cole, Ainſworth, and many others of leſs conſideration.

For the Greek, we have thoſe of Henry Stevens and

ered, ſhorter than the petiole." *Root* perennial. The young branches, petioles, leaves, peduncles, and calyxes, cloathed with a ſilky ſhining down. *Stem* cylindrical, woody, almoſt ſmooth. *Leaves* broad-oval, alternate, acute, entire, nerved, about twice the length of the petioles. *Peduncles* axillary, ſolitary, with two awl ſhaped bractes about the middle; calyxes ſhort; two inner leaves ſmaller; corollas at leaſt two inches long, funnel-ſhaped. A native of the Philippine iſlands. Specimen in the herbarium of Juſſieu. 16. C. *chenopodioides*. Deſr. 21. Lam. 2020. "Villous; leaves egg-ſhaped, ſerrate-ſinuated; flowers ſolitary, nearly ſeſſile." *Stems* ſlender, weak, cylindrical. *Leaves* an inch long; petioles about half their length, channelled. *Peduncles* axillary, ſolitary; bractes two, ſmall, ſiliform, rather long; leaves of the calyx egg-ſhaped, acute, corollas narrow, tabular. In the herbarium of La Marck. 17. C. *medium*. Linn. Sp. Pl. 4. Mart. 6. Deſr. 10. Lam. 2009. Willd. 12. "Leaves linear, haſtate-acuminate; auricles toothed; peduncles one-flowered; calyxes arrow-ſhaped." Plant ſmooth in all its parts. *Root* annual. *Stems* very ſlender. *Peduncles* axillary, ſolitary, often bent in the middle at the origin of the two bractes; upper half angular, thicker; three outer leaves of the calyx large, nearly as long as the peduncles, acute, arrow-ſhaped at the baſe, like thoſe of campanula medium; auricles terminated by two or three ſmall teeth; two inner ones entire, acute, a little ſhorter; corolla not longer than the calyx. A native of Madagaſcar and the Eaſt Indies. 18. C. *filicaulis*. Mart. 88. Willd. 13. Vahl. Sym. 3. 24. "Leaves linear-lanceolate, obtuſe, mucronate, dilated and toothed at the baſe; calyx leaves oblong." *Root* annual. *Stem* herbaceous, filiform, branched. *Leaves* on very ſhort petioles, diſtant, two inches long or more, tender, veined, quite ſmooth. *Peduncles* axillary, filiform, thicker at the top; bractes two, oppoſite, awl-ſhaped, above the middle of the peduncle; calyx-leaves mucronate, ſmooth; ſtigma ſimple, bluntiſh. A native of Guinea. 19. C. *tridentatus*. Linn. Sp. Pl. Ed. 1. Mart. 76. Deſr. 12. Lam. 2011. Willd. 14. Pluk. Alm. 117. tab. 276. fig. 6. & Mant. 117. tab. 167. fig. 5. (Evolvulus tridentatus; Linn. Sp. Pl. Ed. 2. Fendera-claudi; Rheed. Mal. 11. 133. tab. 65.) "Leaves ſpatulate-linear, three-toothed at the tip, dilated and toothed at the baſe; calyx-leaves elliptical, cuſpidate." *Root* annual. *Stems* filiform, ſmooth, ſlightly ſtriated, almoſt ſimple. *Leaves* alternate, about half an inch long, ſmooth; petioles about a line long. *Flowers* purpliſh at the baſe, with a yellowiſh white border; peduncles axillary, ſolitary, one-flowered, longer than the leaves, with two ſmall bractes near their ſummit. A native of the Eaſt Indies. Introduced into England in 1778, by ſir Joſeph Banks. 20. C. *anguſtifolius*. Mart. 89. Deſr. 32. Lam. 2030. Willd. 15. (Ipomæa anguſtifolius; Jacq. ic. 2. tab. 317.) "Leaves linear, haſtate, obtuſe, mucronate, ſmooth; auricles generally entire; peduncle one-flowered." *Root* ſpindle-ſhaped, riſing about an inch above the ſurface of the ground, with the appearance of a ſlender, ſimple, erect, leafleſs ſtem. *Stems* ſeveral, ſcarcely a foot high, a little twining, almoſt ſimple, filiform, weak. *Leaves* an inch long, about a line broad, numerous, on very ſhort petioles. *Flowers* yellow, longer than the calyx; peduncles axillary, ſolitary, ſhorter than the leaves, with two awl-ſhaped bractes, about the middle, upper half thicker; calyx-leaves connivent, lanceolate, mucronate; corolla funnel-ſhaped; border very open; diviſions egg-ſhaped, obtuſe; ſtigma globular, didymous. *Capſule* two-celled. A native of Guinea and the Eaſt Indies. 21. C. *ariſtolochifolius*. Mill. Houſton MSS. "Leaves haſtate-lanceolate; auricles rounded; peduncles many-flowered." *Root* annual. *Stem* ten feet high, ſlender. *Flowers* yellow, in ſmall cluſters, on long peduncles. *Capſules* trigonous, three-celled. *Seeds* two in each cell. Seeds ſent to Mr. Miller from Carthagena in New Spain. 22. C. *Adanſonii*. Deſr. 82. Lam. 2080. "Leaves haſtate, linear,; ſtipules in pairs, ſomewhat ſiliform; calyx muricated." *Stems* herbaceous, weak, a little villous. *Leaves* alternate, diſtant, petioled, entire, ſmooth, from three to four inches long; ſtipules about an inch long. *Flowers* near two inches long, axillary; peduncles nearly the length of the petioles, ſmooth, with two ſmall bractes about the middle; calyx-leaves egg-ſhaped, rough, with ſharp tubercles. A native of Senegal. 23. C. *japonicus*. Mart. 7. Deſr. 6. Lam. 2005. Willd. 16. Thunb. jap. 85. (Kos and Kudſi vulgo Firaga wo; Kempf. Amæn. 5. 856.) "Leaves haſtate, lanceolate, acute; lateral lobes one-toothed; peduncles one-flowered; ſtem ſimple." *Stems* filiform, ſmooth. *Leaves* alternate, almoſt unilateral, petioled, ſmooth; middle lobe an inch long, lanceolate, entire, acute; ſide ones a little reflexed, ſhorter. *Flowers* axillary, ſolitary; peduncles as long as the leaves, filiform, ſmooth; calyx-leaves egg-ſhaped, acute, entire, ſmooth. A native of Japan. 24. C. *ebracteatus*. Deſr. 7. Lam. 2006. "Leaves cordate-arrow-ſhaped, obtuſe behind; peduncles ſhorter than the petiole, without bractes." Whole plant, except the corolla, cloathed with ſhort white hairs. *Stems* ſcarcely a foot and a half long, ſlender. *Leaves* alternate, acute. *Flowers* white, ſmall; peduncles one or two-flowered; ſegments of the calyx five; two outer ones broader; ſtigmas two, globular, purpliſh. Native country unknown. Cultivated in the botanic garden at Paris. 25. C. *leucanthus*. Deſr. 8. Lam. 2007. (Ipomæa leucantha; Jacq. Coll. 2. 280. ic. 2.) "Leaves heart-ſhaped, acuminate: peduncles ſhorter than the petiole." *Root* annual. *Stems* about four feet high, ſlender, cylindrical, branched, reddiſh, and ſomewhat rough towards the bottom. *Leaves* alternate, entire, or ſlightly ſcolloped, ſmooth. *Flowers* white; peduncles axillary, ſolitary, an inch long, erect, cylindrical, ſmooth, one-flowered: calyx leaves mucronate, a little open at the ſummit, ciliated at the baſe; corolla funnel-ſhaped: anthers purpliſh; ſtigma two-lobed. A native of America in the torrid zone. 26. C. *fruticuloſus*. Deſr. 9. Lam. 2008. "Shrubby; leaves ſomewhat heart-ſhaped at the baſe, linear, lanceolate, petioles ſhort; flowering branches, thick ſet with leaves." *Root* perennial. *Stems* three or four feet high, cylindrical, ſlender. *Leaves* not more than two lines broad, ſloped at the baſe, on very ſhort petioles. *Flowers* with five purple rays; peduncles larger than the petioles, ſcarcely the length of the flowers; bractes two, ſmall, awl-ſhaped, unequal, ſituated nearer to the ſtem than to the calyx; calyx ſmooth; corolla ſhallowly five-lobed. A native of the Canary iſlands, flowering in April and May. 27. C. *dentatus*. Mart. 90. Willd. 17. Vahl. Symb. 3. 25. "Leaves haſtate, ſmooth; auricles toothed; peduncles many-flowered, muricated." *Stem* cylindrical, ſmooth. *Leaves* ſcarcely an inch long, ſomewhat heart-ſhaped at the baſe; middle lobe lanceolate, quite entire; ſide ones roundiſh, unequally four or five-toothed; petioles filiform, often ſomewhat muricated towards the baſe. *General peduncles* ſpreading, thicker, and a little longer than the petioles; partial peduncles in threes; that in the middle one-flowered; ſide ones with two or three pedicelled flowers; both muricated; rigid; calyx-leaves oblong, obtuſe, mucronate, equal. A native of the Eaſt Indies, found by Schumacher. 28. C. *haſtatus*. Mart. 79. Willd. 18. Vahl. Symb. 1. 15. Forſk. deſcr. 203. "Leaves lanceolate, haſtate; peduncles axillary, in pairs, two-flowered." *Stem* hairy. *Leaves* remote, quite entire, ſmooth on the upper ſurface, villous on the lower; au-

ricles rounded, ſometimes with one tooth behind: petiole half the length of the leaf. *Peduncles* ſhorter than the petiole, villous; calyx-leaves hairy, acuminate, patulous at the tip. A native of Egypt and Arabia. 29. C. *Sonneratii*. (C. haſtatus; Deſr. 11. Lam. 2010. Tala-neli; Rheed. Mal. 11. 113. tab. 55.) "Leaves linear, haſtate-acuminate; auricles toothed; calyx-leaves ſimple." Whole plant ſmooth. *Stems* very ſlender, ſlightly angular. *Leaves* about two lines broad, alternate, nearly ſeſſile. *Peduncles* longer than the flower, ſlender, one or two-flowered, often bent at the inſertion of the bractes, thicker upwards; bractes two, ſmall, awl-ſhaped, ſituated a little above the middle of the peduncle. *Flowers* yellowiſh-white, twice the length of the calyx; calyx-leaves egg-ſhaped, acute. A native of the Eaſt Indies, communicated to La Marck by Sonnerat. 30. C. *aſarifolius*. Deſr. 89. Lam. 2087. "Leaves kidney-ſhaped, broad, veined; peduncles one or two-flowered." *Stems* cylindrical, ſmooth, not much branched. *Leaves* alternate, large, entire, ſmooth, firm; petioles about two inches long, channelled. *Peduncles* longer than the petioles; bractes from two to four, ſmall, awl-ſhaped, ſituated almoſt cloſe to the flowers; calyx-leaves ſhort, egg-ſhaped, obtuſe, two outer ones ſmaller; corollas at leaſt two inches long, tubular; tube about half an inch diameter; border but little open, with five pointed diviſions; ſtigma capitate, didymous. A native of Senegal. 31. C. *tiliæfolius*. "Shrubby; leaves heart-ſhaped, rounded; younger ones ſomewhat tomentous; flower and fruit very large." *Stems* cylindrical, almoſt ſmooth. *Leaves* alternate, a little orbicular, entire; petioles about half the length of the leaves, channelled. *Flowers* large; peduncles not more than eight or ten lines long, axillary, ſolitary, one-flowered; calyx-leaves ſhort, obtuſe, almoſt round; corolla at leaſt three inches long, almoſt cylindrical; tube narrow as far as the length of the calyx, afterwards eight or ten lines in diameter; ſtigma capitate, two-lobed. *Capſule* about the ſize of a walnut, apparently two-celled. A native of the Iſle of France, and the Cape of Good Hope. Found by Commerſon. 32. C. *panduratus*. Linn. Sp. Pl. 5. Mart. 8. Deſr. 91. Lam. 2089. Willd. 19. (C. megalorrhizos; Dill. Elth. 101. tab. 85. fig. 99.) "Leaves, ſome heart-ſhaped, entire, others panduriform or three-lobed; peduncles longer than the petiole, about two-flowered." *Root* perennial, thick, ſpindle-ſhaped. *Stems* long, ſlender. *Leaves* diſtant, petioled. *Flowers* large, white, with the bottom of fine purple; peduncles axillary, ſolitary, from one to three-flowered; calyx-leaves ſhort, two outer ones ſhorter and narrower. *Capſule* two-celled. *Seeds* hirſute, one in each cell. A native of Carolina and Virginia, flowering from June to September. 33. C. *betonicifolius*. Mart. 72. "Leaves cordate-arrow-ſhaped, acute; peduncles one-flowered." *Stem* five or ſix feet high, ſlender. *Flowers* white, with purple bottoms; peduncles long, ſlender. A native of Africa, cultivated by Miller in 1730. 34. C. *bracteatus*. Mart. 91. Vahl. Sym. 3. 25. "Leaves heart-ſhaped, almoſt entire, and three-lobed, haſtate, attenuated; peduncles one-flowered; outer calyx-leaves bracte-ſhaped." *Stem* thinly beſet with ſhort hairs. *Leaves* two inches long; petioles ſhorter than the leaf, pubeſcent. *Peduncles* the length of the leaf, ſolitary; bractes two, laneeolate, acute, ſituated a little below the calyx; calyx pubeſcent; inner calyx-leaves oblong, bluntiſh, nerved; outer ones much broader, encloſing the others as between two bractes; corolla villous on the outſide, tender, ſilky; border five-cleft; ſtigma capitate, two-lobed, found in the Eaſt Indies by Koenig. 35. C. *bicolor*. Mart. 92. Willd. 21. Vahl. Symb. 3. 25. "Leaves heart-ſhaped, villous, ſomewhat angular-lobed at the baſe; peduncles one-flowered; outer leaves of the calyx reſembling bractes." *Stem* villous. *Leaves* acute, mucronate, not attenuated, nearly equal in length and breadth, one, two, or three-lobed at the bottom, villous on both ſides; very ſoftly villous, hoary, and obſcurely veined underneath; the younger ones ſilky. *Flowers* white, with a violet purple baſe; bractes, calyx, and corolla, as in the preceding ſpecies. Found in the Eaſt Indies by Schumacher. 36. C. *Geffroyenſis*. (C. bicolor; Deſr. 96. Lam. 2094.) Hairy; leaves ſomewhat heart-ſhaped, three-lobed, hoary underneath; peduncles many-flowered." On a ſuperficial view having the appearance of a bramble. *Stems* ſlender, cylindrical; beſet, as well as the petioles, peduncles, and calyxes, with blackiſh points, and hiſpid with rather long ſtiffiſh hairs. *Leaves* alternate, longer than their petioles, cloathed with fine recumbent hairs, green on the upper ſurface, hoary underneath; lobes oval, acute, entire. *Flowers* ſmall; peduncles axillary, ſolitary, thicker and longer than the petioles, dichotomous; bractes two, linear, awl-ſhaped, ſituated at each diviſion of the peduncles; calyx-leaves narrow, acute, rather long. Brought from Senegal by M. Geoffroy. 37. C. *trilobus*. Willd. 22. Thunb. prod. 35. "Leaves heart-ſhaped, villous, three-lobed; lobes egg-ſhaped, acute; peduncles one-flowered." A native of the Cape of Good Hope. 38. C. *ſubquinquelobus*. (C. trilobus; Deſr. 94. Lam. 2092. Ipomæa triloba; Linn.) "Lower leaves heart-ſhaped, three-lobed; upper ones ſomewhat five-lobed; peduncles three-flowered." *Root* annual. *Stems* two or three feet long, ſlender, ſlightly angular, ſmooth. *Leaves* alternate, generally ſhorter than their petioles; middle lobes of the lower leaves egg-ſhaped, obtuſe, mucronate, ſmooth; lateral lobes of the upper leaves with a deep ſinus, which makes them appear five-lobed. *Flowers* purple or violet; peduncles angular, nearly the length of the petioles; pedicels very ſhort, bractes ſmall, egg-ſhaped; calyx-leaves half the length of the corolla, ſmooth, egg-ſhaped, acute, connivent; corollas ſmall, cylindrical; border with five ſharp teeth. A native of South America, cultivated in the botanic garden at Paris. 39. C. *platanifolius*. Mart. 93. Willd. 23. Vahl. Symb. 3. 26. Pluk. phyt. tab. 167. fig. 3. Feuil. peruv. 3. 16. tab. 11. "Leaves heart-ſhaped, three-lobed; lateral lobes toothed-angular; peduncles, ſomewhat three-flowered; calyxes almoſt as long as the peduncles, ſmooth." Whole plant quite ſmooth, except the petioles. *Stem* cylindrical. *Leaves* two inches long or more, glaucous, green underneath, with purpliſh veins; lobes lanceolate; middle one longer, broader, quite entire, acuminate; lateral ones narrower, attenuated, with a ſmaller broader lobe at the bottom on each ſide, rounded behind, and furniſhed with an angular tooth; petioles ſhorter than the leaf, beſet with a few ſcattered hairs. *Peduncles* ſolitary, ſhorter than the leaf, thickened at the top; lower ones three-flowered; middle ones two-flowered, uppermoſt one-flowered; calyx-leaves oblong, ſomewhat membranous, ending in a briſtle; ſtigma capitate. It differs altogether from C. batatas in the ſmoothneſs of the ſtem, and the form of the leaves. A native of America. 40. C. *acuminatus*. Mart. 94. Willd. 24. Vahl. Symb. 3. 26. "Leaves heart-ſhaped and three-lobed, attenuated; peduncles elongated, many-flowered; calyxes ſmooth." *Stem* with a few minute ſcattered hairs, preſſed cloſe, and viſible only with a magnifier. *Leaves* four inches long, three or more broad at the baſe, three-lobed or entire, quite ſmooth, nerved, acute; lateral lobes lanceolate; middle one egg-ſhaped, attenuated; petioles longer than the leaf. *Flower* large, bell-ſhaped, purple with a pale baſe and five paler rays running to the margin; peduncles axillary, the length of the petioles alternate; pedicels about five, an inch and half long; bractes at the baſe of each pedicel two, lanceolate, attenuated, finely

marmot: in the abdominal pouch of the female, the marſupial bones in both ſexes, and in the ſyſtem of the ſexual organs, with the opoſſum; and in the formation of the poſterior legs, with the kanguroo. The marſupial bones have been alſo obſerved by Geoffroy, in that extraordinary creature, the duck-bill quadruped, *Daſyurus*, the Platypus of Dr. Shaw, and Ornithorhynchus of Geoffroy.

Thus it is evident, the character of an abdominal pouch like that of the opoſſum is not peculiar to this genus of quadrupeds, but common, at leaſt, to three genera of thoſe at preſent known, and we might add from our own obſervations, a circumſtance, not perhaps before noticed, that a ſimilar proviſion exiſts in ſome kinds of fiſhes, as well as in the quadrupeds before mentioned. The exiſtence of this abdominal pouch has furniſhed Vicq d'Azir with the character of a new order of quadrupeds, which he calls *Bourſins*, and of which, according to that author, there are five genera, the opoſſums being divided into two genera, and the kanguroo (Pedimanes), the Platypus (Daſyure), and the new genus Phaſcolome, conſtituting the other three.

Moſt of the true opoſſums inhabit America, and live in holes in woody places, burrowing in the earth, and being of the carnivorous kind, feeding on ſmall birds, poultry, reptiles, worms, and inſects, and alſo on vegetables, eſpecially the ſugar cane. Theſe animals walk indifferently, but they climb trees, by means of their prehenſile tail, with great facility; and are often ſeen ſuſtained by the tail to the branches of trees, watching to ſeize upon ſmall birds when they alight near them. The feet are furniſhed with five toes, the greater one of which is placed remote from the reſt. The abdominal pouch is ſuſtained by means of two bones of a peculiar ſtructure, and which in alluſion to their functions have been called the marſupial bones. The opening of the vagina, which is double, and gave riſe to the name of the genus, from the Greek (didelphis) is moiſtened with a kind of fluid of a yellowiſh colour, and ſo offenſive to the ſmell as to communicate its odour to the whole animal. The fleſh of the opoſſum is, however, occaſionally introduced to table as an article of food.

Species.

MARSUPIALIS. Teats eight, within the pouch. Schreber. *Philander Amboinenſis*, &c. Briſſ.

This ſpecies which inhabits Amboyna, is about the ſize of a large cat. The noſtrils are perpendicular, and lunar; whiſkers long; at each corner of the mouth eight briſtles, and under the throat five: the ears oval, lax, black, with the tip white; the grinders lobate: legs black, ſmooth, and beſet with ſhort hair; and the tail the length of the body.

OPOSSUM. Tail hairy at the baſe: region of the eyebrows paler. *Didelphis Opoſſum*, Gmel. *Semivulpa*, Geſn. *Tlaquatzin*, Hern. *Tai-ibi-Braſilienſibus*, Marcg. *Opoſſum*, Cateſby. *Sarigue*, Buff. *Virginian Opoſſum*, Penn. Shaw's Gen. Zool.

The common or Virginian opoſſum is about the ſize of a ſmall cat. The face is long and ſharp, the mouth wide and armed with very numerous ſharp teeth; the ears thin, naked, blackiſh, round, and ſurrounded with a white border; the legs are ſhort and the feet armed with ſharp claws, but the interior toes or thumbs of the hind feet are flat and rounded, and have nails like thoſe of the monkey tribe. The tail is blackiſh at the origin and covered with longiſh hair; but from that part to the extremity is naked, and covered with a ſcaly ſkin, the diviſions of which are marked in ſuch a manner as to give the tail very much the appearance of a whitiſh ſnake: it is ſtrongly prehenſile, or poſſeſſed of the power of coiling, like thoſe of ſeveral monkies, round any object from which the animal pleaſes to ſuſpend itſelf. Its general colour is a dingy yellow white, with the legs blackiſh, and belly white. The abdominal pouch is a large cavity which can be opened and cloſed at pleaſure. It is in this cavity the teats are ſituated in which the young are placed by the parent immediately after their birth, and where they remain for ſome time after, like fœtuſes deſtitute of hair, and adhering ſtrongly to the teats. When they have attained ſufficient growth and ſtrength they emerge, and afterwards, while they remain young, occaſionally take refuge in the ſame receptacle on the appearance of danger. By this means the opoſſum is enabled to carry away her litter of young with perfect facility and ſafety. This receptacle for the young is common to moſt of the opoſſum tribe, but there are two ſpecies which are deſtitute of it, and have only inſtead a kind of depreſſion or furrow.

This animal is carnivorous and preys on poultry, ſmall birds, &c. in the manner of the European polecat, and alſo feeds on various kinds of fruit. It is of a gentle diſpoſition, and may be eaſily tamed; but, like ſome other ſpecies, has a diſagreable ſmell: its voice is a ſort of grunting ſqueak: its pace in running is not ſwift, but it is very expert in climbing trees, and readily paſſes by means of its clinging tail from bough to bough in the manner of a monkey. The female produces four or five at a birth, and has the power of cloſing the pouch ſo ſtrongly as to make it extremely difficult to open it by the hand; nor will any torture compel the animal to looſen it. This power of ſtrongly cloſing the pouch is performed by certain bones and muſcles which nature has provided for that purpoſe. The female, when ready to produce her young, is ſaid to make herſelf a neſt of dry graſs, in ſome buſh near the root of a tree.—A variety is deſcribed by Gmelin under the name of Molucca, the back of which is dark brown, and the belly whitiſh. This is found chiefly in the iſle of Ceylon.

CAYOPOLLIN. Tail longer than the body: no abdominal pouch: eyes ſurrounded with a black border. Schreber. *Mus Africanus; Cayopollin dictus*. Seba. *Mexican Opoſſum*.

The Cayopollin inhabits the mountainous parts of New Spain where it lives on trees; it has large angular, naked, tranſparent ears, thickiſh ſnout, and large whiſkers. The colour above is browniſh or tawny-aſh, beneath pale grey or whitiſh: the face whitiſh with a dark line down the middle, and a blackiſh or brown border round the eyes. The total length is about ſeventeen inches, of which the body meaſures ſix and the tail eleven.

MURINA. Tail half naked; teats ſix. Linn. *Mus ſylveſtris*, &c. Seba. *Marmoſe*, Buff. *Murine Opoſſum*, Penn.

One of the ſmaller ſpecies of opoſſum, meaſuring ſix or eight inches from the noſe to the baſe of the tail, and having the tail about the ſame length as the body. It is of a ſomewhat ſlender form, with the ſnout long and acute, and the mouth wide; the ears are large and rounded, and the tail naked, or ſcaly throughout its length. This animal has no ventral pouch, but on each ſide the lower part of the abdomen is a longitudinal furrow or fold, in the cavity of which the teats are ſituated. The general colour is tawny brown above, and whitiſh beneath; the eyes encircled with black. It produces ten or more young at a birth, which immediately after being brought forth affix themſelves to the teats, and remain there till they attain their proper growth and ſtrength; it is a native of South America, and particularly of Surinam. The feet in this ſpecies are all furniſhed with ſharp claws, except on the thumbs or great toes of the hind feet, which have rounded nails.

DORSIGERA. Tail at the baſe hairy, and longer than the

the body; toes of the poſterior feet unarmed. Schreber. *Genus gliris ſylveſtris*, Merian. *Philandre de Surinam*, Buff. *Merian opoſſum*, Penn.

This ſpecies, which is deſcribed principally on the authority of madame Merian, is a native of Surinam; it burrows in the ground like the rabbit, and, when in danger, the young are ſaid to affix themſelves to the mother by twiſting their tails round hers. This animal brings forth five or ſix young at a litter, and is about the ſize of the common rat.

Cancrivora. Tail ſcaly, almoſt naked, and nearly as long as the body; thumb of the poſterior feet flat. *Didelphis cancrivora*, Gmel. *Crabier*, Buff. *Cayenne opoſſum*.

A native of Cayenne, firſt deſcribed in the Supplement to the works of Buffon. It is ſaid to be an animal of great activity, living on trees by day, and by night deſcending into marſhy places in order to prey on crabs, which it draws out of their holes by means of its feet, or ſometimes even with its tail. The colour is reddiſh, tawny above, and yellowiſh beneath; the fur ſomewhat woolly, but beſet with coarſer hairs externally, eſpecially along the back, where they form a kind of mane. The face is long and ſlender; the ears upright, ſharp, and pointed; the tail very long, taper, and naked. This animal is about three feet in length, meaſuring from the tip of the noſe to the end of the tail; it grunts like a pig; brings forth from four to five young at a litter, is eaſily tamed, and grows fat by domeſtication. The fleſh reſembles that of the common hare.

Petaurus. Sides furniſhed with a flying membrane: body above blackiſh-grey, beneath white; tail long, ſubcylindrical, and hairy. *Didelphis petaurus, petaurine opoſſum*, Shaw. Gen. Zool. *Hepoona-roo*, White's Journ. *Great flying opoſſum*.

This remarkable ſpecies meaſures about twenty-two inches from the tip of the noſe to the beginning of the tail, which latter is twenty inches in length. The body is about the ſize of a ſmall rabbit, and the general appearance is ſimilar to that of the flying ſquirrel. Its colour is a fine ſable, varied with a greyiſh ferruginous caſt above, the lower ſurface whitiſh; a ſtripe of deep brown runs along the back from head to tail, and the verge of the flying membrane on the upper part has a darker tinge than the reſt, while the extreme edge is white. The tail is very full of long, and ſoft hairs of a blacker caſt than the reſt, eſpecially towards the end. This ſingular animal is enabled, by means of its expanſile lateral membranes, to ſpring to a conſiderable diſtance at pleaſure; it inhabits New Holland, where the natives diſtinguiſh it by the name of Hepoona-roo.

Lemurina. Cinereous, beneath tawny; tail cylindrical, black, furry, and prehenſile. *Didelphis lemurina, lemurine opoſſum*, Shaw Gen. Zool. *Wha-tapoa-roo*, White's Journ.

A large ſpecies, being equal in ſize to the common cat, but of a more elongated form in proportion. The upper part is an iron-grey, beneath tawny, more or leſs pale. The muzzle is ſhort and roundiſh; whiſkers large and black, the ears upright, large, and rather acuminated at the top; its eyes are bright and reddiſh. The poſterior feet furniſhed with a rounded interior toe. The tail, which is very thick, long, and furry, is prehenſile, and for about a fourth part of its length of the ſame colour with the body, the remainder black; the tail is naked beneath to a conſiderable diſtance from the tip. The total length of this animal is about two feet ſix inches, of which the tail alone meaſures about twelve inches.

This kind, like moſt others of the genus, ſubſiſt on ſmall birds, inſects, and vegetables, and when they feed are obſerved to ſit upright in the ſame manner as the ſquirrel.

Obesula. Pale brown; beneath whitiſh; tail rather long. *Didelphis obeſula, porculine opoſſum*, Shaw. Nat. Miſ.

About the ſize of a half grown domeſtic rat; the hind legs are conſiderably longer than the others, and ſomewhat reſemble thoſe of the kanguroo; the ears are rounded, the tail rather long, and its hair more coarſe in appearance than in the reſt of the ſmall opoſſums.

Viverrina. Black ſpotted with white; tail hairy. *Didelphis viverrina, viverrine opoſſum*, Shaw. Gen. Zool.

This animal is remarkable for its ſlender form, and in its general figure bears a ſtrong reſemblance to the weeſel tribe. The colour is deep gloſſy black, and the whole body and outſides of the limbs are marked with numerous, large, and ſomewhat irregular patches of white. Mr. Hunter ſpeaks of a variety which is entirely brown and immaculate.

Philander. Tail hairy at the baſe; abdominal pouch with four teats. Schreber. *Tlaquatzin*, Seba.

The philander is about the ſize of a large rat; the head large, the ſnout thick, and the ears rounded and erect. The tail is longer than the body, and is hairy at the baſe, the reſt naked. The length of the body is nine inches, and the tail thirteen. The general colour of this animal is reddiſh brown above, beneath whitiſh; the eyes are ſurrounded with a browniſh border; and the mouth beſet on each ſide with whiſkers. The forehead is marked with a browniſh ſtripe. This ſpecies inhabits Surinam.

Orientalis. Tail hairy from the baſe to the middle, and longer than the body; two middle toes of the poſterior feet united. Pallas. *Phalanger*, Buff.

The phalanger is the ſize of a very large rat, meaſuring about nine inches from the noſe to the tail, and the tail itſelf ten inches. The colour of the phalanger is rufous grey on the upper part, and yellowiſh white beneath; the top of the head, and the back marked with a blackiſh line; the tail is hairy for about two inches and a half from the baſe. Its voice is ſaid to reſemble that of the ſquirrel, and it commonly aſſumes the attitude of that animal when feeding.

Brunii. Tail ſhort, naked; poſterior feet long and tridactylous. Schreber. *Filander*, Le Bruyn. *Javan opoſſum*, Penn.

This ſpecies, which is about the ſize of the common hare, was firſt diſcovered by Le Bruyn in the iſland of Java. The head is narrow, and ſhaped like that of the fox, with the ears placed erect. The general colour of the animal is pale yellowiſh brown, with a brown ſtripe along the forehead. The abdominal pouch is large. Bruyn refers this animal to the kanguroo tribe.

Brachyura. Tail hairy, and very ſhort; ears naked; no pouch; body rufous. Schreber. *Short-tailed opoſſum*, Penn.

One of the ſmaller ſpecies ſeldom exceeding the length of five inches from the noſe to the tail, and the latter about two inches. Its colour is a reddiſh brown on the upper parts, and whitiſh beneath. This ſpecies being deſtitute of an abdominal pouch, the young faſten themſelves to the teats. The fur of this animal is ſoft and elegant, the tail very thick at the baſe, and gradually tapering to the end. It is a native of South America.

Sciurea. Sides furniſhed with a flying membrane; body above greyiſh, beneath ſnowy white; tail prehenſile and very hairy. *Didelphis ſciurea, ſquirrel opoſſum*. Shaw Zool. New Holl.

The ſize of this animal is nearly that of the common European ſquirrel, and from the fullneſs and peculiar growth of its hair, appears rather larger. Its general colour reſembles that of the American grey ſquirrel. A black ſtripe paſſes over each eye along the top of the head; and under

each

each ear is a black patch ſurrounded with white. The tail, which is prehenſile, is of the ſame colour with the body for half its length, but the remainder is black; it is remarkably full of hair, and tapers in a ſlight degree towards its extremity, but does not terminate acutely. The eyes are black, rounded, and very full; the ears rather ſhort, round, and very thin. The upper parts of the feet are white, and the lateral or flying membrane, which extends from the fore feet to the hind, is edged with blackiſh, as in the flying ſquirrels. The abdominal pouch is of conſiderable ſize, and is ſituated, as in other opoſſums, on the lower part of the abdomen. The poſterior feet are furniſhed with a rounded unarmed thumb. This curious animal is of the nocturnal kind, remaining during the greateſt part of the day in a ſtate of torpidity, but appearing in the night time full of vigour and activity. This ſpecies inhabits New Holland.

Dr. Shaw ſpeaks of a ſuppoſed variety which agrees in every reſpect with that above deſcribed, except in having the extreme half of the tail black, that part being nearly throughout of the ſame grey colour with the upper ſurface of the animal, and only marked near the end with a black band; the tip is white.

Macroura. Sides furniſhed with a flying membrane; body cinereous above, beneath white; tail very long and black. *Didelphis macroura, long-tailed opoſſum.* Shaw Zool. New Holl.

This ſpecies is about the ſize of a black rat, and is of a dark or browniſh grey above, the lower ſurface white; the head and neck are alſo whitiſh; a duſky ſtripe runs along the top of the head, almoſt to the noſe; the ears are whitiſh, moderately large, and ſlightly rounded; the upper parts of the fore feet are whitiſh, and the poſterior half of the tail deeper black than the other part. Native of New Holland.

Pygmæa. Sides furniſhed with a flying membrane; tail flat, pinnated, and linear. *Didelphis pygmæa, pigmy opoſſum.* Shaw Zool. New Holl.

The moſt diminutive of the opoſſum tribe, its ſize being equal only to that of the common mouſe. This elegant little animal is furniſhed on each ſide the body with an expanſile membrane, like that of the flying ſquirrel, and by the aſſiſtance of which it is enabled to ſpring to a conſiderable diſtance. The fur is extremely fine; its colour a ſoft and paliſh brown above, beneath almoſt white; the noſe, feet, and ears, internally, are light pink. The tail is of a flattened form, and beautifully fringed on each ſide with ſoft, ſilky hairs. The opening of the abdominal pouch is of a ſemilunar form. The teats are extremely ſmall, and only four in number. Its tongue is remarkably large and long, and of a flattened form. The ſpecies is ſuppoſed to feed chiefly on inſects and young birds.

Pencillata. Cinereous, beneath whitiſh; tail at the end hairy and black. *Didelphis pencillata, bruſh-tailed opoſſum* Shaw Gen. Zool.

The prevailing colour of this ſpecies is cinereous, or deep grey; the noſe is rather ſharp; the ears moderately large, and of a very ſlightly pointed form at the tips; the ſides of the mouth are furniſhed with very long fine briſtles; and others, ſomewhat ſhorter, are ſituated under each eye. The ſides are dilated into a flying membrane. The tail is thin and aſh-coloured for nearly half its length, beyond which it is jet black, with long and fine hairs diſpoſed in a bruſh like form. Its ſize is that of the black rat. Native of Auſtralaſia.

Vulpina. Ferruginous; tail hairy and black. *Didelphis vulpina, vulpine opoſſum.* Phillip's Voy. New South Wales.

This is one of the larger ſpecies of opoſſum, meaſuring about twenty-ſix inches from the noſe to the baſe of the tail, and the tail itſelf being fifteen inches in length. The general colour is duſky grey, with a rufous tinge above, and being tawny buff colour, deepeſt on the throat. The tail is of the ſame colour with the back for about one-fourth of its length, and from thence to the end black. It is conjectured that this may in reality be no other than the lemurine opoſſum, *Didelphis lemurina.*

Ursina. Yellowiſh, with the upper lip bifid. Shaw Gen. Zool.

A ſpecies of large ſize very lately diſcovered in New Holland.

It ſhould be laſtly obſerved, that Gmelin includes the kanguroo in the didelphis genus, under the ſpecific name of *gigantea*, a circumſtance that muſt have ariſen from inattention to the ſtructure and arrangement of the teeth and other eſſential characters, which at once remove that ſingular animal from the didelphis tribe. See Kanguroo.

DIDELTA, in *Botany*, (from δις, *double*, and δελτα, the Greek letter Δ, in alluſion to the form of the fructifying diſk, which reſembles one equilateral triangle within another;) L'herit. Stirp. t. 28. Ait. Hort. Kew. v. 3. 256. Schreb. 590. Willd. Sp. Pl. v. 3. 2262. Juſſ. 182. Lamarck t. 705. Claſs and order, *Syngeneſia polygamia-fruſtranea.* Nat. Ord. *Corymbiferæ, Sect.* 2. Juſſ.

Gen. Ch. *Cal.* the common one double: outermoſt in three deep, ovate, widely-ſpreading ſegments; inner in 11 or 12 unequal, linear-lanceolate, pointed, ſpreading ſegments, alternately ſmaller. *Cor.* compound, radiated: florets of the diſk hermaphrodite in ſtructure, numerous, funnel-ſhaped, five-cleft; thoſe in the central triangle in effect barren, the ſurrounding ones fertile: florets of the radius 11 or 12, female, but abortive, ligulate, with three or four teeth, longer than the calyx, and oppoſite to its twelve internal ſegments. *Stam.* Five in all the florets of the diſk; filaments capillary, very ſhort; anthers united into a tube: in thoſe of the radius ſolitary and obſolete. *Piſt.* Germen in the external florets of the diſk oblong, compreſſed, immerſed in the receptacle; ſtyle thread-ſhaped; ſtigma cloven, revolute: in the central ones the germen is minute and roundiſh: in the marginal ligulate florets is ſcarcely the rudiment of any. *Peric.* None. *Receptacle* ſplitting into three portions, each of which has one large ſegment of the calyx, and ſome of the ſmaller inner ones, adhering to it, and contains ſeveral ſeeds in its cells. *Seeds* none, either in the central or radiant florets; in the external florets of the diſk oblong; down ſhort, ſimple, rigid. The common receptacle is triangular, divided into four triangular parts, of which the central one is naked, the reſt fungous and briſtly. Eſſ. Ch. Receptacle briſtly, triangular; its centre triangular and barren. Down of many ſcales. Outer calyx in three deep ſegments; inner in many. 1. D. *carnoſa.* Ait. Hort. Kew. v. 3. 256. Willd. Sp. Pl. v. 3. 2262. (D. tetragoniæfolia; L'herit. Stirp. Nov. 55. t. 28. Polymnia carnoſa; Linn. Suppl. 384. Choriſtea carnoſa; Thunb. Prod. 163.) Succulent-leaved Didelta. "Leaves alternate, lanceolate-oblong, fleſhy." Grows at the Cape of Good Hope in ſandy ground. It was ſent to Kew garden in 1774, by Mr. Maſſon, and is kept in the green-houſe, flowering in July. Stem ſhrubby, branched, angular, ſpreading. Leaves from an inch to two inches long, thick and juicy, entire, obtuſe, ſomewhat downy beneath. Flowers on long, ſimple, ſolitary, terminal ſtalks, large and handſome, yellow or orange. Calyx with prickly teeth. 2. D. *ſpinoſa.* Ait. Hort. Kew. v. 3. 256. Willd. Sp. Pl. v. 3. 2262. (Polymnia ſpinoſa; Linn. Suppl. 384. Choriſtea ſpinoſa; Thunb. Prod. 163.) Oppoſite-leaved Didelta. "Leaves oppoſite, ovate, half claſping the ſtem." Found at the Cape of Good Hope, by Thunberg

Thunberg and Maſſon, the latter of whom ſent it to Kew, in 1774. It flowers in June and July, and requires the ſhelter of a green-houſe. Hort. Kew. "Stem ſhrubby, erect. Leave broad-ovate ſomewhat heart-ſhaped, ſmooth, with prickles above their inſertion. Calyx entire; the outermoſt of 5 leaves or ſegments." Linn.

DIDEROT, Denys, in *Biography*, an eminent French writer, was ſon of a cutler at Langres, where he was born in 1713. He was educated among the Jeſuits, who, finding him a youth of excellent talents, were very deſirous of retaining him in their ſociety, but he was ill inclined to adopt the eccleſiaſtical profeſſion, and his father ſent him to Paris to finiſh his ſtudies, intending to bring him up to the buſineſs of the law. Literature, however, was his delight, and ſo intent was he in improving his mind, that he neglected the duties of his ſituation. His father was offended at his conduct, and refuſed, for ſome time, to continue his uſual ſupport. But he had a mind calculated to riſe above trifling obſtacles, and continued his ſtudies in phyſics, geometry, and metaphyſics; in theſe and in the belles lettres he made very conſiderable progreſs. When he was about thirty years of age he commenced author, and one of his earlieſt publications was a tranſlation of "Stanyan's Hiſtory of Greece" from the Engliſh. In 1745, he publiſhed a ſmall work, entitled "Principles of Moral Philoſophy," and in the following ſpring he publiſhed his "Penſées Philoſophiques," by which he obtained conſiderable celebrity. From this period he was received as a diſciple of the new philoſophy; and became at length one of its ableſt advocates. He republiſhed his "Penſées" under the title of "Etrennes aux Eſprits forts," when it was very generally circulated, and contributed much to the prevalence of thoſe opinions for which France has the laſt half century been diſtinguiſhed. It was at this period that Diderot, in conjuncture with d'Alembert, laid the foundation of the "Dictionaire Encyclopedique," which was intended not only as a magazine of every ſpecies of human knowledge, but as an engine to ſubvert all eſtabliſhed opinions. The firſt edition of this work was publiſhed between the years 1751 and 1767, in 28 vols. folio. To this, as editor, Diderot gave the labour of almoſt twenty years, but allowing himſelf time for the publication of many ſeparate works; of which, ſome have done credit to his talents, and others, particularly his "Bijoux Indiſcreets," have injured his reputation, and have been highly injurious to the morals of his countrymen. His writings have been characterized, and juſtly, as "containing a glaring mixture of good and bad, of brilliant thoughts, and obſcure reaſoning; of ſentences that dart from the imagination with the energy of lightning; and cloudy periods of metaphyſical rhetoric, that convey either no ideas, or falſe ones. This great dictionary, though very popular, did not remunerate the editors for the time and labour which it occupied. Diderot was obliged, when it was finiſhed, to ſell his library; he fortunately met with a liberal purchaſer in the empreſs of Ruſſia, who paid him 50,000 livres for it, and left him the uſe of it during life. She and the great Frederic were the avowed diſciples of the French ſchool. This able writer on mathematics, mechanics, arts, and manufactures, all which he had explored, extended his inquiries and reflections to muſic: and while M. Bemetzrieder, a diſciple of Schobert, was teaching his daughter on the piano-forte, M. Diderot contrived generally to be preſent at the lecture, and drew up, in dialogues between maſter and ſcholar, the moſt pleaſing and clear elementary treatiſe on the principles of muſic, and the art of performing on that inſtrument, which has perhaps ever been printed in any language.

The dialogue is as lively as in the beſt written comedies. Among his miſcellaneous works there is an excellent eſſay on acouſtics. His knowledge, perſeverance, and acquirements, ſeem to have been unlimited.

He, d'Alembert, the abbé Arnauld, and M. Suard, were among the firſt in France to feel the ſuperior merit of Italian muſic, over the old French ſtyle of Lulli and Rameau, which contributed much to its diſgrace whenever an opportunity offered for a parallel. Unfortunately, Diderot was as confirmed a philoſopher as Voltaire, which, when generally known, cauſed the doors of almoſt all the great academies in Europe to be ſhut againſt him, and prejudiced the friends of religion againſt his other writings, however excellent. During the muſical reform that was attempting in France, he made remarks and reflections on the ſubject, ſufficient to fill a 4to. vol. which ſtill remains in manuſcript, and in the hands of the writer of this article, to whom he preſented them more than thirty years ago, but little uſe has been made of theſe remarks hitherto; yet in the courſe of drawing up the muſical articles for the preſent Cyclopædia, they will not be forgotten. Diderot died ſuddenly, as he was riſing from table, in July, 1784.

DIDIER, Saint, in *Geography*, a ſmall town of France, in the department of the Rhone, 3 miles from Lyons; alſo a ſmall town of France, in the department of the Loire, not far from St. Etienne.

Didier, *Saint, et la Séauve*, a ſmall town of France, in the department of the Upper Loire, diſtrict of Yſſengeaux, chief place of a canton, with a population of 3175 individuals. The canton has 7 communes, and 10,458 inhabitants, upon a territorial extent of 152½ kiliometres.

DIDIUS Julianus, *M. Salvius Severus*, in *Biography*, a Roman emperor, who, in early life, had been employed in public ſtations, and who, A. D. 179, was made conſul with Pertinax. In the reign of Commodus he was accuſed of ſome ſtate offences, of which he was acquitted; but whether on account of his innocence, or by means of his wealth, does not appear. At that period of the empire almoſt every thing was attainable by riches. Julian had accumulated a prodigious ſum, to which he owed his elevation to the throne. When Pertinax was dethroned and murdered, the ſoldiers reſolved that the crown ſhould be transferred to the higheſt bidder. The news quickly ſpread over the city, and reached the ears of Didius Julianus, who, regardleſs of the public calamities, was indulging himſelf in all the luxuries that his wealth could command. His wife and his daughters, his freedmen and his paraſites, eaſily convinced him that he deſerved the throne, and conjured him to embrace the favourable opportunity. He immediately repaired to the camp, where Sulpicianus had already began to bargain with the ſoldiers. Didius in an inſtant made a large advance upon his offer, and raiſed the bribe to 200*l.* ſterling *per* man. The gates of the camp were inſtantly thrown open to the purchaſer; he was declared emperor, and received the oath of allegiance from the ſoldiers, who retained ſo much humanity as to ſtipulate that he ſhould pardon and forget the competition of Sulpicianus. The Prætorians placed their new ſovereign in the centre of their ranks, ſurrounded him on every ſide with their ſhields, and conducted him in cloſe order of battle through the deſerted ſtreets of the city. The ſenate was commanded to aſſemble, who, through fear, ratified the infamous tranſactions. They congratulated their own, and the public felicity; engaged their allegiance, and conferred on the new emperor all the branches of imperial power. He was next conducted to the palace, where he beheld the abandoned trunk of Pertinax, and the frugal entertainment that had been prepared for his ſupper. The one he viewed with apparent indifference, the other with contempt. A banquet was prepared by his order, and he amuſed himſelf till a late hour, with dice, and the performances of a celebrated dancer.

dancer. It was obſerved, that when left to darkneſs, ſolitude and himſelf, he paſſed a ſleepleſs night, reflecting on the dangerous tenure of an empire that had not been acquired by merit, but purchaſed by money. "He had," ſays the eloquent hiſtorian, "reaſon to tremble. On the throne of the world he found himſelf without a friend, and even without an adherent. The guards themſelves were aſhamed of the prince whom their avarice had perſuaded them to accept, nor was there a citizen who did not conſider his elevation with horror, as the laſt inſult of the Roman name." The people refuſed the proffered liberality of the emperor; inſulted his perſon, and waited with anxiety for the armies in the diſtant provinces, as avengers of the public wrongs. The approach of Severus, who had been declared emperor by the Pannonian legions, ſoon brought on the criſis of his fate. He was deteſted by the Prætorians; was formally depoſed, and ſentenced to death. He met with no compaſſion, but ended, like a common malefactor, his wretched reign of ſixty-ſix days, at the age of ſixty. Gibbon.

DIDO, in *Fabulous Hiſtory* and *Mythology*, the ſurname of the princeſs Eliſa, who is ſaid to have founded Carthage. She was the daughter of Belus II. king of Tyre, in Phœnicia. When her brother Pygmalion aſcended the throne after the death of his father, and Eliſa was married to Sicharbas, the prieſt of Hercules, his mother's brother, who was immenſely rich; the dread of Pygmalion's avarice induced them to keep ſecret this great wealth. Pygmalion, however, conjecturing that that was the caſe, cruelly murdered the huſband of his ſiſter. Eliſa, diſſembling her reſentment, and profeſſing her deſire to leave a place where her grief was renewed, took up her abode with Pygmalion. The king, preſuming that ſhe would bring with her the treaſure of her huſband, ſent her a ſhip and convoy; but before ſhe ſet ſail, ſhe artfully contrived to lodge in the ſhip ſome bales loaded with ſand; and having reported that ſhe was going to ſacrifice to the manes of her huſband what ſhe chiefly valued, ſhe took an opportunity of throwing theſe bales into the ſea; and then told the ſoldiers, who accompanied her, that they contained the money of Sicharbas, and that they had no alternative for their own ſafety but that of flying with her; for as ſoon as Pygmalion found that they were come without the expected treaſure, he would put them all to death. Accordingly they firſt landed in Cyprus, whence Dido carried off 50 young virgins, whom ſhe gave in marriage to the companions of her expedition. They were afterwards driven by the winds on the coaſt of Africa, where this princeſs erected a citadel, near which Carthage was afterwards built. It has been ſaid by fabulous tradition, that Dido bought of the inhabitants of the country as much ground as a bull's hide would encloſe; and that ſhe cut this into a great number of thongs, which encompaſſed a ſpace of ground ſufficient for the ſite of a citadel, which was hence called *Byrſa*, *i. e.* a bull's hide; and it has been farther ſaid, that in digging the foundation, they found a horſe's head, which preſaged its future grandeur. See CARTHAGE.

After the Phœnicians, whom Dido led into this part of Africa, had made their ſettlement there, they attempted to compel the princeſs to marry Iarbas, king of Mauritania: but ſhe diſappointed their views, by firſt erecting a funeral pile, as if by ſome ſacrifice ſhe intended to appeaſe the manes of her former huſband, and afterwards putting an end to her life with a poniard. From this action, it is ſaid, ſhe obtained the name of Dido, importing *valiant woman*: but Virgil, by a ſtrange reverſe of hiſtory, repreſents her as being ſo much in love with Æneas, that his departure drove her to deſpair. But it is remarkable, that he makes an anachroniſm of almoſt 300 years, as there is no leſs an interval between Æneas and Dido; for, notwithſtanding a variety of opinions about the time in which ſhe lived, it is generally agreed that it was later than that of the Trojan heroes by ſome ages: Troy having been taken in the time of the judges, and Pygmalion, Dido's brother, having been born in the reign of Joram, king of Judah, about 889 years B.C. Accordingly Bochart makes Dido to have been aunt to the famous Jezebel, whom Ahaz married, and who brought ſo many calamities upon the kingdom of Iſrael. Moreover, Dido left the kingdom of Tyre in the 7th year of Pygmalion's reign, about 300 years after the taking of Troy, and between eight and nine hundred years B. C. After her death her ſubjects aſcribed to her divine honours and paid her religious worſhip. Sir Iſaac Newton, in his Chronology, repreſents Æneas and Dido as contemporaries in the year 883, B. C.; when, as he ſays, Dido built Carthage, and he ſtates the capture of Troy to have happened in the year 904 B.C., which others refer to 1184 B. C.

DIDRACHM, from δις, *double*, and δραχμα. See DRACHM.

DIDUGUA, in *Ancient Geography*, a town of Aſia, in Babylonia.

DIDURI, a people of Aſiatic Iberia, according to Pliny. Ptolemy places them in Sarmatia, in the vicinity of the Caſpian ſea.

DIDUS, in *Ornithology*, a genus of the gallinaceous tribe. The bill is ſtraightened in the middle with two tranſverſe wrinkles, and both mandibles are bent in at the tip; the noſtrils are placed obliquely near the edge of the middle of the bill; face naked beyond the eyes; legs ſhort, thick; feet cleft; wings unfit for flight. DODO.

Species.

INEPTUS. Greyiſh; wings and tail cinereous yellow; head hooded. *Didus ineptus*, Linn. *Raphus*, Briſ. *Cygnus cucullatus*, Raii. *Hooded Dodo*, Lath. Edw. &c.

The exiſtence of this uncouth bird has been diſputed, though not in our opinion with ſufficient reaſon, for although this curious creature has not been ſeen by any modern traveller, or naturaliſt, the evidence of thoſe reſpectable authors who deſcribed it in the early part of the 17th century, ought not to be rejected. The Dutch are ſaid to have found it in the iſle of Mauritius, and to have given it the name of Dodaerts, and Walgh-vogel; the name Dodo is that by which the Portugueſe diſtinguiſhed it, and the French called it Cygne à capuchon, and autruche encapuchonnée, but the name under which it was firſt noticed by them is Dronte.

In Herbert's travels, publiſhed in 1634, an account of this bird is inſerted, accompanied by a rude and indifferent figure, under the name of Dod-eerſen. He informs us that "it ſeldom weighs leſs than fifty pounds. The bill is hooked and bent downwards; the thrill, or breathing-places in the midſt; from which part, to the end, the colour is of a light-green, mixed with pale yellow; eyes round and bright; has fine down inſtead of feathers; the train (like to a China-beard) is no more than three or four ſhort feathers; the head variouſly dreſſed, one-half being hooded with down of a dark colour, the other half naked, and of a white hue, as if lawn were drawn over it; the legs thick and black, and the talons great. The pace, he ſays, is ſlow, and the body round and fat; by ſome eaten as meat, but more pleaſureable to look than feed upon, and her ſtomach ſo fiery that it can eaſily digeſt ſtones; in that ſhape not a little reſembling the oſtrich." A painting of this bird is preſerved in the Britiſh muſeum, to which Edwards is indebted for the following deſcription, and from which alſo the various figures of the Dodo, in that, and later publications, are evidently copied.

According to Edwards, this bird is rather larger than the ſwan, and nearly three feet in length. The bill is ſtrong, large, and hooked at the end; the gape ſtretches beyond the eyes, and is of a pale blue colour, except the end of the upper mandible, which is yellowiſh, and a red ſpot on the bend of it; the end of the lower blackiſh; irides white; the general colour of the plumage cinereous, and ſoft to the touch; the belly and thighs whitiſh; the head large, and ſeems as it were covered with a black hood or cowl; the wings are very ſhort, and of a yellowiſh aſh-colour; the tail-feathers curled, ſtand upon the rump, and incline to yellow, like the wings; the legs have four toes, three before, and one behind, and are very ſtout, ſhort, and yellowiſh, and armed with black claws.

Gmelin affirms that the didus or dodo family has no tail; the caudal feathers are certainly not placed at the extremity of the body as in other birds, but conſiderably higher upon the back, and aſſuredly from their ſituation rather deſerve the epithet of a dorſal tuft than tail. The ſame writer obſerves alſo that the hooded dodo has no claws or toe-nails: upon what authority this writer ſpeaks we cannot preſume to determine, but the ſame aſſertion has been ſince made by Sonnini. We are aware that an opinion did prevail to this effect, till the recent diſcovery made in the Britiſh Muſeum, of the legs of a large bird, conjectured to be thoſe of the hooded dodo, and which appear, at leaſt for the preſent, to diſcountenance that idea, the toe-nails in thoſe relics being not only viſible but very conſpicuous.

Solitarius. Varied grey and brown; wings ſhort and terminating in a rounded knob. Lath. *Didus Solitarius*, Gmel. —*Le Solitaire*, Buff.—Solitary Dodo.

Nearly as large as the former. This ſpecies is an inhabitant of the iſle of Rodrigue, where it is not uncommon, but never appears in large flocks, ſcarcely more than two being ever found together: it makes its neſt in retired places of the leaves of the palm, about eighteen inches in thickneſs, and lays one egg, which is larger than that of the gooſe. The male ſits in his turn, or ſtands on the watch, and will not ſuffer any bird to approach within a moderate diſtance of the neſt while the hen is ſitting, which continues for ſeven weeks. They are chaſed in the winter ſeaſon between March and September, being then very fat, and the young birds in particular much eſteemed at that time for the table.

This bird bears ſome reſemblance to the turkey; the legs are as in that bird, but longer, and the bill is more bent in proportion. The neck is of a proportionable length, and the eyes black and lively: the general colour of the plumage is grey and brown mixed, and it has ſcarcely any tail: the wings are too ſhort for flight, and the hind parts are rounded like a horſe's rump, and clothed with feathers. The females are ſometimes covered with brown and light yellow feathers, and appear very beautiful. This ſex has a kind of widow's peak above the bill; and the feathers on each ſide enlarge into two white tufts: the feathers of the thighs are rounded at the end like ſhells, and this conſtitutes the principal character of the ſpecies.

Nazarenus. Body entirely downy and black. Lath. —*Didus nazarenus*, Gmel.—*Oiſeau de Nazareth*, Buff.—Nazarine Dodo.

This is rather larger than the ſwan: the bill is a little bent downwards and large; and inſtead of feathers the whole body is covered with a black down: the wings conſiſt of feathers, and there are ſome frizzled feathers upon the rump which ſupply the place of a tail: the legs are long and ſcaly, and, unlike the two former birds, there are only three toes on each foot inſtead of four.

The ſpecies was met with in the iſle of France, and is deſcribed by Caiſche a French writer. This bird forms its neſt of leaves and dry herbs in the foreſts on the ground, and lays only a ſingle egg, which is large and white.

DIDWANA, in *Geography*, a town of Hindooſtan, in the country of Agimere; 30 miles N. E. of Nagore, and 51 N. of Agimere.

DILYMA, a fountain of Greece, in Theſſaly.—Alſo, two ſmall iſlands; near that of Scyros.—Alſo, one of the Æolian iſles near Sicily.—Alſo, a town of Africa in Libya.

DIDYMÆUS, in *Mythology*, an appellation given to Apollo.

DIDYMANDRA, in *Botany*, (from διδυμος, *a twin*, and ανηρ, *a man*, in alluſion to the two anthers upon one filament.) Willd. Sp. Pl. v. 4. 971. (Synzyganthera, Ruiz. and Pavon. Prodr. 137. t. 30.) Claſs and order, *Polygamia Monœcia*; Willd. Nat. Ord. *Amentaceæ*.

Eſſ. Ch. Catkin cylindrical, with imbricated ſcales, bearing united as well as female flowers.

United Fl. Cal. deeply four-cleft. Cor. deeply four-cleft. Filament ſolitary, bearing two anthers at its ſummit. Germen ſuperior. Styles three, very ſhort. Berry with three cells. and three ſeeds.

Female, Cal. and Cor. with Styles and Berry as in the former.

1. D. *purpurea*. Willd. (Synzyganthera purpurea; Ruiz. and Pavon. Syſt. Veg. Fl. Peruv. v. 1. 273.) A native of umbrageous woods in Peru. The tree is ſaid by the Spaniſh botaniſts to be near forty feet high, with oblong-lanceolate pointed leaves. From them Willdenow has adopted the above characters, very properly changing their uncouth name, as it had not as yet found its way into any book in common uſe.

DIDYMELES, (from διδυμος, *a twin*, and μηλις, *an apple*, becauſe, as we preſume, the fruit grows in pairs.) Aubert Hiſt. Inſ. Afr. 23. t. 3. Willd. Sp. Pl. v. 4. 648. Claſs and order, *Diœcia Monandria*. Nat. Ord. *Amentaceæ*?

Eſſ. Ch. Male, Flowers in pairs, joined at the baſe. Cal. a ſcale. Cor. none. Anther ſeſſile.

Female, Fl. in pairs, joined at the baſe. Cal. a ſcale. Cor. none. Style none. Stigma of two lobes. Drupa with one ſeed.

1. D. *madagaſcarenſis*. Willd. loc. cit.

"A tall tree, found in Madagaſcar. The leaves are alternate, ſtalked, oblong, tapering at the baſe, entire, veiny. Male flowers panicled, female ones ſpiked. Flowers always in pairs." Willd.

DIDYMI, Διδυμοι, the ſame with *gemelli*, or *twins*.

Didymi, in *Ancient Geography*, mountains of Greece, in Theſſaly.—Alſo, a gulf of the iſle of Crete.

DIDYMODON, in *Botany*, an Hedwigian genus of moſſes, the teeth of whoſe fringe are approximated in pairs. It is referred by Dr. Smith to *Trichoſtomum*, which ſee.

DIDYMOTICHOS, in *Ancient Geography*, a ſmall town of Thrace, near the river Hebrus.—Alſo, a place of Aſia Minor, in Caria.

DIDYMUS, in *Biography*, a grammarian of Alexandria, who flouriſhed in the age of Auguſtus, and who is celebrated for having compoſed nearly four thouſand books, none of which have come down to us. Seneca ſpeaks of the ſubjects which Didymus diſcuſſed as trifling in themſelves, or, as he ſays, ſubjects which are forgotten, or which ought to be forgotten if they were known.

Didymus, of Alexandria, preſident of the catechetical ſchool in that city, flouriſhed in the fourth century. When he was but four years old he loſt his ſight, yet ſo vigorous and intenſe was his application, that he became deeply learned in many branches of ſcience. As he advanced in life he diligently ſtudied the ſcriptures of the Old and New Teſtament, on which he wrote ſeveral judicious and learned com-

mentaries, and ſo converſant was he in controverſial theology and eccleſiaſtical hiſtory, that, from his ſuperior merit only, he was elected to fill the chair of the Alexandrian ſchool. St Jerome and other celebrated characters were among his ſcholars, who never loſt an opportunity of ſpeaking loudly of the pre-eminence and learning of their maſter. Jerome pronounced him to be the moſt learned man of the age, and Palladius affirms that he ſurpaſſed all the ancients in the extent and variety of his knowledge. He was author of many learned works, of which one only has reached us; *viz.* "A Treatiſe on the Holy Spirit," tranſlated into Latin by his ſcholar, St. Jerome, and inſerted among the works of that father.—Moreri. Lardner.

Didymus, an eminent muſician of Alexandria, and, according to Suidas, cotemporary with the emperor Nero, by whom he was much honoured and eſteemed. This proves him to have been younger than Ariſtoxenus, and more ancient than Ptolemy, though ſome have imagined him to have preceded Ariſtoxenus. He wrote upon grammar and medicine, as well as muſic; but his works are all loſt, and every thing we know at preſent of his harmonical doctrines is from Ptolemy, who, by diſputing, preſerved them. However, this author confeſſes him to have been well verſed in the canon and harmonic diviſions, and if we may judge from the teſtimony even of his antagoniſt, he muſt have been not only an able theoriſt in muſic, but a man of conſiderable learning. As this muſician preceded Ptolemy, and was the firſt who introduced the minor tone into the ſcale, and, conſequently, the practical major 3d $\frac{4}{5}$, which harmonized the whole ſyſtem, and pointed out the road to counterpoint, an honour that moſt critics have beſtowed on Ptolemy, he ſeems to have a better title to the invention of modern harmony, or muſic in parts, than Guido, who appears to have adhered, both in theory and practice, to the old diviſion of the ſcale into major tones and limmas.

"The beſt ſpecies of diapaſon," ſays Doni, "and that which is the moſt replete with fine harmony, and chiefly in uſe at preſent, was invented by Didymus. His method was this: after the major ſemitone E F $\frac{16}{15}$, he placed the minor tone in the ratio of $\frac{10}{9}$, between F G, and afterwards the major tone $\frac{8}{9}$ between G A; but Ptolemy, for the ſake of innovation, placed the major tone where Didymus placed the minor." Ptolemy, however, in ſpeaking of Didymus and his arrangement, objects to it as contrary to the judgment of the ear, which requires the major tone below the minor. The ear certainly determines ſo with us: is it not therefore probable, that in Ptolemy's time the major key was gaining ground? Upon the whole, however, it appears, that theſe authors only differ in the order, not the quality of intervals.

Didymus, in *Ancient Geography*, a mountain of Aſia Minor, named *Dindyma* by Steph. Byz. Herodotus places here the ſource of the river Hermus.

Didymus, or *Didymi*, mountains of Arabia Felix, in the country of the Sachalites. Ptolemy.

DIDYNAMIA, in *Botany*, (from δις, and δυναμις, *power*, implying the ſuperiority of two ſtamens over the reſt,) the 14th claſs of the Linnæan artificial ſyſtem, but which is in itſelf a natural claſs, or nearly ſo, comprehending almoſt all the ringent and perſonate flowers. Its character conſiſts in having four ſtamens, two of which are longer than the other two. The natural character of the flowers is as follows. *Cal.* Perianth of one leaf, erect, tubular, permanent, five-cleft, more or leſs irregular or unequal. *Cor.* of one petal, erect, irregular, its tube ſecreting or containing honey; its limb uſually two-lipped and ringent. *Stam.* Filaments four, linear, parallel, inſerted into the tube, moſtly curved, according to the direction of the upper lip, ſometimes divaricated as they fade; anthers cohering in pairs, moſtly overſhadowed by the upper lip. *Piſt.* Germen almoſt always ſuperior; ſtyle ſimple, except in *Perilla*, thread-ſhaped, parallel to and between the filaments, and ſlightly curved like them; ſtigma uſually bifid. *Peric.* either wanting, as in the firſt order, where the calyx ſupplies its place; or capſular, ſometimes pulpy, and moſtly of two cells. *Seeds* if naked four, except in *Phryma;* if covered generally very numerous. The orders of this claſs are two: 1. *Gymnoſpermia*, in which the ſeeds are naked. Of this the plants are often aromatic, and never poiſonous. 2. *Angioſpermia*, ſeeds in a ſeed-veſſel, in which are many beautiful, though ſeveral poiſonous and fœtid plants. In this order, and in the former, though much more rarely, the flowers occaſionally become regular and then have five equal ſtamens, as in ſeveral ſpecies of *Antirrhinum*, and ſome *Bignoniæ* and *Chelones*. S.

DIE. See Dye.

Die, *Dea Vocontiorum*, in *Geography*, a ſmall town of France, in the department of the Drôme, chief place of a diſtrict of the ſame name, ſituated in a fine valley on the river Drôme; 27 miles S. E. of Valence, 45 N. W. of Gap, 36 S. W. of Grenoble, and 450 S. by E. of Paris. Lat. 44° 44′. Its canton has a territorial extent of 430 kilometres, 15 communes, and 7975 inhabitants, of whom the town itſelf contains 3968.

As chief place of a diſtrict, Die has a ſub-prefect, a court of juſtice, and a regiſter-office. Mount Orel, in its neighbourhood, has a ſpring of mineral water, which is conſidered as a ſpecific remedy againſt intermittent fevers.

The ſoil of the diſtrict of Die is mountainous and not very fertile: it produces, however, ſome corn, and has good orchards. The paſtures are favourable for the rearing of cattle. There are a few manufactures of woollen and linen cloth. The whole diſtrict counts nine cantons, 117 communes, and 58,090 inhabitants, upon a territorial extent of 2430 kiliometres.

Die, *Saint*, in Latin *Sanctus Deodatus*, a ſmall town of France, in the department of the Voſges, chief place of a diſtrict of the ſame name, ſituated on the river Meuſe, which runs through the town: 30 miles W. of Scheleſtat, 36 S. E. of Luneville. Lat. 48° 20′. The extent of its canton is 225 kiliometres; it has 22 communes, and 14,925 inhabitants, 5346 of whom inhabit the town. St. Dié has a ſub-prefect, a court of juſtice, and a regiſter office.

The plains in this diſtrict produce rye, oats, millet, and potatoes; the mountains are covered with foreſts of pine. The paſtures are good, and there is fine flax grown, of which the inhabitants make excellent linen cloth, tape, and thread; which articles, together with cattle, iron, hardware, jewellery, timber, and firewood, conſtitute their principal trade. There are copper mines at Luſſe, Fraize, and Lubirce, lead and ſilver mines at La Croix, and an iron mine at the foot of a mountain called the Donon. At Chipal there are alſo ſeveral kinds of mines, and a fine quarry of variegated marble. The diſtrict of St Dié has a territorial extent of 1515 kiliometres, nine cantons, 108 communes, and 75,298 inhabitants. —Alſo a ſmall town of France, in the department of the Puy-de-Dôme, chief place of a canton, in the diſtrict of Clermont, with a population of 1200 individuals. The canton has 10 communes and 12,727 inhabitants, upon a territorial extent of 177½ kiliometres.—Alſo, a ſmall town of France, on the river Loire, in the department of Loire and Cher, 12 miles E. of Blois.

DIEBACH, a town of the duchy of Luxemburg; four miles W. S. W. of Luxemburg.

DJEBAIL, the ancient *Byblos*, a town of Syria, the moſt

moſt conſiderable in the country of Keſraouan, which extends from Nahr-el-Kelb, paſſing by Lebanon, as far as Tripoli. It has not, however, above 6000 inhabitants. The ancient port reſembles that of Latakia, but is in a worſe ſituation; ſcarcely any traces of it remaining. The river Ibrahim, the ancient Adonis, two leagues to the ſouthward, has the only bridge to be ſeen, that of Tripoli excepted, from thence to Antioch. It has a ſingle arch, 50 feet wide, and upwards of 30 high; of an architecture, which appears to be the work of the Arabs.

DJEBAL, or HIGH-LANDS, one of the general diviſions of Yemen, in Arabia; the other being *Tehama*, or the Low-lands. The latter contains ſix of thoſe governments into which the kingdom of Sana is ſubdivided, and the former 24.

DIE'CKIRCH, a ſmall town of France, in the department of the Foreſts, (des Forêts) chief place of a diſtrict of the ſame name, on the river Sarre, with a population of 2513 individuals. Its canton has a territorial extent of 207½ kiliometres, 10 communes, and 8909 inhabitants.

As chief place of a diſtrict, Diéckirch has a ſub prefect, a court of juſtice, and a regiſter office. It contains many tan-yards, and ſome manufactures of woollen cloth. The vine grows on the hills in the neighbourhood of Vianden. There is a mine of very fine copper, the working of which is ſtopped for want of hands.

The whole diſtrict contains five cantons, 70 communes, and 38,128 inhabitants, upon a territorial extent of 1287½ kiliometres.

DIEDRAVA, a village of Ruſſia, on the road from St. Peterſburg to Moſcow; 361 verſts from St. Peterſburg.

DIEGO D'ALVAREZ, an iſland in the Southern Atlantic ocean, whoſe bearing and diſtance from the iſlands of Triſtan d'Acunha, according to the general chart of Capt. Cook's Third Voyage, are 38° 53′ S. and 13° W.

DIEGO *Garcia*, or CHAGOS, an African iſland in the Indian ſea. Rochon, in his "Voyage to Madagaſcar," ſays, that it is 12 leagues in circumference; and that its form reſembles a horſe-ſhoe. Its greateſt breadth is not above ¼ of a league: the ground, however, is ſufficiently elevated to ſerve as a fence and ſhelter to a vaſt reſervoir or canal, which affords ſpacious room to the moſt numerous fleets. This canal is four leagues long, and its main breadth about one league. Its excellent harbour has two entrances to the ſouth. The roads are very fine. He aſcertains its ſituation to be in S. lat. 7° 14′, and E. long. from Paris 68°.

DIEGO *de Ramirez*, an iſland near the coaſt of Terra del Fuego, S.S.W. of cape Horn. S. lat. 56° 39′. W. long. 68° 1¼′.

DIEGO *Rias*, or *Rodriguez*, an iſland of Africa, in the Indian ocean; 100 leagues E from the iſland of Mauritius, or iſle of France. S. lat. 19° 30′. E. long. 57° 32′.

DIEGO *Sourez*, an iſland in the Indian ſea, near the eaſt coaſt of the iſland of Madagaſcar.

DIEGO, *Cape*, *St.* the low point that forms the north entrance of the ſtrait of La Maire, on the eaſt coaſt of Terra del Fuego. S. lat. 54° 33′. W. long. 65° 14′.

DIELCYSTINDA, among the *Ancients*, a kind of exerciſe performed by boys, who, being divided into two parties, or ſides, each endeavoured to draw the other over to their ſide, and the party which prevailed gained the victory.

DIELE, in *Geography*, a river of European Turkey, which runs into the Pioth, near Czezora.

DIELETTE, a ſmall town of France, in the department of La Manche, with an inconſiderable harbour in the Engliſh channel, which was finiſhed in 1731; 5 miles S.W. of Cherbourg.

DIEM CLAUSIT EXTREMUM, in *Law*, a writ iſſued out of chancery to the eſcheator of the county, upon the death of any of the king's tenants *in capite*, to enquire, by a jury, of what lands he died ſeiſed, and of what value, and who was the next heir to him.

DIEMEN, ANTHONY VAN, in *Biography*, a governor of the Dutch Eaſt-India ſettlements, was born at Kuilenburg. He went, in early life, in a low military capacity to India, where he was chiefly employed in writing petitions for the ſoldiers. He was afterwards promoted to a poſt under government, which required ſome ſkill in accounts: hence he became a merchant, and afterwards accountant-general of the Dutch ſettlements in India. In 1625, he was appointed a member of the ſupreme council, and in 1631 he returned to Holland as commander of the India fleet. He remained but a few months in Europe, and when he went back to India many important offices devolved on him. In 1642, he ſent out two ſhips to explore the unknown countries to the ſouth, part of which, forming the ſouthern extremity of New Holland, was, in honour of him, diſtinguiſhed by the appellation of "Van Diemen's land." He died in April 1645, having held, with much reputation, the ſupreme power in India upwards of nine years. Gen. Biog.

DIEMEN, in *Geography*, a town of Holland; 4 miles S.E. of Amſterdam.

DIEMEN, *Straits of*, lie between the coaſt of Aſia, and the iſlands of Japan.

DIEMEN'S, or *Van Diemen's Land*, an iſland in the form of an oblong ſquare, about 160 Britiſh miles long, by half that breadth, ſeparated, by a ſtrait, or rather channel, more than 30 leagues wide, called, in recent maps, Baſs's ſtrait, and containing a chain of ſmall iſlands, running N. and S., from New Holland, ſo called by Taſman, in honour of the Dutch governor-general in the Eaſt Indies, who diſcovered it in November 1642. From that time, ſays capt. Cook, it had eſcaped all farther notice by European navigators, till captain Furneaux touched at it in March 1773; but he did not know at that time that capt. Marion, after having remained here for ſome time, ſailed from thence on the 10th of March 1772. It was again viſited by captain Cook in January 1777. The land is, for the moſt part, of a good height, diverſified with hills and vallies, and every where of a greeniſh hue. It is well wooded, and, if one may judge from appearance, ſays captain Cook, and from what we met with in Adventure bay, is not ill ſupplied with water. The beſt is a rivulet, which is one of ſeveral that fall into a pond, that lies behind the beach at the head of the bay. Fire-wood is to be obtained, with great eaſe, in ſeveral places. The only wind to which this bay is expoſed is the north-eaſt, which, blowing from Maria's iſlands, can bring no very great ſea along with it; and, therefore, this may be accounted a very ſafe road. The bottom is clean, good-holding ground; and the depth of water from twelve to five and four fathoms. The author has annexed a chart, which gives a better idea of this part of the coaſt than any deſcription. The following table will exhibit both the longitude and latitude at one view:

	Lat. S.	Long. E.
Adventure bay	43° 21′ 20″	147° 29′ 0″
Taſman's head	43 33 0	147 28 0
South cape	43 42 0	146 56 0
South-weſt cape	43 37 0	146 7 0
Swilly iſle	43 55 0	147 6 0

Adventure bay — Variation of the compaſs 5° 15′ E.; Dip. of the ſouth end of the needle 70 15½

The high water was, on the 29th of January, two days before the laſt quarter of the moon, at nine in the morning: the perpendicular riſe was then 18 inches; and there was no appearance of its ever having exceeded 2½ feet. The beautiful ſandy beach, at the bottom of Adventure bay, is about two miles long, and excellently adapted for hauling a ſeine,

a ſeine, which was repeatedly done with ſucceſs. The parts of the country adjoining the bay are quite hilly; and both theſe and the plain behind the beach, in which is a brackiſh lake, are an entire foreſt of very tall trees, rendered almoſt impaſſable by ſhrubs, brakes of ferns, and fallen trees; except on the ſides of hills, where the trees are thinly ſcattered, and intermixed with coarſe graſs. The ſoil on the low land, to the northward of the bay, is either ſandy, conſiſting of a white ſand-ſtone, which forms the Fluted cape, and bounds the ſhore, or conſiſts of a mould that is yellowiſh, or of a reddiſh hue. The ſame is found on the lower parts of the hills, and farther up, it is of a greyiſh caſt, and very poor. In the vallies there are ſome ſmall ſtreams; but the country appears to be naturally very dry. The heat alſo is great, as the thermometer ſtood at 64, 70, and once at 74 degrees; and birds were obſerved to putrefy in an hour or two after they were killed. The country has no minerals, nor, indeed, ſtones; and among its vegetable productions none were found that yielded the ſmalleſt ſubſiſtence to man. The foreſt trees are all of one ſort, growing to a great height, and generally ſtraight; and they ſeem to have ſome affinity to the *myrtus* of botaniſts. There are other ſmaller trees, and a variety of plants, which it is needleſs to enumerate. The only quadruped obſerved was a ſort of opoſſum, about twice the ſize of a large rat. However, the kanguroo is alſo an inhabitant of this part of the country, as the natives uſed pieces of its ſkin in their dreſs. Here are ſeveral ſorts of birds, which, being much haraſſed by the natives, who derive much of their ſubſiſtence from them, are very ſhy. In the woods the principal ſorts are large brown hawks or eagles, crows, yellowiſh parroquets, and large pigeons. On the ſhores were gulls and plovers. A few wild ducks were ſeen about the pond or lake behind the beach, and ſome ſhags were alſo obſerved. Some large blackiſh ſnakes were ſeen in the woods, and a lizard, 19 inches long and ſix round, elegantly clouded with black and yellow. The ſea was well ſtocked with various ſpecies of fiſh; but the elephant fiſh, or pejagallo, ſeemed to be the moſt numerous. Upon the rocks the muſcles and other ſhell-fiſh were plentiful; ſea-ſtars were numerous; ſponge, Meduſa's heads, and ſea-fuci were not uncommon. Of inſects there is a conſiderable variety. The inhabitants had little of that fierce or wild appearance, common to people in their ſituation; but ſeemed mild and cheerful, without reſerve, or jealouſy of ſtrangers. They appear to have little genius, or perſonal activity, either of mind or body; their greateſt ſkill is manifeſted in their manner of cutting their arms and bodies in lines of different lengths and directions, which are raiſed conſiderably above the ſurface of the ſkin, ſo that it is difficult to gueſs how they execute this embroidery of their perſons. Their colour is a dull black, and not quite ſo deep as that of the African negroes. Their hair is perfectly woolly, and it is clotted or divided into ſmall parcels, like that of the Hottentots, with ſome ſort of greaſe, mixed with a red paint or ochre, which they ſmear in great abundance over their heads. Their noſes, though not flat, are broad and full. The lower part of the face projects conſiderably; their eyes are of a middling ſize, with the white leſs clear than in ours; and though not remarkably quick or piercing, they gave a frank cheerful caſt to the whole countenance. Their teeth are broad, not equal nor well ſet; their mouths are rather wide; their beards are long, and clotted, like their hair, with paint. In other reſpects they are well proportioned; though the belly is rather projecting. Their habitations are wretched huts, formed of ſticks, apparently ſerving for a temporary purpoſe; but many of their largeſt trees were converted into more comfortable dwellings. The trunks of theſe were hollowed out by fire, to the height of ſix or ſeven feet, and in theſe hollows they took up their abode. The inhabitants of this part of the country are ſprung, without doubt, from the ſame ſtock with thoſe of the northern parts of New Holland; and the difference may be accounted for by diſtance of place, entire ſeparation, diverſity of climate, and other concurring circumſtances. But there is not the leaſt reſemblance in their language, a circumſtance which cannot be eaſily accounted for.

The natives approached our navigators, who had landed, without betraying any ſymptoms of fear, or rather, with the greateſt confidence imaginable. Labillardiere (ubi infra) aſcribes the gentleneſs with which they behaved to Capt. Cook and his companions to the dread of European fire-arms, excited by Capt. Marion's being under the neceſſity of uſing theſe arms againſt them. They were quite naked, and wore no ornaments, if we except the punctures and ridges already mentioned. They received every preſent that was made to them without the leaſt appearance of ſatisfaction, and they indicated a degree of ſtupidity. They ſeemed to ſet no value on iron or on iron tools; and they were even ignorant of the uſe of fiſh hooks. Some of them wore, looſe, round their necks, three or four folds of ſmall cord made of the fur of ſome animal; and others of them had a narrow ſlip of the kanguroo ſkin tied round their ancles. The females wore a kanguroo ſkin, juſt as it came from the animal, over the ſhoulders, and round the waiſt; but its only uſe ſeemed to be to ſupport their children, when carried on their backs; but it did not cover thoſe parts which the inhabitants of moſt nations conceal. The bodies of the women were marked with ſcars like thoſe of the men; but though their hair was of the ſame colour and texture, ſome of them had their heads completely ſhorn or ſhaved: others had this operation performed only on one ſide, while the reſt had the upper part of the head ſhorn cloſe, leaving a circle of hair all round, ſomewhat like the tonſures of the Romiſh eccleſiaſtics. The women rejected offers of addreſſes and preſents with diſdain: either from a ſenſe of delicacy and virtue, or from a fear of diſpleaſing their men. That this gallantry was not very agreeable to the latter was certain; becauſe an elderly man, as ſoon as he obſerved it, ordered all the women and children to retire, which they obeyed, though on the part of ſome not without reluctance. (Cook's Third Voyage, vol. i.) Of this iſland we have had ſome additional information by Mr. Collins, Capt. Flinders, as well as Labillardiere. The ſouth-weſt cape of Van Diemen's land, according to Mr. Collins, (Account of the Engliſh Colony in New South Wales, vol. ii. 1804,) is a narrow piece of land, projecting from the higher land at no great diſtance, with two flattiſh hummocks, reſembling the Ram Head, near Plymouth. The ſouth-weſt and ſouth capes lie nearly eaſt and weſt of each other, and are diſtant about 15 leagues. The intermediate coaſt forms the ſouthern boundary of Van Diemen's land. The extremity preſents a rugged and determined front to the icy regions of the ſouth pole, and like that of Terra del Fuego, ſeems once to have extended farther ſouth than it does at preſent. Its extraordinary elevation and irregular form entitle it to rank among the foremoſt of the grand and wildly magnificent ſcenes of nature. Lofty ridges of mountains, bounded by tremendous cliffs, project from two to four miles into the ſea, at nearly equal diſtances from each other, with a breadth varying from two miles to two and a half. The heights or bays lying between them are backed by ſandy beaches. Theſe vaſt buttreſſes appear to be the ſouthern extremities of the mountains of Van Diemen's land, which have, very probably, projected into the ſea far beyond their preſent abrupt termination, and have been united with the now detached

tached land, De Witt's iſles, ſo named, probably, by Taſman, which are twelve in number, and of various ſizes. The two largeſt are from three to four miles in circuit, with ſteep ſides, but with height inferior to that of the main: the largeſt is the loweſt. Their aſpect, like that of the main, beſpeaks extreme ſterility. After paſſing ſeveral places of ſmaller note, they entered Herdſman's cove; above which they went up the Derwent river in a boat. As they advanced, Mr. Baſs and his companion found the ſtream was 230 yards broad, and three fathoms deep. Here they met with a man, with hair which they did not think to be woolly, armed with two ſpears, very ill made, of ſolid wood. His aſpect was frank and open, and led them to form a favourable opinion of the diſpoſition of the inhabitants of the country in general. From various appearances they concluded, that the natives drew the principal part of their food from the woods; the bones of ſmall animals, ſuch as opoſſums, ſquirrels, kanguroos, rats, and bandicoats, were numerous round their deſerted fire-places, and the two ſpears juſt mentioned were ſimilar to thoſe uſed for hunting in other parts. No canoes were ever ſeen, nor any trees ſo barked as to anſwer the purpoſe of their conſtruction. Upon comparing Van Diemen's land with New South Wales, Mr. Baſs gives the preference, with regard to fertility of ſoil, to the former. Both countries reſemble one another in being amply furniſhed with water for the purpoſes of life; but in being deficient with reſpect to thoſe larger ſtreams, which ſerve to facilitate the operations of man, and convey commerce to the door of almoſt every inland farmer.

Captain Flinders, in his "Obſervations on the Coaſt of Van Diemen's Land, &c. 1801," ſays, that the capes are moſtly baſaltic, and he includes the "Fluted Cape;" the columns being ſometimes ſingle, ſometimes grouped like ſtacks of chimnies. Upon the iſland of "Cape Barren" are found kanguroos, and the new animal, called *womat* by the natives near Port Jackſon, reſembling a little bear. "Furneaux's iſles" are moſtly of a coarſe quartz, and likewiſe "Wilſon's Promontory," in New South Wales; while the general rocks in the laſt are ſoftiſh grit amid iron-ſtone. In general, Van Diemen's land preſents a moſt dreary and inhoſpitable ſhore, mottled with rocks of white quartz and black baſalt. Port Dalrymple is the only harbour upon the north coaſt, which ſeems the moſt fertile.

Labillardiere, in his "Voyage in Search of La Perouſe in 1791—1794," (vol. i.) furniſhes ſome intereſting details with regard to this iſland. He obſerves that, in the month of May, the ſummits of the higheſt mountains were whitened with ſnow; and that theſe mountains form part of a chain, which extends from ſouth-eaſt to north-weſt; whilſt another chain of great extent runs from north-eaſt to ſouth-weſt. In the iſland there are many rivulets and lakes. On the ſide of the mountains was obſerved an horizontal bed of coal, not exceeding in its greateſt thickneſs $3\frac{1}{2}$ feet, but extending for a diſtance of more than 200 fathoms; it reſts on free-ſtone, and is covered with a deep brown ſchiſtus. In theſe rocks were alſo found beautiful pieces of hematite, of a red copper colour, and of tripoli. The foreſts are thick, and not eaſily penetrated; and they conſiſt of many very tall trees, and others of a moderate height, which thrive well notwithſtanding the ſhade of the "eucalyptus globoſus," which is of an enormous ſize. Near the rocky bay, where the French navigators ſtopped, is a lake abounding with pelicans and black ſwans; and on the ſhores are many ſpecies of plants, ſeveral of them being new, which Labillardiere has particularly deſcribed, and of ſome of which he has given drawings. Among the animals are ſeen the kanguroo, which lives in burrows like the rabbit; the ſea-calf of the ſpecies called "phoca monachus;" a new ſpecies of parroquet, repreſented and deſcribed by our author under the name of the parroquet of Cape Diemen: another of "merops," deſcribed by White. Labillardiere's account of the inhabitants is very ſimilar to that of Capt. Cook. They did not flee at the approach of the French, and appeared to be mild and affable. The men and women were equally naked, or covered with a kanguroo ſkin. Their hair is woolly, and they let their beard grow; the upper jaw of children projects conſiderably over the lower, but falls back with increaſe of age, ſo that in adults it is in the ſame line: their ſkin is not very dark; but to increaſe its blackneſs, they cover themſelves with charcoal duſt, principally the upper parts of the body. They eat muſcles, oyſters, the large lobſter, and crabs which they broil: the women are chiefly employed in procuring food and preparing it. They do not appear to have any chiefs: each family ſeems to live in complete independence; but the children are very ſubordinate to their parents; and the women are ſo to their huſbands. They all appear unacquainted with the bow. Thoſe of Adventure Bay have their body tattooed, and their hair powdered with oker. Their domeſtic utenſils afford but an unfavourable ſpecimen of their ſkill and induſtry. There are baſkets clumſily conſtructed of the reed called *juncus acutus*, and drinking veſſels made of a large piece of *fucus palmatus*, cut into a circular form, and moulded into the ſhape of a purſe. They underſtand the art of procuring fire by ſtriking two pieces of flint together, in which reſpect they differ from the other inhabitants of the South Sea iſlands, and even ſome of thoſe of the more eaſterly part of New Holland; whence our author inclines to believe that they are deſcended from a different origin. Their thinly ſcattered huts indicated a very ſcanty population; and the heaps of ſhells found near the ſea-ſhore ſhewed that theſe ſavages derive their principal means of ſubſiſtence from the ſhell-fiſh which they find there. One of theſe navigators found ſome human bones among the aſhes of a fire made by the natives. Several bones of the pelvis he diſcovered by their form to have been part of the ſkeleton of a young woman: ſome of them were ſtill covered with pieces of broiled fleſh. Our author, however, is ſcrupulous of ranking the natives of this country with the cannibals: he rather ſuppoſes that they have the cuſtom of burning the bodies of their dead. As theſe were the only human bones diſcovered in this country, and theſe partly burnt, it appears that they do not expoſe the bodies of their dead to the open air. If it be not their cuſtom to burn their dead, they may poſſibly bury them in the earth, or throw them into the ſea.

As there is another Van Diemen's land, Mr. Pinkerton very properly ſuggeſts, that the above deſcribed land, which is one of the iſles of New Zealand, ſhould be called *Taſmania*, in honour of the diſcoverer: and thus the confuſion ariſing from a duplicate of names would be prevented.

Diemen's *Land*, the northern part of New Holland, diſcovered by a Dutch navigator, named Zeachen, who beſtowed upon it this appellation in honour of Anthony Van Diemen, governor-general in the Eaſt Indies, who returned to Europe with incredible treaſures in 1631. We may conclude that this governor encouraged ſuch diſcoveries, as his name was impoſed upon various regions in this part of the world. See New Holland.

DIEMERBROECK, Isbrand, De, in *Biography*, was born at Montfort, in the neighbourhood of Utrecht, in the year 1609. After taking his degree of doctor in medicine at Angers, he went to Nimeguen in 1636, and continued there, through that and the following years, freely attending the inhabitants who were afflicted with the plague, which raged with

with great violence, during that time. It was here that he collected obſervations on the nature and treatment of that diſeaſe, which he publiſhed in the year 1644, in 4to. at Amſterdam. As he followed the method, pretty generally adopted in all fevers, of keeping the patients, in warm, cloſe apartments, and gave them mithridate, and other heating medicines, called Alexipharmics, it may be ſuppoſed his ſucceſs was not remarkably great. The book, however, obtained great credit, and has paſſed through many editions. In 1642 he went to Utrecht, and was made profeſſor extraordinary in medicine. His lectures in medicine, and in anatomy, procured him great credit, and were no leſs uſeful to the univerſity, drawing thither a great conflux of pupils. In 1651, he was made ordinary profeſſor, he was alſo twice appointed rector of the univerſity, and continued in high eſteem to the time of his death, which happened Nov. 17, 1674. In 1649 he publiſhed "Oratio de reducenda ad Medicinam Chirurgia," and in 1664, "Diſputationum practicarum, pars prima et ſecunda, de morbis Capitis et Thoracis," 12mo. in which, Haller ſays, there are ſome curious and uſeful obſervations. His "Anatome Corporis Humani," which has paſſed through numerous editions, was firſt publiſhed in 1672, 4to. It is a compilation, but is interſperſed with ſome original obſervations. The plates are principally from Veſalius, and neither very elegant, nor very correct. In 1685, his works were collected and publiſhed together, under the title of "Opera Omnia," by his ſon Timanis de Diemerbroeck, in folio. This was reprinted in two volumes, 4to. and publiſhed at Geneva in 1687. It contains, beſides the works above-named, "A Treatiſe on the Meaſles and Small-pox, a Century of Obſervations in Medicine and Surgery, and a Third Part of Diſputations containing Accounts of Diſeaſes of the lower Belly." Boerhaave Methodus Studii Med. Eloy. Dict. Hiſt.

DIEMERIS, in the *Ancient Muſic*, a word uſed ſometimes alone, and ſometimes joined with the word phorbeia. It expreſſed a ſort of bandage, uſed by the ancients, to tie up the lower lip in playing on the pipe. The other kind of phorbeia conſiſted only of one perpendicular piece, which went down the cheek, and one tranſverſe one, which covered the whole mouth, but had a hole cut into it to admit the mouth-piece of the pipe See PHORBÆA.

DIENNE, in *Geography*, a ſmall town of France, in the department of the Cantal; 15 miles N. of St. Flour.

DIENSES, in *Ancient Geography*, a people of Gallia Narbonnenſis, placed in the vicinity of the Rhone.

DIENSIS COLONIA, a Roman colony in Pieria, a country of Macedonia. Ptolemy calls it *Dion*.

DIENVILLE, in *Geography*, a ſmall town of France, in the department of the Aube; 9 miles N.W. of Bar-ſur-Aube.

DJEOUABYS, a hoſpitable tribe of Arabs, compoſed of about 2000 men, and poſſeſſing about 60 horſes, who lead a ſhepherd's life, and encamp every winter on the banks of the Natron lake in Egypt with their flocks. During this time they are employed in carrying natron and prickly reeds; they have alſo ſome traffic in dates, which they fetch in caravans from Sioua in the Ammonian Oaſis, which is a journey of 12 to 15 days. Theſe Arabs are "marabouths," or peaceful people, who wander here and there to find water and paſture for their cattle. They never make war; and only take up arms for ſelf-defence, and this they rarely do; they almoſt always trade for money. They retain more than any other tribe their ancient cuſtoms; they are merely ſhepherds, and refuſe to cultivate the ſoil. Their manners are mild and ſimple; though they are ſubject to the occaſional turbulence of paſſion, particularly that of love, cloſely allied to jealouſy in the eaſt, and ſometimes hurrying them into the moſt cruel exceſſes. The cloathing of the Djeouabys, conſiſts of an *ibbram* and a *bernous*, a kind of cloak, ſimilar to the ſurplice of thoſe who officiate in the Romiſh church, made of white wool. This ſtuff, which is uſed for the cloathing both of the men and the women, is manufactured in Barbary, and it is bought at Cairo, but chiefly at Alexandria. The wealth of the Djeouabys, and of the Arabs of the deſert in general, conſiſts in camels and ſheep, whilſt that of the Arabs who dwell in villages, conſiſts in large cattle. The Arabs always carry with them a great part of their wealth, in order to furniſh their habitable camps. They preſerve their chopped ſtraw and their grain in large pits underground. The neighbourhood of a well of freſh water, a few ſlips of land of a ſcanty product, or ſalt lakes that can be wrought with ſome profit, determine theſe encampments. They poſſeſs beſides, at four or five leagues from the margin of cultivated countries, ſtorehouſes kept ſecure, and further on in the deſert depoſits under the ſand, known by ſome outward marks to the proprietors only. The Djeouabys, in order to prevent being pillaged by the wandering tribes, are obliged to receive them into their camps, and furniſh them with proviſions, and barley for their horſes. The Arabs of the deſert are of a very different diſpoſition and character: they are a lawleſs predatory race, and are commonly conſidered merely as robbers and aſſaſſins. The principal weapon of the Arabs is a pike, which they throw and wield with great dexterity. They manage their horſes with equal ſkill; but they never attack in line, but always like foragers, uttering at the ſame time loud cries and invectives; their ſtyle of fighting being merely that of light troops. They are in general but ill equipped; their fire-arms and powder are very bad; their balls are not well caſt; the powder is granulated in an inartificial manner, and is for the moſt part charcoal; which they carry in a wooden flaſk, and the balls ſeparately in a leathern bag, ſeldom charging their pieces with cartouches. As ſoon as the Arabs are apprehenſive of an attack, they ſeparate into ſeveral ſmall camps at a great diſtance from each other, and tie their camels to the tents, ſo as to be able to move off at a moment's notice. When one tribe is engaged with another, the women come within ſight of the combatants, playing on the tambourine, and ſinging ſtrains to excite their courage; the wounded are taken care of by their wives and miſtreſſes. The women hold valour in great eſtimation, and a chief covered with ſcars is the boaſt of the whole tribe; thus the ſupport of empires is the bond of union among theſe miſerable hordes of robbers. See BEDOUEENS.

DIEP BAY, a bay in the iſland of St. Chriſtopher, near Diep-bay town.

DIEP-BAY *Town*, or *Deep town*, a town on the north-weſtern coaſt of the iſland of St. Chriſtopher. N. lat. 17° 30'. W. lon. 62° 43'.

DIEPBOURG. or DIEBURG, a ſmall town of Germany, in the circle of the Lower Rhine, formerly in the electorate of Mayence, but ſince the peace of Luneville in the grand duchy of Heſſe Darmſtadt, one of the confederated ſtates of the Rhine.

DIEPENAU, a town of Germany, in the circle of Weſtphalia and county of Hoya; 21 miles S.S.W. of Hoya.

DIEPENBEKE, ABRAHAM VAN, in *Biography*, a painter and engraver, was born at Bois-le Duc, in 1607, and was at firſt a painter on glaſs, in which he excelled his cotemporaries; but, diſcouraged by a variety of accidents, he directed his attention to painting in oil. He reſided for ſome time in Italy, and became the ſcholar of Rubens, under whom he made great improvement. His invention was fertile,

tile, and his execution ſpirited; and if he had taken time to correct his firſt ideas, he would have produced works that might have given him rank among the firſt artiſts; but being much employed in making drawings for prints and books of prints, he hurried his compoſitions, without attending to the propriety of his choice. He is ſaid, however, to have imitated Rubens with ſucceſs; he coloured well, and gave great force to his paintings by his ſingular ſkill in the chiaro-ſcuro. He engraved ſeveral "devotional ſubjects" with great ſucceſs. Strutt and Pilkington.

DIEPHOLD, or rather DIEPHOLZ, in *Geography*, a ſmall town of Germany, in the circle of Weſtphalia, ſituated on the lake Dummer, (which ſee) 30 miles S. of Bremen, 36 N. W. of Minden, and 30 N. E. of Oſnabruck. Lat. 52° 45'. It is the chief place of a county of the ſame name, formerly in the electorate of Hanover, but now in the conſcription of the new kingdom of Weſtphalia.

DIEPPE, a conſiderable ſea-port town of France, in the department of the Lower Seine, chief place of a diſtrict of the ſame name, ſituated near the Engliſh channel, at the mouth of the river Béthune, 138 miles N. W. of Paris, and 42 miles N. of Rouen. E. long. 1° 12'. N. lat. 49° 55' 17". It is a handſome well-built town; the ſtreets are ſtraight and ſpacious, particularly the high ſtreet, (la grande rue) which runs all the length of the place, and is nearly a mile long. The church of St. James is a fine building. There are two ſuburbs, that which is called Le Paulet is chiefly inhabited by ſailors and fiſhermen. At the weſtern extremity of the town is an old, but irregularly and badly fortified caſtle; at the eaſt end is the harbour, in the ſhape of a ſemicircle, with two very fine moles of ſtrong brick-work.

Dieppe is one of the eleven quarters of the maritime diſtrict of Havre, and comprizes in its naval conſcription the leſſer ports of Berneval, Criel, and Le Tréport. As it is the neareſt ſea-port town to Paris, it ſupplies that capital with fiſh by means of light carts, called chaſſe marées, which travel night and day. Its principal fiſheries are, thoſe of the herring, whiting, and mackarel. The number of veſſels engaged in the herring fiſhery amounts, in times of peace, to 60 or 70, the average produce of which is from 84 to 120,000 barrels, worth from two to two millions and a half French livres. The barrel of ſalt herrings is generally ſold at 21 livres, freſh at 20, and red herrings at 16½ livres. During the ſhort interval of peace from 1801 to 1803 the annual produce was not more than 40,000 barrels. The whiting fiſhery laſts during the months of December, January, and February, and is chiefly for the Paris market. The average produce of the mackarel fiſhery is 280,000 livres. It employs from 40 to 50 veſſels.

In time of peace there are regular packet-boats between Dieppe and Brighton. The paſſage is only 66 Engliſh miles, and takes from 10 to 24 hours. The diſtance from London to Paris, by Brighton and Dieppe, is 87 Engliſh miles ſhorter than by Dover and Calais.

Next to the fiſheries, the moſt important trade at Dieppe is its thread lace manufacture; which, in 1788, occupied about 4000 married and unmarried females and children, chiefly fiſhermen's daughters and wives. Its annual produce was eſtimated at 400,000 livres. The merchants ſell the thread to the women, and pay them for the lace according to its value, which differs from ſeven-pence halfpenny a yard (aune) to fifteen and ſixteen ſhillings ſterling a yard. They uſe chiefly Flemiſh thread from St. Amand. Common lace conſumes more thread than the fine bone lace. A yard of fifteen-penny lace holds nine-pennyworth of thread, whilſt a yard of ſeven or eight ſhilling lace holds only about three-pennyworth of thread. The inferior workwomen earn but from three-pence to four-pence a day; the beſt from ſix-pence to eight-pence, and even a ſhilling a day.

The manufacture of ivory and bone toys, of excellent workmanſhip, and at uncommonly reaſonable prices, occupies ſeveral hundred hands at Dieppe. Its population amounts to 20,000 individuals. The territorial extent of the canton is 12 kiliometres and a half; it includes only two communes, and reckons, altogether, 20,500 inhabitants.

As chief place of a diſtrict Dieppe has a ſub-prefect, a court of juſtice, a tribunal of commerce, and a regiſter office. The ſoil of the diſtrict is very fertile, and produces all ſorts of corn, vegetables, fruits, hemp, and flax, but chiefly a plant called vetch, (la veſce) which is conſidered as an excellent fodder for cattle.

The diſtrict of Dieppe comprizes, upon a territorial extent of 1237½ kiliometres, eight cantons, 222 communes, and 106,082 inhabitants. Herbin. Statiſtique de la France.

DIEPPENHEIM, a town of Overyſſel; 20 miles E. of Deventer.

DIER. See DYER.

DIERNA, in *Ancient Geography*, a town of Dacia. Ptolemy.

DIERDORF, in *Geography*, a town of Germany, in the circle of Weſtphalia, and county of Wied Runkel, ſeated on the Wiedbach, with a caſtle, the reſidence of the counts. The inhabitants are induſtrious, and employed in agriculture and commerce; eight miles N. N. E. of Coblentz.

DIERNBACH, a town of Germany, in the archduchy of Auſtria; 11 miles S. of Steyr.

DIERNBERG, a town of Germany, in the duchy of Stiria; ſix miles N. of Nitterfeldt.

DIERNPACH, a town of Germany, in the archduchy of Auſtria, five miles E. of Mieſſau.

DIERNSTEIN, or TYRNSTEIN, a ſmall town of Auſtria, in that part which is called Lower Auſtria, or the country below the Ens, in the circle above the Manhartſberge (circulus ſupra montem Meinhardi.) It is ſituated near the Danube, and famous for being the place where king Richard was diſcovered and confined, in 1194, by Leopold; and where a diviſion of the French army, of but 5,000 men, commanded by general Gazan, fought their way through 20,000 Ruſſians in the year 1805.

DIERVILLA, in *Botany*. See LONICERA.

DIES. See DAY.

DIES, in *Common Law*. There are two kinds of days, *juridici*, & *non juridici*.

DIES *juridici*, or *faſti*, are all days wherein juſtice is adminiſtered in court.

DIES *non juridici*, or *nefaſti*, are all Sundays in the year: and in Eaſter term, the feaſt of the Aſcenſion of our Lord: in Trinity term, the Nativity of St. John the Baptiſt: in Michaelmas term, the feaſt of All Saints, and All Souls: and in Hilary term, the Purification of the Bleſſed Virgin.

The ſame diſtinction holds not only as to legal proceedings in court, &c. but alſo as to contracts.

DIES, in ſome *Ancient Authors*, is alſo uſed for daily proviſion. "Et reddebat dimidium diem mellis, *q. d.* as much honey as ſerved the king's family half a day."

DIES *datus*, is a day, or time of reſpite given to the tenant, or defendant, by the court.

DIES *Marchiæ*, was a day of congreſs, or meeting of the Engliſh and Scots, appointed annually to be held on the marches or borders, to adjuſt all differences between them, and preſerve the articles of peace.

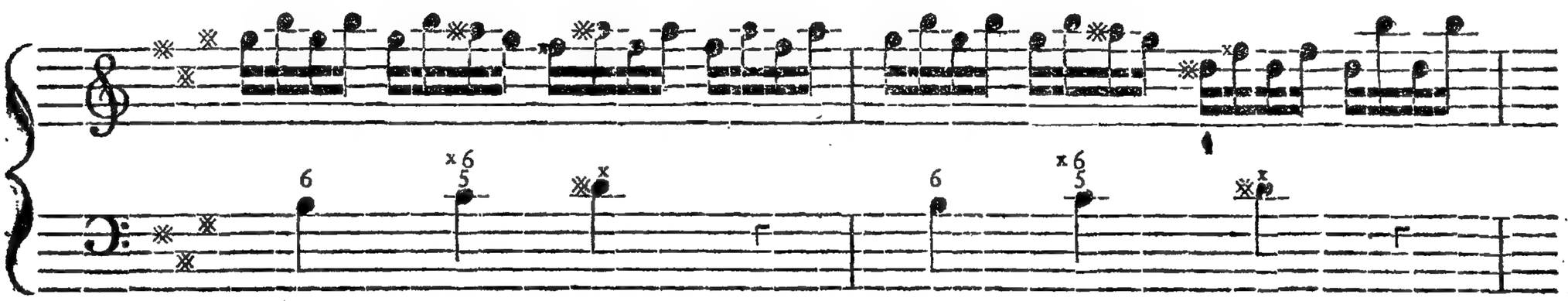
DIESBACH, in *Geography*, a ſmall town of Switzerland, in the canton of Berne, remarkable for its excellent

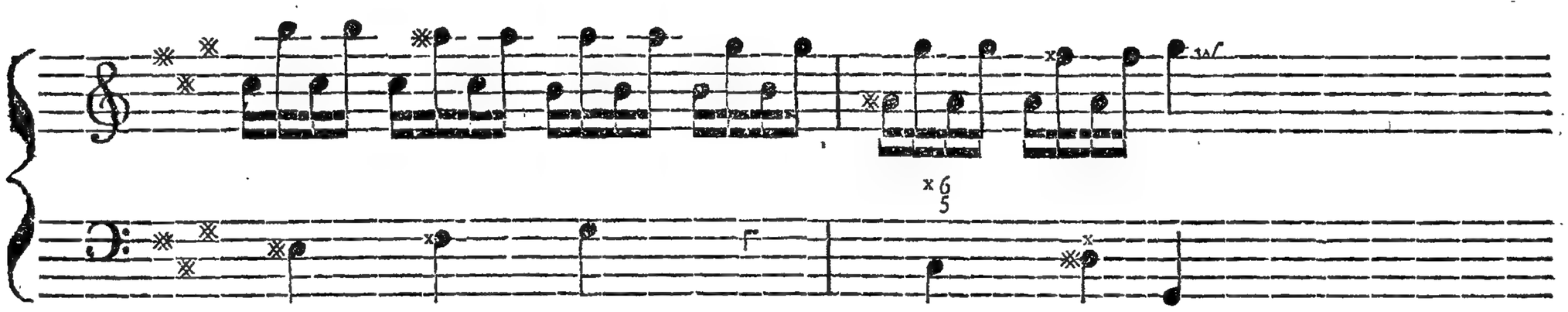
manufactures of coarſe and fine woollen cloth and linen cloth of a ſuperior quality.

DIESIS, in the *Ancient Muſic*, was the enharmonic ſharp, ×; in the modern Italian muſic it implies a common ♯ or minor ſemitone. See SHARP and ENHARMONIC. The order in which the ſharps are placed at the clef is by fifths, in the following manner: F C G D A, &c. The uſe of a ♭ and ♯ in the middle of a movement extends no further than a ſingle bar, unleſs the laſt note of a bar is ſharp, and is repeated or continued by the firſt note of the next bar; then the ſharp of the firſt bar need not be repeated, but is underſtood, unleſs contradicted by a ♮. Flats and ſharps at the clef are to regulate the ſemitones of tranſpoſed keys. In major keys, aſcending, the ſemitones are from the third to the fourth and from the ſeventh to the eighth, and in minor keys, deſcending, without accidental ſharps, or flats, they lie from the ſixth to the fifth and third to the ſecond.

The French and Italians have no other word to expreſs a ♯ or minor ſemitone, than *dieze* and *dieſis*.

The enharmonic ſharp, or quarter-tone, in the Greek muſic marked with a ſingle croſs ×, is uſed in modern muſic for a double ſharp; as in a key with many ſharps at the clef, if it is neceſſary to elevate one of the ſounds already ſharp a nominal half note, it is (or ſhould be) expreſſed by an enharmonic di-ſis, thus: as in Corelli's XIth ſolo.





The dieſis, or common ſharp, is inadmiſſible in canto fermo. P. Martini.

DIESIS *Enharmonic*, in *Muſic*, is an interval ſo named by Rameau. Overend, &c. whoſe ratio is $\frac{125}{128}$, and its common logarithm .9897000,4336. It is alſo the dieze major of Rameau; the harmonia of Henſling; the apotome major of Saloman de Caus, Boetius, &c.; the minor enharmonic quarter tone of ſome; the quarter note or quarter tone of Dr. Boyce and others: the tierce wolf of earl Stanhope, and the comma greater of ſome. It is equal to $21\,\Sigma + 2\,m$, $= 1.909170$ times the major comma. In Euler's logarithms, or decimals of an octave, it is $= .0342157$. It reſults from the addition of the following intervals, *viz.* a major comma and a minor comma; a ſchiſma and two minor commas; and a major reſidual and an hyperoche. This interval will alſo be found as the difference of the following intervals; *viz.* a major comma from a ſemitone minimum; a ſemitone minor from a ſemitone major; a ſemitone ſubminimis from a limma; a ſemitone medius from a ſemitone maximum; an hyperoche from a ſemitone minor; two ſemitones minor from a minor tone; a ſchiſma from two minor commas; a minor tone from two major ſemitones; three ſchiſmas from two diaſchiſmas; three major thirds from an octave; and three minor ſixths from two octaves; alſo two major thirds from the ſum of a minor fourth and minor third. The three laſt furniſhing us with practical methods of tuning an enharmonic dieſis upon an organ, &c.

DIESIS *Major* of Maxwell; this interval has a ratio of $\frac{2025}{2048}$, $= 10\,\Sigma + m$; and is the *minor* COMMA, which ſee.

DIESIS *Minor* of Maxwell; this interval has the ratio of $\frac{32768}{32805}$, $= \Sigma$, and is the SCHISMA, which ſee.

DIESIS *Major* of lord Brouncker; the ratio of this interval is $\frac{24}{25}$, $= 36\,\Sigma + f + 3\,m$, being the *Minor* SEMITONE, which ſee.

DIESIS *Chromatic*; this interval has a ratio of $\frac{16,384}{15,625}$, $= 26\,\Sigma + f + 2\,m$, its common logarithm is .0871761,5779. It reſults from the addition of the following intervals; *viz.* a ſchiſma, and ſemitone ſubminimis; and the major comma, and hyperoche; alſo, as the difference of the following, *viz.* an enharmonic dieſis from a medius ſemitone; a minor comma from a minor ſemitone; a major reſidual from a ſemitone minimum; two minor commas from a limma; two enharmonic dieſes from a ſemitone maximum; and three minor fourths from four major thirds, the laſt furniſhing a method of tuning a chromatic dieſis on an organ, &c.

DIESIS of Dr. Smith. This author, in his Harmonics, has conſidered various tempered ſyſtems, whoſe ſeveral octaves he makes to conſiſt of five equal tones, and two equal limmas; in each of which he calls the difference between the tone and limma the minor limma of that ſyſtem; and he alſo denominates the difference between the major and minor limma the dieſis of each ſyſtem; for example, (page 223) he calculates the dieſis, in his ſyſtem of equal harmony, to be in common logarithms $= .9879016.993$.

DIESIS *quadrantalis* of Euclid, is the $\frac{1}{10}$th part of the minor fourth, or $25\,\frac{2}{5}\,\Sigma + \frac{1}{2}f + 2\,\frac{1}{5}\,m$.

DIESIS *trientalis* of Euclid, is the $\frac{2}{15}$th part of the minor fourth, $33\,\frac{12}{15}\,\Sigma + \frac{2}{3}f + 2\frac{14}{15}\,m$.

DIESIS of Boethius, is half of the limma, or $23\,\Sigma + \frac{1}{2} + 2\,m$.

DIESIS of Mercator, is ſtated to be $\frac{2}{53}$d part of an octave, or $23\,\frac{5}{53}\,\Sigma + \frac{24}{53}f + m$.

DIESIS

DIESIS *quadrantal* of Ariſtoxenus, is the $\frac{1}{4}$th part of a major tone, or $26\,\Sigma + \frac{1}{2}f + 2\,\frac{1}{4}\,m$.

DIESIS *triental* of Ariſtoxenus, is the $\frac{1}{3}$d part of the major tone, or $34\,\frac{2}{3}\,\Sigma + \frac{2}{3}f + 3\,m$.

DIESIS of Martianus Capella, is an interval very nearly equal to $7\,\frac{1}{2}\,\Sigma + \frac{3}{5}\,m$; of which he ſtates, that 38 of them, and 19 ſemitones minor, make up a major twelfth; and alſo, that 34 of them, and 17 ſemitones minor, make up the minor eleventh.

DIESPITER, in *Antiquity*, a name given to Jupiter.

Some authors will have it the ſame with *Dios Pater*, Jupiter father; Jupiter being called in Greek Ζευς, or Δευς, whence the oblique caſe Διος, &c. Others hold Dieſpiter to ſignify *Dii pater*, father of the day. St. Auguſtin derives the name from *dies*, day, and *partus*, production, bringing forth; it being Jupiter that brings forth the day. Of which ſentiment were Servius and Macrobius; the former adding, that in the language of the Oſci they called him *Lucentius*, as Dieſpiter in Latin.

Struvius, Antiq. Rom. Synt. C. I. ſeems to intimate, that Dieſpiter ſignified Pluto; but, if that be his meaning, he is apparently miſtaken. For both in Cicero, and in the inſcription, he quotes from Gruter, xxi. 8. we have only *Dis pater*, and not Dieſpiter.

DIESSE, or TESSENBERG, in *Geography*, a beautiful high valley of Switzerland, in the canton of Berne, about eight miles long, and ſix broad, containing two pariſhes in the clerical juriſdiction of Nidau. The inhabitants ſpeak French, and are of the Proteſtant religion.

DIESSENHOFEN, an ancient town of Switzerland, in the canton of Thurgau, ſituated on the Rhine. Its ſtreets are regular and ſpacious, and it has ſeveral very fine buildings, but only one church, in which the Proteſtants and Roman Catholics alternately perform divine ſervice. Hartman, count of Kibourg, is ſuppoſed to have founded this place, or at leaſt walled it in, about the year 1178. From him it devolved to the counts of Habſburg, and was taken from the houſe of Auſtria by the Swiſs in 1460.

DIESSENSTEIN, a town and caſtle of Germany, in the circle of Bavaria; 12 miles N. of Paſſau.

DIEST, ADRIAN VAN, in *Biography*, a painter and engraver, was born at the Hague in 1655, but reſided chiefly in England, where he painted landſcapes with great ſucceſs; forming his taſte for this ſpecies of painting, from a contemplation of the ſcenes which he ſurveyed along the coaſts, in the weſtern parts of this kingdom. If this artiſt had met with encouragement adequate to his genius, he would probably have arrived at a ſuperior degree of excellence; but being obliged to paint pictures at low prices, he had not leiſure to beſtow upon them ſufficient ſtudy; and, therefore, his works are very unequal. Some of his pictures, finiſhed in his beſt manner, poſſeſs great clearneſs and tranſparence in the colouring, and a peculiar tenderneſs in the diſtances; in the ſkies they are truly fine, in the clouds they have an uncommon freedom, and through the whole they are diſtinguiſhed by an agreeable harmony. This maſter has etched in a ſlight, but maſterly ſtyle, ſeveral ſets of ſmall landſcapes. He died in 1704. Pilkington and Strutt.

DIEST, in *Geography*, a town of France, in the department of the Dyle, chief place of a canton in the diſtrict of Louvain, ſituated on the river Demer, three miles E. of Montaigu, and 14 N. of Tirlemont. N. lat. 50° 59′. It has ſome manufactures of woollen cloth and worſted ſtockings. Its population amounts to 5053 individuals. The canton contains 13 communes, and 13,883 inhabitants, upon a territorial extent of 215 kiliometres.

DIET, Δίαιτα, *diæta*, in *Medicine*, the regimen in reſpect to food and drink, adopted more particularly with a view to the prevention and cure of diſeaſes.

The importance of a proper regulation of the diet in preſerving the health, even of the moſt robuſt, cannot for a moment be queſtioned; but it would appear that both phyſicians, in their theoretical diſquiſitions on this ſubject, and mankind, in their practical application of the reſults, have fallen into frequent errors, but of a different nature. Phyſicians have often diſcuſſed the modifications of diet, both in health and diſeaſe, with too many minute and ſubtle diſtinctions as to the wholeſomeneſs of individual articles, and with too rigid an application of their general rules. And men, on the other hand, conſidering only the general notion of the ſalutary nature of this or that ſubſtance, have forgotten that the regulation of the quantity is not leſs important than caution as to the quality of their food. As to the quality of our diet, indeed, an over-anxious obſervation of rules and precepts is to be deprecated; it has frequently been the occaſion of injury to the healthy, as Dr. Heberden has juſtly remarked, and has not ſeldom augmented the indiſpoſition of the ſick. Cuſtom and experience have long ſince taught mankind what food and what regimen are uſeful and wholeſome to the generality of men; and among thoſe matters, which are generally wholeſome, no particular article is to be avoided; unleſs individual experience has pointed out ſome peculiar conſtitutional diſpoſition to be affected by particular ſubſtances. For, in other reſpects, thoſe who are not deficient in common judgment, will readily aſcertain what forms and modes are more congenial with their individual conſtitution.

If we look into the hiſtory of mankind, inhabiting the different parts of the globe, ſo far as we are acquainted with it, we ſhall find that different nations ſubſiſt on kinds of diet very different from each other, yet all enjoy a degree of health, which renders them competent to their duties in life in the countries which they inhabit. A great part of the eaſtern world is principally ſubſiſted by rice and vegetables; the inhabitants of many countries live upon fiſh; others on a mixed diet, partly animal, partly vegetable. Some have no fermented liquors; others uſe theſe only. Yet all, compared with each other in the ſame community, are healthy. The author of nature has ſo conſtructed us and our organs of digeſtion, that we can gradually accommodate ourſelves to every ſpecies of aliment; to live on rice, on vegetables, on animal food ſolely, or mixed with vegetables, without ſuffering injury. Nay, we can ſubſiſt on every variety of theſe ſubſtances, under every mode of preparation, preſerved in ſalt, hardened in ſmoke, pickled with vegetable acids, &c. as is exemplified in different countries, and in different ſeaſons of the year. In a word, no *kind* of food injures us; we are capable of being habituated to every ſpecies, and of converting into nutriment almoſt every production of nature. It is obvious, therefore, that in a ſtate of health, the conſideration of the quality of our victuals is of leſs importance than it has frequently been deemed. We are often aſked, ſays Dr. Fothergill, what our opinion is reſpecting certain articles of food, as to their being more or leſs wholeſome. "Perhaps the moſt pertinent anſwer in common would be, that which is reported of the late Dr. Mandeville, of famous memory, who being often the convivial gueſt, I think it was of one of the firſt earls of Macclesfield, was frequently interrogated on the ſubject of diet. Doctor, is this wholeſome? Does your lordſhip like it? Yes. Does it agree with your lordſhip? Yes. Why then it is wholeſome." See Medical Obſervations and Inquiries, vol. vi. p. 119.

But, even to the healthy, an attention to *quantity* is by no means unimportant. There are many people, indeed, who ſeem to be poſſeſſed of ſuch powers of digeſtion, as to be

under no reſtraints on that account, and who ſeldom feel themſelves incommoded, either with the quantity or with the moſt heterogeneous qualities of their food. They riſe from the moſt plentiful, mixed, and rich repaſts, without any kind of apparent uneaſineſs. But even the robuſt are not perfectly ſecure from the dangerous effects of a full meal. "Apoplexies," ſays the experienced phyſician juſt quoted, "proceed, perhaps, more frequently from this cauſe, than all the reſt put together." Of this remark, indeed, our newſpapers afford abundant corroboration; ſince nothing is more common than accounts of the ſudden death of individuals, "who appeared to be in perfect health, and had juſt eaten a hearty dinner," or "who had gone to bed in apparent good health, after having enjoyed a hearty ſupper," and ſo forth. It has been thought, ſays Dr. Fothergill, that more people ſuffered by hard drinking than immoderate eating. My obſervation leads me to take the oppoſite ſide. At preſent, indeed, the former practice is generally baniſhed to the vulgar, but whilſt it prevailed to the utmoſt, it ſeems to me that more were injured by exceſs of diet than of drinking. *Loc. Cit.*

"The firſt phyſicians by debauch were made,
Exceſs began, and ſloth ſuſtains the trade."

In fact, it is a doctrine, however trite and familiar, which cannot be too ſtrongly inculcated; as a neglect of this attention to the *quantity* of the food, proportioned to the neceſſity of each individual, is ſooner or later followed with the moſt ſerious conſequences. To the ſtrong and robuſt inflammatory diſeaſes happen, and all ſuch as proceed from plenitude, as the gout, apoplexy, palſy, lethargy, and a variety of chronic indiſpoſitions. To the more tender and delicate, it is the parent of a numerous progeny of diſtempers, affecting both body and mind; there is ſcarcely a malady that can be named, which either does not originate from this neglect of diet, or is not increaſed by it, till the diſeaſe at length bids defiance even to temperance itſelf, and all preſcription. The *how much*, indeed, muſt be determined by every individual; but thoſe who are happy enough to abſtain at the firſt ſenſation of ſatiety, have made great progreſs in the art of maintaining ſuch a command of appetite, as, under moſt chronic indiſpoſitions, is one of the greateſt aids of recovery; and, in health, is one of the ſureſt preſervatives againſt them.

To the delicate and valetudinary the conſideration of the quantity of the food is of ſtill more importance. They do not riſe from rich and varied repaſts with the ſame freedom from uneaſy ſenſations, as the robuſt; they are affected with uneaſineſs, ſome in one way, ſome in another, by the unnatural load. And we often hear them complaining of the ill effects of this or of that particular kind of diet, when, perhaps, their ſufferings ariſe from the quantity of all, rather than from the diſagreement of any.

What renders an attention to the quantity of food in invalids ſtill more neceſſary, is, that they are often ſubject to a falſe appetite; to a craving that does not ariſe from the demands of health, but from the morbid condition of the juices in the ſtomach, which prompts them to eat more, and more frequently than nature requires. Whence it happens that ſuch people are often diſpoſed to take in much more than can be digeſted, to devour their food rather than eat it; by which means their ſufferings are increaſed, the diſeaſe gains ground, defeats every purpoſe of the phyſician, and leads them into ſome permanent and incurable malady. And ſhould the patients have admitted an opinion, (and ſuch an opinion occurs but too often) that their recovery will be aided by taking in a greater ſhare of food, their misfortune is complete. Theſe are not ideal traits in the hiſtory of the ſick; they are known to be but too true by every phyſician of obſervation; and they cannot be mentioned too often, or with too much fervency, for the ſake of thoſe who are liable to become the victims of appetite or inattention. Early habits of ſelf-command are of the utmoſt benefit to all; and even thoſe who feel no immediate diſtreſs from the utmoſt repletion at preſent, would find it their intereſt to be moderate and diſcreet. Fothergill.

The cuſtom of countries, in reſpect to meals, are different. Breakfaſt, dinner, and ſupper, in this country, have been habitual. Suppers, at preſent, are diſcouraged among the affluent; and exceſſive ones, ſuch as have been in uſe among our anceſtors, very probably with good reaſon. Or, perhaps, we ſhould rather conſider the meal of dinner to have been diſcarded, and an early ſupper ſubſtituted; a change which, on the whole, is to be conſidered as detrimental, at leaſt to invalids and perſons of delicate habit. Two very moderate meals, at a ſuitable diſtance of time, would doubtleſs be digeſted with much more eaſe than one full meal, when the ſtomach has been debilitated by long faſting, and has ſuffered fatigue, together with the body at large, from the exertions of a long day. So that, as Dr. Fothergill has obſerved, "when people aſſure us that they eat no ſuppers, from obſervation I am led to ſuſpect, that it would be better for them if they did, than to oppreſs nature with a cumbrous load, that may be much more detrimental." This, indeed, ſeems to be pretty well underſtood, with reſpect to invalids and convaleſcents, who are generally ſupplied with ſmall light meals, at proper intervals, rather than have all their diet crowded into one late dinner.

The general breakfaſt of people, from the higheſt to the loweſt, is tea, coffee, or chocolate. There are, of courſe, many exceptions; ſome for one reaſon, ſome for others, making choice of other ſubſtitutes, as their experience or opinions guide them. To theſe articles bread of ſome kind, with more or leſs butter and ſugar, is commonly joined to make up the meal. From many inconteſtible proofs, that butter in conſiderable quantities is injurious to conſtitutions not ſtrong, it is ſparingly uſed in many families. It is found by many to be very difficult of digeſtion, eſpecially when toaſted before the fire, or fried, as well as in ſauces. Many people, apparently robuſt, and whoſe organs of digeſtion are ſtrong, often find themſelves much diſordered by large quantities of butter. Nothing more ſpeedily and effectually gives the ſick head-ache, and ſometimes within a very few hours. After breakfaſt, if much toaſt and butter has been uſed, it begins with a ſingular kind of glimmering in the ſight, objects ſwiftly changing their apparent poſition; giddineſs then comes on, head-ache, and ſickneſs. An emetic, and warm water, ſoon waſh off the offending matter, and remove theſe diſorders. Theſe are circumſtances which very often happen to people who are inattentive to the quantity of butter they eat at breakfaſt. A moderate quantity of freſh butter, with bread expoſed as little to the fire as poſſible, or not at all, appears to be wholeſome, and is capable of becoming with the other aliments, as ſoft and inoffenſive chyle, perhaps, as any part of our diet.

The ſame thing may perhaps be ſaid of coffee, as of tea; the heat, the ſtrength, and the quantity, make it unwholeſome or otherwiſe. There are nations who almoſt live upon coffee, as others do on tea; and among neither are any diſeaſes prevalent, that can juſtly be aſcribed to theſe ingredients in the common courſe of living. There are, however, individuals of peculiar conſtitution, in whom the Indian tea excites various unpleaſant ſymptoms, as head-ache, reſtleſſneſs, &c.; and ſeveral Britiſh plants have been recommended

mended as ſubſtitutes, and uſed with advantage. Such are ſage, balm, mint, and the like; the leaves of the different ſpecies of roſe-tree, and of the ſloe-tree, or black thorn, (*prunus ſpinoſa*, Linn.) are recommended by Dr. Withering, eſpecially the latter, the leaves of which, dried, he eſteems the beſt ſubſtitute for tea that has yet been tried. Dr. Willich recommends the flowers of the *roſa pimpinelliſolia*, of the woodroof, *aſperula odorata*; but adds that the firſt tender leaves of the whortle-berries, *vaccinium myrtillus*, cannot be diſtinguiſhed from real tea, when properly gathered, and dried in the ſhade. (Lectures on Diet and Regimen, p. 417.) It ſhould be recollected, however, that every vegetable infuſion of this ſort, is but warm water, rendered more palatable by the aroma of the herbs ſo infuſed; and that there is little or no nutriment conveyed by them to the body, except what is contained in the ſmall portion of milk and ſugar added to them. Theſe liquors, then, ſhould be conſidered as the mere beverage, by which the ſolid portion of the breakfaſt, the bread, &c. is to be diluted, and its digeſtion aſſiſted: and it would be adviſable for the delicate and valetudinary to curtail the liquid, and augment the ſolid part of a meal, which is to ſupport them during the exertions of the day, rather than to fill the ſtomach with a diluent and narcotic liquid, at once failing to nouriſh the body, and depreſſing the action of the ſtomach, where little is taken beſides.

Chocolate, which is the fruit of a tree growing in the Weſt Indies, ground into a paſte, with other ingredients, is in itſelf a nutritious ſubſtance, and to thoſe who like it, and with whom it agrees, it may be conſidered as a wholeſome breakfaſt. The ſame may be ſaid of milk, eſpecially of that from which ſome of the oleaginous part, the cream, has been taken away, and which has been afterwards boiled. Both theſe matters are ſo oleaginous that little or no butter ſhould be taken with them.

But the effects of improper conduct in reſpect to thoſe things which now conſtitute our breakfaſts, are of little conſequence, compared with thoſe which ariſe from the well-covered table at dinner. The indulgences of breakfaſt ſupply but very few materials for deſtruction; but the repeated exceſſes at dinner are ſerious affairs. And although, as we have before ſtated, the quantity of food is the point to be principally regarded; yet the quality is by no means a matter of indifference to the valetudinary.

The principal admonition, which the late Dr. Heberden deemed it neceſſary to impreſs on the minds of delicate perſons and invalids, was to avoid all thoſe artificial ſtimulants of the appetite, which excite the deſire for food beyond the ſimple call of nature, and, therefore, beyond the natural powers of the ſtomach to digeſt. Such are all made diſhes, and condiments of the more poignant qualities; nor is variety of diſhes leſs pernicious, upon the ſame principle. (See Heberden Comment. de Morbor. Hiſt. et Curat. cap. i.) It is probable that, in their nature, aromatic vegetable condiments, or ſpices, are leſs pernicious to the organs of digeſtion, than the various modifications of alcohol, or ſpirits; but the miſchief which they occaſion indirectly, by leading to exceſs, is unbounded. This exceſs is ſtill more pernicious, now that the hour of dinner is poſtponed to the evening; for the ſtomach is enfeebled by the long abſence of ſtimulus, and by ſympathizing in the fatigue of the body, ſo that its power of digeſting a copious and heterogeneous maſs is greatly diminiſhed; it is loaded, and diſtended, and oppreſſed; and the body, in its turn, ſuffers with the ſtomach. Hence, we ſee the fluſh of the countenance ſucceeding to a late and copious dinner; the indiſpoſition to any active exertion, mental or corporeal; the general oppreſſion of the animal powers; the heavineſs to ſleep; and the general ſenſation of heat; the hurried pulſe; dry or clammy tongue; and other ſymptoms of ſlight feveriſhneſs. It is moſt obvious, that the daily, or even frequent repetition of ſuch a diſorder, (for it is, in fact, a morbid condition which is thus produced,) cannot be ſuffered, without injury to the conſtitution. That this is no imaginary deſcription, the feelings of every valetudinary, who thus ſubmits to the controul of a pampered appetite, will teſtify.

Some of the common articles of diet require a little attention. Bread, the ſtaff of life, is not the moſt eaſy of digeſtion; if taken in conſiderable quantity, very ſtrong organs are requiſite to convert it into nutriment, and more eſpecially when it is new, or recently baked; for then it is of a glutinous and heavy nature, and extremely difficult of ſolution. Caſes have been recorded, indeed, in which an immoderate quantity of freſh-baked bread proved the cauſe of death. (See London Med. Journal for 1781, vol. i. p. 333.) In weak ſtomachs a large proportion of bread is indigeſtible; it turns ſour, produces the heart-burn, flatulencies, and interrupts the perfect concoction of every thing elſe. On this principle, the neceſſity of paying much attention to this capital article of diet, ought to be inculcated on valetudinaries in general; never to abſtain from it wholly, but to uſe it with moderation; to conſider it as one of thoſe things which, ſparingly uſed, is extremely neceſſary and beneficial; if otherwiſe, the fruitful ſource of many complaints, which are little ſuſpected from this cauſe.

In this country, animal food, of one kind or another, conſtitutes the chief part of our nouriſhment. That there are ſome kinds of more eaſy, ſome of harder digeſtion, is well known to every one; ſo that it is unneceſſary here to particularize them. The young of animals is generally conſidered as more eaſily ſoluble than the old; but in ſtomachs diſpoſed to acidity, this does not appear to be the caſe. Animal food is rendered more digeſtible, by approaching to a ſtate of beginning putrefaction; hence, the fleſh of animals recently killed is leſs eaſy of digeſtion than that which has been kept for ſome time; and hence, alſo, the fleſh of an animal which has been hunted, or has uſed any violent exertions before death, is more tender and wholeſome, than one which has been in confinement; for, after ſuch exertions, the muſcular or fleſhy parts are diſpoſed to go ſpeedily into a ſtate of putrefaction. On the contrary, the regular continued action of the muſcles, during life, hardens them, and renders them more difficult of ſolution in the ſtomach. Thus, the legs of poultry, which are in conſtant exertion, are harder than the fleſh of the wings, or of the breaſt, becauſe theſe muſcles are ſeldom exerted in flying. There can be no doubt, however, that ſcarcely any modification of animal diet would generally diſagree, *i. e.* would be digeſted with difficulty and uneaſineſs, if we were fully as anxious, in reſpect to exceſs of quantity, as to the unſuitableneſs in kind. If a perſon eats as much of ham, ſalted beef, or bacon, as he ought to do of fiſh or chicken, he may ſuffer by it.

Fiſh holds a ſort of intermediate rank between animal and vegetable matters, as to the quantity of nutriment it contains; it is of itſelf eaſy of digeſtion, and fits light on a delicate ſtomach, provided it is taken without heavy ſauces, or preparations of butter.

It is the opinion of ſome writers, that animal diet has conſiderable influence on the powers of the underſtanding, being equally adverſe to the exertions of genius, ſentiment, and delicate feelings, as well as to deep mental reſearches. Dr. Falconer, after expreſſing this opinion reſpecting the influence of animal diet, adds, at the ſame time, that it may, nevertheleſs, be better adapted to the common buſineſs of life,

life, than a diet which produces a greater degree of ſenſibility. On the contrary, in proof of the favourable nature of vegetable diet to mental exertion, he quotes the anecdote related by Cheyne of ſir Iſaac Newton, who was ſo ſenſible of the unfavourable operation of animal food, that during the time of writing his treatiſe on optics, which is generally thought to be the work in which his genius diſplayed itſelf in its fulleſt force, he lived on a vegetable diet only, and that extremely ſimple and rigid. There is, doubtleſs, ſome truth in theſe obſervations; but the extreme temperance, and not the vegetable nature of the food, may be conſidered as the favourable meaſure. We are ſatisfied that, after a temperate meal, even of animal food, the mind is ſoon again adequate to its beſt exertions.

In reſpect to vegetables, the beſt rule is to uſe thoſe which beſt agree with each particular conſtitution. All the vegetables brought to table, which have been rendered ſoft by boiling, are readily digeſtible. The raw vegetables, uſed in ſallad, &c., are ſomewhat leſs ſo; but, except where the ſtomach is much diſpoſed to aceſcency, they are generally wholeſome. "On this head," ſays Dr. Fothergill, "I have only one ſhort caution to give. Thoſe who think it neceſſary to pay any attention to their health at table, ſhould take care that the quantity of bread, and of meat, and of puddings, and of greens, ſhould not compoſe each of them a meal, as if ſome were only thrown in to make weight; but carefully to obſerve, that the ſum of all together do not exceed due bounds, or incroach upon the firſt feelings of ſatiety."

With reſpect to fruit, it is, doubtleſs, wholeſome, in its ripe ſtate; eſpecially, if taken in the forenoon, or inſtead of a meal. But, like other agreeable and nutritious ſubſtances, it muſt prove injurious, when added to the load of the ſtomach, after a plentiful meal.

Much might be ſaid about the comparative advantages of the different kinds of liquor uſed at table. The great object of drink at our meals is to dilute the aliment taken into the ſtomach, and thus render it more capable of digeſtion. It is too often, however, uſed for a very different purpoſe; namely, to ſtimulate an imperfect appetite, and to enable the ſtomach to receive with reliſh what, in its unſtimulated ſtate, it would loath and reject. In as much, then, as drink is conducive to exceſs in eating, it is pernicious to take large and frequent draughts of any liquid during the great meal. It will be ſeen, under the article CORPULENCY, how little liquid is abſolutely required by nature for the healthy digeſtion, and how much a free uſe of the mildeſt and moſt unexceptionable tends to promote corpulency, by promoting gluttony. Dr. Fothergill has laid down a few ſimple rules in reſpect to drink.

"The leſſer quantity of fermented liquors we accuſtom ourſelves to the better.

"To abſtain from ſpirits of every kind, however diluted, as much as may be.

"Where mild, well-brewed beer agrees, to keep to it as a beverage.

"Where water does not diſagree to value the privilege, and continue it.

"Like what has been ſaid of diet in general, ſo, likewiſe, it may be added in reſpect to liquors; it is the quantity, in common, that does more harm than the kind; and people, eſpecially in the fore part of life, cannot be too ſolicitous to ſhun the firſt temptations to the love of ſpirituous liquors." Loc. cit.

Thus alſo the nonagenarian Dr. Heberden. "Potui aptiſſimæ ſunt cereviſia tenuis, et aqua pura. Spiritus, qui vocatur vini, et vinum aqua mixtum, cane pejus et angue ſunt vitanda. Etenim plures cognovi, qui horum uſu ſenſim ſeſe aſſuefecerunt ſiquoribus vinolentis, quibus iiidies meracioribus ſumptis brevi omnino carere non potuerunt, donec ex ſobriis et ſanis facti ſunt ebrioſi et valetudinarii; tam animorum, quam corporum debilitate, graviſſimas hujus erroris pœnas luentes." Comment. loc. cit.. See DRUNKENNESS.

There is another repaſt which, ſince the introduction of tea, is become a kind of neceſſary of life, and is as much expected in every family as the other uſual meals themſelves. Upon the ſubject of tea and coffee, eſpecialry when taken after dinner, much difference of opinion prevails. Some have conſidered tea as invariably noxious, but from oppoſite cauſes; one aſſerting that it is noxious only when the infuſion is weak, another when it is ſtrong; the former attributing its pernicious effects to the hot water alone, the latter to the narcotic quality of the tea. The laſt opinion is, we believe, in a certain degree, correct. There is unqueſtionably in a ſtrong infuſion of tea a quality, which excites diſorder of the ſtomach, head-ache, &c. in numerous individuals, and which, taken plentifully and late, will altogether prevent ſleep for many hours, in ſtill greater numbers. But the notion of the warm water relaxing and enfeebling the ſtomach, is probably deduced, erroneouſly, from the effects of warm water on inanimate ſubſtances, and from the ſoddening of the cuticle after long immerſion in it. Warm water is doubtleſs a gentle *ſtimulus* to the ſtomach, and has been recommended, alone, for that purpoſe, to invalids ſuffering under dyſpepſia, or indigeſtion. (See Saunders on the Liver.) In this view, then, a warm watery liquid may be uſeful to the digeſting ſtomach; and farther by diluting its contents, it muſt facilitate the motions and commixture of them, and therefore tend to expedite the proceſs of digeſtion. Hence tea, not too ſtrong, taken an hour or two after the meal of dinner, is, in our opinion, a ſalutary repaſt. And it is well known that, among perſons of weak digeſtive organs, the oppreſſion of ſtomach, occaſioned by even a temperate meal, is ſpeedily removed after drinking tea. According to this view of the matter, however, the leſs that is eaten with it, the better; for either ſweet cakes, or cakes of any kind, eſpecially with butter, muſt rather retard digeſtion than promote it. For, if whilſt the ſtomach is performing its taſk, a ſecond quantity of food is added, although of a lighter quality, the whole maſs is augmented, and as the additional matter muſt be aſſimilated to the chyle, now forming, the work of digeſtion is impeded.

The imagination of ſome phyſicians has wandered far to deſcribe the miſchiefs of this ſuppoſed enervating liquor, tea; and they would repreſent the picture as truly alarming. "Tea," ſays a ſenſible popular writer, "will induce a total change of conſtitution in the people of this country. Indeed it has gone a great way towards effecting that evil already. A debility, and conſequent irritability of fibre, are become ſo common, that not only women, but even men are affected with them. That claſs of diſeaſes, which, for want of a better name, we call nervous, has made almoſt a complete conqueſt of the one ſex, and is making haſty ſtrides towards vanquiſhing the other." (Buchan.) It has been frequently aſſerted by others, that the diſeaſes of this country have undergone a great change ſince the days of Sydenham, from the ſame cauſe, and inſtead of highly inflammatory fevers, we now ſee thoſe only of the low kind, accompanied by debility. This degeneration is, perhaps, not leſs fanciful, than that of the heroes of Homer and Virgil. Sydenham has deſcribed a moſt ample catalogue of nervous diſorders under the head of hypochondriaſis; and the meaſles and ſmall-pox are juſt as inflammatory now, as in the time of that able phyſician. Or if a change be admitted to have

have occurred in our conſtitutions, it may be as juſtly attributed to other changes in the mode of life, as to the ſipping of tea; to the increaſe of luxury in every rank, and every department of life.

In a ſtate of actual diſeaſe, and eſpecially in febrile complaints, a certain degree of caution is requiſite; but not ſo much, perhaps, as is often preſcribed. For, in the febrile ſtate, the ſtomach naturally loathes animal food, and is averſe in the extreme to the ſtronger and more alkaleſcent kinds, which it cannot be forced to take without much oppreſſion, and increaſe of the diſeaſe: but in the decline of the fever, the ſick often crave the lighter ſorts of animal food, and uſe them with impunity. In this point, however, the feelings of the patient ſhould be ſpecially conſulted; for, too often, the officiouſneſs and miſtaken kindneſs of nurſes and friends miſlead the patient; they preſs upon him articles, which his own inſtinctive ſenſations would not have led him to deſire, and which, therefore, injure him. The lower claſſes, from among whom our nurſes are of courſe choſen, are with difficulty reſtrained from pouring in wine and other ſtimulants, in every ſtage of febrile diſeaſes, from a notion that the patient will die for want of nouriſhment, as they cannot eat, unleſs ſomething comfortable is given.

Febrile thirſt is moſt effectually removed by ſimple water; whether it be cold or tepid is perhaps of little importance; and in general as much ought to be given as is agreeable to the ſick. Various forms of diluent drink, in which the properties of the water are ſcarcely changed, except in its flavour, may be uſed; ſuch as water in which currant-jelly, and various ſyrups, have been mixed, or tamarinds, roaſted apples, ſage, balm, or other palatable ingredients.

In chronic diſeaſes, accompanied with hectic fever, it is important to ſupport the ſtrength of the body, without ſtimulating the arterial ſyſtem; that is, by adminiſtering a diet, which is at once nutritious, and eaſy of digeſtion. For this purpoſe, a diet conſiſting chiefly of milk, with vegetables, and diluent drinks, is generally recommended. The milk of the aſs and the goat, which contain a larger proportion of ſugar, and leſs of the butyraceous and caſeous matter than cow's milk, and therefore are equally or more nutritive, and occaſion leſs excitement during the proceſs of digeſtion, are frequently preferred. But cow's milk may be eaſily rendered more ſaccharine or leſs caſeous by art, and its qualities appoſitioned to the powers of the ſtomach. A ſtrict perſeverance in a diet of this nature, and a rigid rejection of every thing ſtimulating, liquid or ſolid, is in many chronic diſeaſes the moſt valuable courſe of medicine, as it ſupports the conſtitution, without augmenting the diſeaſe, as a heating diet would do, and thus often affords the powers of the conſtitution an opportunity of reſtoring its own health, or removes all impediment to the operation of medicines.

The effects of a diet of animal matters excluſively, in removing the leading ſymptoms, if not in curing the diſtreſſing and generally fatal diſeaſe, the DIABETES *mellitus*, has been ſtrongly exhibited by Dr. Rollo; and it cannot be doubted that this diet has a much greater power over the ſymptoms of this obſcure malady, than all the medicines which have as yet been adminiſtered for its cure. See DIABETES.

As the gout, apoplexy, palſy, lethargy, and other diſeaſes of a full habit, ariſe from too great a quantity of blood, or of fat, &c. in the ſyſtem, a rigid temperance in diet is the moſt effectual and unexceptionable mode of preventing and of removing the prediſpoſition to theſe diſeaſes. Dr. Gregory, the preſent profeſſor of the practice of phyſic at Edinburgh, affords an animating example of the effect of ſtrict temperance, with corporeal exerciſe, in completely baniſhing the gout from the conſtitution, although he had it hereditarily from both parents, and ſuffered ſome ſevere attacks at an early period of life. In the inſtance of the miller of Billericay, we have a ſtill more ſtriking inſtance of the benefits derived from a proper change of diet, to the loweſt degree of abſtinence, in removing enormous corpulence, and all its attendant ſymptoms of diſeaſe (See CORPULENCY.) In fact, much of the adminiſtration of medicines might be ſuperſeded, would mankind ſubmit their appetites in a ſomewhat greater degree to the controul of reaſon; and Dr. Cheyne's obſervation is very juſt. Any one, he ſays, may loſe a pound of blood, take a purge, or a ſweat, by dropping the great meal, or by abſtaining from animal food, or fermented liquors for four or five days, as effectually as by opening a vein, ſwallowing a doſe of pills, or taking a ſudorific bolus. Eſſay on Health, p. 35.

The diet of infants and children ſhould be regulated with great attention. Many an infant is loſt in conſequence of improper food; for a ſtate of irritation in the ſtomach and inteſtines, occaſioned by crude and ill-digeſted aliment, is one of the moſt prolific ſources of convulſions in the early periods, and of maraſmus and tabes afterwards. Here, as in moſt other points, we chiefly err, by neglecting the intimations of nature. The proper food for infants is pointed in the milk of the parent, and, therefore, in our attempts to ſubſtitute a diet, when that is not to be procured, or is not in ſufficient abundance, it behoves us to imitate the food of nature.

DIET-*Drinks*, a form of phyſic, including all the medicated wines, wheys, and ales, uſed in chronic caſes. They require a courſe or continuance to anſwer any intention of moment. In acute caſes they are of no uſe; but where the diſorder of the conſtitution is gradually to be gained upon, much help may be had from them.

DIET, or *Dyet*, is alſo uſed for an aſſembly of the ſtates or circles of the empire, or Poland, to deliberate and concert meaſures for the public good.

The general diet of the empire is ordinarily held at Ratiſbon. It conſiſts of the emperor in perſon, or by his repreſentative or commiſſary; the nine electors, three of whom are eccleſiaſtic, and the other ſix ſecular, forming the electoral college; the eccleſiaſtical princes, *viz.* archbiſhops, biſhops, abbots, and abbeſſes, and the ſecular princes, forming the ſecond college; and the repreſentatives of the imperial cities, who conſtitute the third college, and are divided into two benches, *viz.* that of Suabia and of the Rhine. This diet has been uſually ſummoned by the emperor, but there are ſome caſes in which the electors have ſummoned it without his conſent, or requeſted him to ſummon it. In the abſence of the emperor the right of convocation belongs to the king of the Romans. The diet makes laws, raiſes taxes, determines differences between the ſeveral princes and ſtates, and relieves the ſubjects from the oppreſſions of their ſovereigns. The diets of the empire were originally the ſame with aſſemblies of March and May, held by the kings of France: they met, at leaſt, once a year; and every freeman had a right to be preſent. Theſe were aſſemblies, in which the monarch deliberated with his ſubjects, concerning their common intereſt: but when the princes, dignified eccleſiaſtics, and barons, acquired territorial and independent juriſdiction, the diet became an aſſembly of the ſeparate ſtates, which formed a confederacy of which the emperor was the head. Whilſt the conſtitution of the empire remained in its primitive form, the ſeveral members of the diet were obliged to attend in perſon, otherwiſe he not only loſt his vote, but was liable to a heavy penalty. When the members of the diet became independent ſtates, the right of ſuffrage was annexed to the territory or dignity, not to the perſon; and the members might ſend their deputies,

as

as princes ſend ambaſſadors. By degrees any member, who poſſeſſed more than one of thoſe ſtates or characters, which entitle to a ſeat in the diet, was allowed a proportionable number of ſuffrages. The Imperial cities alſo, as ſoon as they became free and acquired independent juriſdiction, were received as members of the diet. The powers of the diet extend to every thing relative to the common concern of the Germanick body, or that even intereſt or affect it as a confederacy. The diet takes no cognizance of the inferior adminiſtration in the different ſtates, unleſs that happens to threaten or diſturb the general ſafety. Robertſon's Hiſt. Charles V. vol i. p. 462.

The term diet is alſo applied to the aſſembly of electors for the choice of an emperor or king of the Romans: this is uſually held at Frankfort on the Main.

The general diet of Poland was by the laws only to be held every two years; but preſſing occaſions convened them every year; the laws alſo confined their ſitting to fifteen days, but they frequently protracted it to ſix weeks. The uſual place was at Warſaw, the capital of the kingdom; though it has been often held at other places: in effect, as by the laws every third diet was to be convened at Grodno, in Lithuania; whenever, for particular reaſons, it was judged meet to change the order, and hold it elſewhere, the nobility of the grand duchy muſt have conſented to it. It was the king who fixed the time, and ſummoned it by circulars letters ſent to all the palatines. In an interregnum the archbiſhop of Gneſna called the diet.

The ſeveral particular diets, which were held ſix weeks before the general one, ſent three deputies each, choſen out of the members thereof.

In Poland there were likewiſe diets on horſeback, held in the champagne, or country, ſuch were thoſe wherein they choſe their king. They were called poſpolites. See POLAND.

There are likewiſe diets held in Switzerland; diets of the Proteſtant cantons; diets of the Catholic cantons; and general diets. The firſt aſſemble at Araw, and are convoked by the canton of Zurich; the ſecond at Lucern, convoked by the canton of that name; the third, compoſed of the deputies of all the cantons, both Proteſtant and Catholic, is held twice a year, at the end of June, and the beginning of December, and meets at Baden. It is the canton of Zurich which has the right of convening it. See SWITZERLAND.

DIETA, in our *Old Law Books*, denotes a day's journey. "Omnis rationabilis dieta conſtat ex viginti milliaribus." Fleta.

DIETERSTORFF, in *Geography*, a town of Germany, in the archduchy of Auſtria; four miles S.S.W. of Tuln.

DIETETIC, DIÆTETICA, that part of phyſic which conſiders the way of living, with relation to food, ſuitable to particular caſes. See DIET.

DIETFURTH, in *Geography*, a town of Germany, in the centre of Bavaria, ſituated on the north ſide of the Altmuhl; 19 miles weſt of Ratiſbon.

DIETHUSA, in *Ancient Geography*, an iſland of the Ægean ſea; repreſented by Pliny as a deſerted iſland.

DIETMANFRIED, in *Geography*, a town of Germany, in the circle of Swabia, belonging to the abbey of Kempton; eight miles N.N.W. of Kempton.

DIETRICH, or DIETRICY, CHRISTIAN WILLIAM ERNEST, in *Biography*, a painter and engraver of conſiderable merit, was born at Weimar in 1712, and reſided chiefly at Dreſden, where he was profeſſor of the academy of arts. As a painter he poſſeſſed extenſive abilities, and ſucceeded both in hiſtory and landſcape. He alſo engraved a great number of ſmall ſubjects from his own compoſitions, in the ſtyle of Oſtade, of Laireſſe, and of Salvator Roſa. Several of theſe etchings are very rare. A print by this maſter of a "Satyr entertained by a Peaſant and his Family," is finely drawn and admirably executed: it is dated 1739. The time of his death is not aſcertained. Strutt.

DIETRICHSTEIN, in *Geography*, a ſmall town of Auſtria, in Upper Carinthia, belonging to the prince of Dietrichſtein. It is ſituated on the river Geyl, three miles weſt of Arnoldſtein.

DIETTER, CHRISTIAN LUDWIG, in *Biography*, born at Ludwiſburg, 1757, performer on the violin, compoſer, and maitre de chapelle to the duke of Wirtenburg, at Stuttgard. He was one of the firſt ſcholars of his ſerene highneſs's academy, where he at firſt ſtudied painting, and had the opportunity of hearing lectures in mythology, hiſtory, and geography; but devoted all his leiſure hours to muſic. The duke, obſerving his muſical talents, adviſed him to cultivate them excluſively. He accordingly ſtudied under Schubart, and the celebrated violiniſt, Celeſtini, who came from Rome to England with the late duke of Dorſet, and after remaining in London ſeveral years, went to Stuttgard, where he was placed at the head of the opera-band. Ditter, whoſe thirſt for knowledge was inſatiable, wiſhing to ſtudy the theory of muſic regularly, and finding that he could get no inſtructions from the maeſtro di cappella Bononi, ſtudied the works of Jomelli, and other famous compoſers; and in the year 1778 gained a prize medal for compoſition, which he had gained two years before on the violin. He continued to reſide in the duke's academy, or conſervatorio, till the year 1781, and compoſed various works for the theatre as well as for public concerts.

DIETZ, in *Geography*, a ſmall town of Germany, in the circle of the Upper Rhine, on the river Lahn, formerly the capital of the principality of Naſſau Dietz, and as ſuch belonging to the prince of Orange, but ſince the peace of Tilſit, in the conſcription of the new kingdom of Weſtphalia. It is 18 miles E. of Coblentz, 30 N. of Mayence. Lat. 50° 22'. See NASSAU.

DIEU, LEWIS DE, in *Biography*, an eminent proteſtant divine, was born at Fluſhing about the year 1590, where he afterwards became paſtor to the French church. He was an uſeful and popular preacher, and might have been appointed court miniſter at the Hague, an honour which he declined, though preſſed upon him by prince Maurice of Orange, who had heard him preach at Zealand. In 1619, he was appointed aſſiſtant to his uncle at the Walloon college at Leyden; the duties of this ſituation he performed with diligence and credit, until his death, which happened in the year 1642. His publications were moſtly theological; ſuch as "A Commentary on the Four Goſpels;" "Notes on the Acts of the Apoſtles;" &c. &c. M. Bayle has given the titles of a long liſt of works, which he publiſhed during his life, or which were given to the world ſoon after his deceaſe. By them it ſhould ſeem that he was a learned and very reſpectable divine. Bayle. Moreri.

DIEU, *l'Ile*, or *l'Ile d'Yeu*, in *Geography*, a ſmall iſland on the weſtern coaſt of France, 9 miles S.W. of Saint Jean de Mont, and 15 W. of Saint Gilles. W. long. 2° 10'. N. lat. 46° 50'. It is a rock of granite, of a ſuperficies of nearly four miles, covered with a very thin ſoil of a ſandy earth, the produce of which is hardly ſufficient for the conſumption of its inhabitants for the ſpace of three or four months. The paſtures are ſo ſcanty, that they feed only a very few cows and ſheep. The women till the ground, moſt of the men being engaged as ſailors and fiſhermen. There is one ſmall town, the harbour of which is inconvenient, and incapable of being fitted for trade. The whole iſland contains ſix ſquare leagues, or 27,600 French arpens. It forms a canton of the

the diſtrict of the Sables d'Olonne, in the department of La Vendée. The town has 1049 inhabitants. The whole canton or iſland has two communes, and 2053 inhabitants. Herbin. Statiſtique de la France.

Dieu-le Fit, a ſmall town of France, in the department of the Drôme, chief place of a canton in the diſtrict of Montelimart, 15 miles E. of that place. It has ſome mineral ſprings, one of which is particularly remarkable for the great quantity of native vitriol which its water contains. This water, taken inwardly, is an excellent remedy againſt thoſe diſeaſes of the eyes which require tonics; it diſſipates inflammation, ſtrengthens the ſight, and cures beſides all cutaneous diſeaſes, and long-ſtanding ulcers.

The population of Dieu-le-Fit amounts to 2847 individuals. The canton contains, upon a territorial extent of 330 kiliometres, 16 communes, and 8636 inhabitants.

Dieu *& mon droit, q d. God and my right*, the motto of the arms of England, firſt given by king Richard I. to intimate, that he held not his empire in vaſſalage of any mortal.

It was afterwards taken up by Edward III. when he firſt claimed the crown of France; and it was continued, without interruption, to the time of king William III. who uſed the motto *Je maintiendray;* though he commanded the former to be retained on the great ſeal. The ſame is to be underſtood of the late queen Anne, who uſed the motto *Semper eadem;* which had been before uſed by queen Elizabeth.

Dieu *ſon act*, in *Law*, are words often uſed in our old law; and it is a maxim in law, that the act of God ſhall prejudice no man. Therefore, if a houſe be blown down by a tempeſt, thunder, or lightning, the leſſee or tenant for life or years, ſhall be excuſed in waſte. Likewiſe he hath by the law a ſpecial intereſt to take timber to build the houſe again for his habitation. (4 Rep. 63. 11 Rep. 82.) So when the condition of a bond conſiſts of two parts in the disjunctive, and both are poſſible at the time of the obligation made, and afterward one of them becomes impoſſible by the act of God, the obligor is not bound to perform the other part. (5 Rep. 22.) And where a perſon is bound to appear in court at a certain day, if before the day he dieth, the obligation is ſaved, &c. See Bond.

DIEUE, in *Geography*, a town of France, in the department of the Meuſe, and diſtrict of Verdun, on the Meuſe; ſix miles S. of Verdun.

DIEULISH, a river of England, which runs into the Stour, near Sturminſter, in Dorſetſhire.

DIEULOWARD, a town of France, in the department of the Meurte, on the Moſelle, and diſtrict of Pont-a-Mouſſon; three leagues N. N. W. of Nancy.

DIEUPART, Charles, in *Biography*, we believe, was a native of France, but who had reſided ſo long in England, that his name only ſuggeſted the idea of his not being an Engliſhman. We have been informed, by thoſe who remembered him, that he was a correct and firm performer on the violin, and aſſociated with Clayton, and Nicola Haym, as leader of the band at Drury-lane and Dorſet-gardens, in the firſt attempts at operas, after the Italian manner. Dieupart, conſequently, played the firſt violin in the operas of Arſinoe, and Camilla, when they were performed in 1705, entirely in Engliſh; and in 1707, in Addiſon's Roſamond, ſet by Clayton. But on the arrival of Valentini, when operas were performed half in Engliſh, and half in Italian; and in 1710, on the arrival of Nicolini and Handel, Clayton, Haym, and Dieupart, diſcouraged from any further attempts at operas by Engliſh performers, were obliged to ſolicit the encouragement of the public in eſtabliſhing a concert, which they propoſed to carry on jointly at Clayton's houſe, in York buildings, where there was a large room, which had long been appropriated to concerts. The propoſals for this undertaking are inſerted in two letters printed in the Spectator, N^os^ 258 and 278. This aſſociation continued but a ſhort time; for, in 1711, we find Clayton engaged with ſir Richard Steele, in a ſubſcription at York buildings. Haym went to the Haymarket, became a performer in the opera band, was frequently the opera poet, and ſometimes the compoſer; while Dieupart betook himſelf to teaching the harpſichord, and was admitted in that capacity into ſome of the beſt families in the kingdom: but late in life, he degenerated into negligence and a vulgar taſte; leading low concerts at ale-houſes in obſcure parts of the town, where he won all hearts by his neat and elegant manner of playing Corelli's ſolos, which he might have done in better company, if, like poor Smart the poet, he had not, during his derangement, preferred foul linen to clean. Dieupart had a great paſſion for diſguiſing himſelf like a common fidler, and playing in booths at fairs. The late Mr. Naphthali Frankes (a firſt rate dilettante on the violin) found him out at May fair in that capacity, by his ſtyle of playing, in which he did not remember to diſguiſe his bow, his tone, or his taſte. He died about the year 1740 at a great age, and in very indigent circumſtances. We find in the Dutch catalogues of the time, ſix ſets of harpſichord leſſons by Dieupart, which he afterwards transformed into concertos for the violin, flute, baſe-viol, and arch lute.

DIEUZE or Dieuse, in *Geography*, a ſmall town of France, in the department of the Meurthe, chief place of a canton in the diſtrict of Chateau Salins, ſituated on the river Seille, between Metz and Saverne, ſix miles E. of Marſal, and 27 N. W. of Nancy. Lat. 48° 50′. It has the richeſt ſalt ſprings in France. Their annual produce averages 256,908 French quintaux.

Dieuze contains 3344 inhabitants. The canton reckons 10,050, diſtributed in 24 communes, upon a territorial extent of 187½ kiliometres. Herbin Statiſtique de la France.

DIEXAHÆDRIA, in *Natural Hiſtory*, the name of a genus of ſpars. The word is derived from the Greek δις, *twice*, εξ, *ſix*, and εδρα, *ſide*. The bodies of this genus are ſpars, compoſed of twice ſix planes, being formed of two hexædral pyramids, joined baſe to baſe, without any intermediate column. Of this genus there are only two known ſpecies: 1. One with long, narrow, and ſharp-pointed pyramids, found in Lamb's-cave on Mendip hills: and, 2. One with long, broad, and obtuſe pyramids: this is found in the mine of Goſſelar in Saxony, and in many of the mines of the Hartz Foreſt. Hill's Hiſt. of Foſſils, p. 213.

DIEXODUS, Διεξοδος, in *Rhetoric*, is uſed for *digreſſion*, which ſee.

DJEZAN, in *Geography*, a ſea-port of Arabia, ſituated on a cape of the Red ſea, which forms one ſide of a large bay, in N. lat. 16° 45′. It is built, like other towns, on the coaſt, with ſtraw and mud. It was once a conſiderable place for trade, but ſince coffee hath been ſo much in demand, of which they have none, that commerce is removed to Loheia and Hodeida. It is an uſurpation from the territory of the Imam, by a ſheriff of the family of Beni-Haſſan, called "Bovariſh." The inhabitants, ſays Bruce, are all ſheriffs, in other terms, troubleſome ignorant fanatics. This town is peculiarly ſubject to fevers. The *faunteit*, ſignifying Pharaoh's worm, or worm, is very frequent here. The place abounds with excellent fiſh, and fruit which is brought from the mountains, whence they are alſo ſupplied with very good water.

DIEZE Maxime of Rameau, in *Muſic*, is an interval

whoſe ratio is $\frac{243}{250}$, or $25\Sigma + f + 2m$, which is the SEMITONE *ſubminimis*, which ſee.

DIEZE *Major* of Rameau, is an interval whoſe ratio is $\frac{125}{128}$, or $21\Sigma + 2m$, which is the *enharmonic* DIESIS, which ſee.

DIEZE *Minor* of Rameau, is an interval whoſe ratio is $\frac{3072}{3125}$, or $15\Sigma + f + m$, which is the HYPEROCHE, which ſee

DIEZE *Minime* of Rameau, is an interval whoſe ratio is $\frac{196883}{200000}$, or $14\Sigma + f + m$; its common logarithm is .9930612 9682. It reſults from the addition of the following intervals, *viz.* a diaſchiſma and a minor reſidual: a major comma and a medius reſidual; alſo as the difference of the following intervals, *viz.* a ſchiſma from an hyperoche; a major comma from a ſemitone ſubminimis; and a ſemitone minimum from a limma; alſo a major third and five minor thirds from four minor fourths, which laſt gives a practical method of tuning the dieze minime on an organ, &c.

DIFF, is the name of an inſtrument of muſic among the Arabs, ſerving chiefly to beat time to the voice: it is a hoop, ſometimes with pieces of braſs fixed to it to make a jingling, over which a piece of parchment is diſtended. It is beat with the fingers, and is the true tympanum of the ancients. Ruſſell's Hiſt. of Aleppo, p. 94.

DIFFARREATION, among the Romans, a ceremony whereby the divorce of their prieſts was ſolemnized.

The word comes from the prepoſition *dis*; which is uſed in compoſition, for diviſion, or ſeparation; and *farreatio* a ceremony with wheat, of *far*, wheat.

Diffarreation was properly the diſſolving of marriages, contracted by confarreation; which were thoſe of the pontifices, or prieſts. Feſtus ſays, it was performed with a wheaten cake. Vigenere will have confarreation and diffarreation to be the ſame thing.

DIFFERENCE, in *Logic*, an eſſential attribute belonging to ſome ſpecies, and not found in the genus; being the idea that defines the ſpecies.

Thus, body and ſpirit are the two ſpecies of ſubſtance, which in their ideas include ſomething more than is included in the idea of ſubſtance. In body, for inſtance, is found impenetrability, and extenſion; in ſpirit, a power of thinking, and reaſoning: ſo that the difference of body is impenetrable extenſion, and the difference of ſpirit is cogitation.

DIFFERENCE, in *Mathematics*, the exceſs of one quantity above another.

When a leſs quantity is ſubtracted from a greater, what remains is called the difference.

It was a fundamental principle among the ancient geometers, that the difference of any two unequal quantities, by which the greater exceeds the leſſer, may be added to itſelf, till it ſhall exceed any propoſed finite quantity of the ſame kind. This principle ſeems inconſiſtent with the ſuppoſition of an infinitely ſmall quantity or difference, which added to itſelf any number of times, is never to be ſuppoſed to become equal to any finite quantity whatſoever; which is the foundation of the modern method of infiniteſimals. However, this laſt may, with proper caution, be made uſeful and accurate.

DIFFERENCE *of longitude* of two places, is an arch of the equator intercepted between the meridians of the places.

DIFFERENCE, *Aſcenſional*, in *Aſtronomy*. See ASCENSIONAL.

DIFFERENCES, in *Heraldry*, certain additaments to coat-armour; whereby ſomething is altered, or added, to diſtinguiſh the younger families from the elder, or to ſhew how far they are removed from the principal houſe. They are called, in Latin, diminutiones, and diſcerniculæ armorum; and, by the French, briſures.

Of theſe differences Sylv. Morgan gives us nine, which obtain principally among us: *viz.* the label, which denotes the firſt and eldeſt ſon; the creſcent, the ſecond; the mullet, the third; the martlet, the fourth; the annulet, the fifth; the fleur-de-lis, the ſixth; the roſe, the ſeventh; the croſs-moline, the eighth; and the eight-foil, the ninth. See each under its proper article.

Again, as the firſt differences are ſingle for the ſons of the firſt houſe, or deſcent; the ſons of the younger houſes are differed by combining or putting the ſaid differences upon each other. As the firſt differences are, the label, creſcent, &c. for the firſt houſe; the difference for the ſecond houſe is the label on a creſcent, for the firſt of that houſe, during his father's life only; for the ſecond, a creſcent charged with a creſcent; for the third brother of the ſecond houſe, a mullet on a creſcent, &c. Siſters, except of the blood-royal, have no other mark of difference in their coats of arms beſides the form of the eſcutcheon. See LOZENGE.

The original of differences is controverted. Camden will have them to have begun about the time of king Richard I. Paradin aſſigns differences worn as early as the year 870. The preſident Fauchet obſerves differences to have been hereditary in the French families before the time of Louis le Gros, who came to the crown in the year 1110. Moreau refers them to the time of St. Louis; and Lallonette, Belleforeſt, &c. to that of Philip Auguſtus. The occaſion of their riſe is well accounted for by Colombiere.

All nations, ſays he, prefer the eldeſt brothers to the younger; whence thoſe, in a direct line, ſucceeding to their fathers, and becoming maſters of their lands, took on them their coat-armour, without any change, or alteration; and tranſmitted the ſame again to their eldeſt ſons; the younger brothers, or baſtards, not being allowed to bear the ſame arms, without ſome additional mark, to diſtinguiſh them from the elder. Hence ſome heralds, he goes on, have endeavoured to confine them to certain fixed and determinate figures, for diſtinguiſhing the ſecond from the firſt, the third from the ſecond, and ſo on to the ſixth; aſſigning the ſecond a label, the third a bordure, the fourth an orle, the fifth a battoon, and the ſixth a bend or cottice. And the deſcendants of theſe bear double differences, or differences charged on one another; *viz.* the eldeſt ſon of the ſecond ſon to retain his paternal coat, with the difference of the label of three points; the ſecond, the label of four points; the third, ſuch a label on a chief; the fourth, a label charged with certain figures, as eaglets, lioncels, martlets, creſcents, roſes, &c. And, for the ſame reaſon, the ſecond ſon of the third ſon ſhall bear a bordure engrailed; the third, a bordure charged with bezants, or tourteaux, &c.

But the ſame author judges the fixing any certain invariable differences at all an abuſe; becauſe they may happen not to be agreeable to the paternal coat, but very much deface and blemiſh it. He adds, that many other figures, beſide thoſe above-mentioned, may be uſed as differences; as ſhells, bezants, cinquefoils, and a thouſand more. Some younger families have made the difference in their arms by only diminiſhing the ordinaries, or changing the poſture; and others, by only changing the metal, or colour.

It muſt be added, that the difference may be of metal on metal, or colour on colour; which, in other caſes, is falſe heraldry.

DIFFERENCES, *Ancient*. See BORDURES.

DIFFERENTIAL, DIFFERENTIALE, in the *Higher Geometry*, an infinitely ſmall quantity, or a particle of quantity ſo ſmall as to be leſs than any aſſignable one. See FLUXION.

DIFFERENTIAL.

It is called a differential, or differential quantity, becauſe frequently conſidered as the difference of two quantities; and, as ſuch, it is the foundation of the differential calculus. Sir Iſaac Newton, and the Engliſh, call it a moment, as being conſidered as the momentary increaſe or decreaſe of a variable quantity. Mr. Leibnitz, and others, call it alſo an infinitesimal. See INFINITESIMAL.

DIFFERENTIAL *of the firſt, ſecond, &c. degree.* See DIFFERENTIO-DIFFERENTIAL.

DIFFERENTIAL *calculus*, or *method*, is a method of differencing quantities; that is, of finding a differential, or infinitely ſmall quantity, which, taken an infinite number of times, is equal to a given quantity. See CALCULUS, DIFFERENTIAL *method*, and FLUXIONS.

DIFFERENTIO-DIFFERENTIAL *calculus*, is a method of differencing differential quantities.

As the ſign of a differential is the letter d prefixed to the quantity, dx is the differential of x; that of a differential of dx is ddx, and the differential of ddx is $dddx$, &c. ſimilar to the fluxions $\dot{x}$, $\ddot{x}$, $\dddot{x}$, &c.

Thus we have degrees of differentials.

The differential of an ordinary quantity is called a differential of the firſt order or degree, as dx; that of the ſecond degree, is an infinitesimal of a differential quantity of the firſt degree, as ddx; that of the third degree, is an infinitesimal of a differential quantity of the ſecond degree, as $dddx$, and ſo on.

The powers of differentials are differenced after the ſame manner as the powers of ordinary quantities: and, again, as compound differentials either multiply or divide each other, or are powers of differentials of the firſt degree; differentials are differenced after the ſame manner as ordinary quantities; and, therefore, the differentio-differential calculus is the ſame, in effect, with the differential, or the method of fluxions.

DIFFERENTIAL, in the *Doctrine of Logarithms*. Kepler calls the logarithms of tangents differentiales; which we uſually call artificial tangents. See LOGARITHM, MESO-LOGARITHM, and TANGENT.

DIFFERENTIAL *equation* is uſed by ſome mathematicians for an equation involving infinitesimal differences, or fluxions. Thus the equation $3x^2dx - 2axdx + aydx - 3y^2dy + axdy = 0$ in the foreign notation, or $3x\dot{x}\dot{x} - 2ax\dot{x} + ay\dot{x} - 3y^2\dot{y} + ax\dot{y} = 0$ in the Engliſh notation, is called a differential equation. But theſe equations ſhould, conſiſtently with the Engliſh, or ſir Iſaac Newton's notation, be rather called fluxional equations. Hence ſome of our mathematicians have applied the term differential equations in another ſenſe, to certain equations defining the nature of ſerieſes. See SERIES.

DIFFERENTIAL *method*, in *Mathematics*, an appellation given to a method of finding quantities by means of their ſucceſſive differences.

This method is capable of very extenſive application and uſe, in the conſtruction of tables, ſummation of ſerieſes, &c. It was firſt uſed, and the rules of it laid down, by Briggs, in his conſtruction of logarithms and other numbers, much in the ſame manner as they were afterwards taught by Cotes, in his "Conſtructio Tabularum per Differentias." See Briggs's Arithmetica Logarithmica, cap. 12, 13. and his "Trigonometria Britannica."

This method is given in another form by ſir Iſaac Newton in the fifth lemma of the third book of his Principia. He treats of it as a method of deſcribing a curve of the parabolic kind, through any given number of points: And he diſtinguiſhes two caſes of this problem; the firſt, when the ordinates, drawn from the given points to any line given in poſition, are at equal diſtances from each other; and the ſecond, when theſe ordinates are not at equal diſtances. He has given a ſolution of both caſes, but without demonſtration in that place, which has ſince been ſupplied by himſelf and others. See his Methodus Differentialis, publiſhed with other tracts of the ſame author, by Mr. Jones, London, 1711; and Stirling's Explanation of the Newtonian differential method, in the Phil. Tranſ. N° 362; Cotes, De Methodo Differentiali Newtoniana, in his works publiſhed by Dr. Smith; Herman, Phoronomia; and Le Seur and Jacquier, in their Comment on ſir Iſaac Newton's Principia.

It is to be obſerved, that the methods there demonſtrated, by ſome of theſe authors, extend to the deſcription of any algebraic curve through a given number of points, which ſir Iſaac, writing to Mr. Leibnitz, mentions as a problem of the greateſt uſe.

By this method, ſome terms of a ſeries being given, and ſuppoſed to be placed at given intervals, any intermediate term may be found nearly; and this therefore gives a method for interpolations. Briggs's Arith. Log. Newton Method. Differ. prop. 5. Stirling's Method. Diff.

Any curvilinear figure may alſo be ſquared nearly, of which ſome ordinates may be found. Newt. Meth. Diff. prop. 6. Cotes, ubi ſupra. Simpſon's Math. Diſſ. p. 115.

And this method may be extended to the conſtruction of mathematical tables by interpolation. Newt. Meth. Diff. in Schol. p. 100.

The ſucceſſive differences of the ordinates of parabolic curves, becoming ultimately equal, and the intermediate ordinate required, being determined according to ſir Iſaac's rules, by theſe differences of the ordinates, is the reaſon of this method being called the differential method. To be a little more particular.

The firſt caſe of ſir Iſaac's problem amounts to this: a ſeries of numbers, placed at equal intervals, being given, to find any intermediate number of that ſeries when its interval from the firſt term of the ſeries is given.

Subtract every term of the ſeries from the next following, and let the remainders be called firſt differences; then ſubtract each difference from the next following, and let theſe remainders be called ſecond differences; again let each ſecond difference be ſubtracted from the next following, and let theſe remainders be called third differences, and ſo on: then if A be the firſt term of the ſeries, d' the firſt of the firſt differences, d'' the firſt of the ſecond differences, d''' the firſt of the third differences, &c. and if x be the interval between the firſt term of the ſeries and any term ſought, E, that is, let the number of terms from A to E, both inclusive, be $= x + 1$, then will the term ſought,

$$E = A + \frac{x\,d'}{1} + \frac{x \cdot \overline{x-1}}{1 \cdot 2}\,d'' + \frac{x \cdot \overline{x-1} \cdot \overline{x-2}}{1 \cdot 2 \cdot 3}\,d''' + \frac{x \cdot \overline{x-1} \cdot \overline{x-2} \cdot \overline{x-3}}{1 \cdot 2 \cdot 3 \cdot 4}\,d'''' + \text{, \&c.}$$

which ſeries differs from the Newtonian in this, that the quantities $\frac{d''}{1 \cdot 2}$, $\frac{d'''}{1 \cdot 2 \cdot 3}$, $\frac{d''''}{1 \cdot 2 \cdot 3 \cdot 4}$ here uſed, ſignify the ſame with d'', d''', uſed by ſir Iſaac Newton.

Hence, if the differences of any order become equal, that is, if any of the quantities d'', d''', d'''', become $= 0$, we ſhall have a finite expreſſion for E, the term ſought; it being

ing evident, that the ſeries muſt terminate when any of the differences d'', d''', &c. become = 0.

It is alſo evident, that the coefficients $\frac{x}{1}$, $\frac{x \cdot \overline{x-1}}{1 \cdot 2}$, &c. of the differences, are the unciæ of the binomial theorem.

E. G. Suppoſe it were required to find the log. tangent of 5′, 1″, 12‴, 24⁗, or 5′, 1″, $\frac{62}{300}$, or 5′, 1″, 2066, &c.

Take out the log. tangents to ſeveral minutes and ſeconds, and take their firſt and ſecond differences, thus:

	Tang.	d'	d''	
5′ 0″	7.1626964			
		14453		
5 1	7.1641417		−49	
		14404		−48.
5 2	7.1655821		−47	
		14357		
5 3	7.1670178			

Here A = 7.164147; $x = \frac{62}{300}$; $d' = 14404$; and the mean ſecond difference $d'' = -48$. Hence

A - - - - -	7.1641417
$x\,d'$ - - - -	2977
$\frac{x}{1} \cdot \frac{x-1}{1} d''$ - - - - -	4
Therefore, the tangent of 5′, 1″, 12‴, 24⁗, is	7.1644398

A method may be deduced from the foregoing expreſſion, of finding the ſums of the terms of ſuch a ſeries. For if we imagine a new ſeries, whereof the firſt term ſhall be = 0, the ſecond = A, the third = A + B, the fourth = A + B + C, the fifth = A + B + C + D, and ſo on, it is plain that the aſſigning one term of this ſeries is finding the ſum of all the terms, A, B, C, D, &c. Now ſince thoſe terms are the differences of the ſums 0, A, A + B, A + B + C, A + B + C + D, and that by the ſuppoſition, ſome of the differences of A, B, C, D, &c. are = 0; it follows that ſome of the differences of the ſums will alſo be = 0; and that whereas in the ſeries $A + x\,d' + \frac{x \cdot \overline{x-1}}{1 \cdot 2} d''$, &c. by which a term was aſſigned, A repreſented the firſt term, d' the firſt of the firſt differences, and that x repreſented the interval between the firſt term and the laſt, we are to write 0 inſtead of A, A inſtead of d', d' inſtead of d'', d'' inſtead of d''', &c. and $x + 1$ inſtead of x, which being done, the ſeries expreſſing the ſums will be $0 + \frac{x+1}{1} \cdot$

$$A + \frac{\overline{x+1} \cdot x}{1 \cdot 2} d' + \frac{\overline{x+1} \cdot x \cdot \overline{x+1}}{1 \cdot 2 \cdot 3} d'' +, \text{ &c. or } x+1$$

$$\times A + \frac{x}{2} d' + \frac{x \cdot \overline{x-1}}{2 \cdot 3} d'' + \frac{x \cdot \overline{x-1} \cdot \overline{x-2}}{2 \cdot 3 \cdot 4} d''', \text{ &c.}$$

Or, again, if the real number of terms of the lines be called z, that is, if $z = x + 1$, or $z - 1 = x$, we ſhall have

$$\text{the ſum of the ſeries} = z \times A + \frac{z-1}{2} d' + \frac{\overline{z-1} \cdot \overline{z-2}}{2 \cdot 3} d'' + \frac{\overline{z-1} \cdot \overline{z-2} \cdot \overline{z-3}}{2 \cdot 3 \cdot 4} d''' +, \text{ &c.}$$

See De Moivre, Doct. of Chances, p. 59, 60. Miſc. Analyt. p. 153. Simpſon's Eſſ. p. 95.

For inſtance, let it be required to find the ſum of ſix terms of a ſeries of the ſquares of the natural numbers 1 + 4 + 9 + 16 + 25 + 36. Thus,

Terms.	d'	d''	d'''
1			
	3		
4		2	
	5		0
9		2	
	7		0
16		2	
	9		
25, &c.			

Here A = 1, $d' = 3$, $d'' = 2$, $d''' = 0$, and $z = 6$. The ſum conſequently will be

$$= z \times 1 + \frac{z-1}{2} \times 3 + \frac{\overline{z-1} \cdot \overline{z-2}}{2 \cdot 3} \times 2$$

$$= z \times 1 + \frac{3z-3}{2} + \frac{zz-3z+2}{3}$$

$$= z \times \frac{6 - 9 + 9z + 2zz - 6z + 4}{6}$$

$$= z \times \frac{1 + 3z + 2zz}{6} = \frac{z \cdot \overline{1+z} \cdot \overline{1+2z}}{6} = \frac{6.7.13}{6} = 91.$$

This eaſy example will be ſufficient to ſhew the applications of this rule. Thoſe who are deſirous of ſeeing its uſe in queſtions of chance, may conſult M. de Moivre's Doctrine of Chances, p. 59, ſeq. Various other inſtances of the uſe of this rule in finding ſums of progreſſions of figurative members, &c. may be ſeen in Miſc. Analyt. p. 154, ſeq.

As to the differential method, it is to be obſerved, that though ſir Iſaac and others have treated it as a method of deſcribing an algebraic curve, at leaſt of the parabolic kind, through any number of given points; yet the conſideration of curves is not at all eſſential, though it may help the imagination. The deſcription of a parabolic curve through given points, is the ſame problem as the aſſigning of quantities from their given differences, which may always be done by algebra, and by the reſolution of ſimple equations. See Mr. Stirling's Methodus Differentialis, p. 97. This ingenious author has treated fully of the differential method, and ſhewn its uſe in the ſolution of ſome very difficult problems. See SERIES.

DIFFERENTIAL *ſcale*, in *Algebra*, is uſed for the ſcale of relation ſubtracted from unity. See *Recurring* SERIES.

DIFFORM, DIFFORMIS, from *forma*, ſhape, is a word uſed in oppoſition to uniform; and ſignifies that there is no regularity in the form, or appearance, of a thing.

The botaniſts uſe it as a diſtinction of the flowers of ſeveral ſpecies of plants.

DIFFRACTION *of* LIGHT, is the bending of the rays of light, which is occaſioned by their paſſing by other bodies. Thus, if the light of the ſun be admitted through a hole in a room, otherwiſe darkened or cloſed, the image of the ſun within the room will be found to be larger than it ought to be, if the rays proceeded in ſtraight lines from the ſun to the ſcreen within the room. Alſo, if a hair, a wire, or other ſmaller body, be placed in the pencil of light which comes through the above-mentioned hole, the image of, or ſhadow of it, will be much larger than the hair or wire itſelf; which ſhews that the rays of light are bent in paſſing by the ſides of the hole, or of the hair, &c. This bending has been called diffraction; but more commonly INFLECTION *of Light*, which ſee.

DIFFUSE, DIFFUSIVE, is chiefly uſed for a proliх manner of writing, &c.

A dictionary cannot well be too diffuſive: for a man is never

never too much informed of the word he wanted; and he is not obliged to read that part of the explication which does not concern him.

A diffuſive ſtyle is proper for diſcourſes in the demonſtrative kind. Demoſthenes is cloſe, and conciſe; Cicero, on the contrary, is diffuſive.

DIFFUSE, in *Botanical Phraſeology*, is applied to the looſely ſpreading panicle of Oats and many other graſſes, and of London Pride *Saxifraga umbroſa*, as well as of various other flowers. It is alſo uſed to characterize the ſtems of various plants which ſpread in a lax indeterminate manner on the ground; for inſtance the Common Chickweed or *Stellaria media*, Sm. Fl. Brit. and the no leſs common *Veronica Chamædrys*, and *agreſtis*, ſuch ſtems being generally procumbent at their origin, and aſcending towards the extremity.

DIFFUSION, from *diffundo*, I pour out, I dilate, the act whereby a body is ſpread, or ſtretched out, ſo as to take up more ſpace.

The ſchoolmen make three kinds of diffuſion: the firſt, that whereby a pure quality is diffuſed; as cold, force, &c. This they diſtinguiſh into equal, whereby equal portions, or degrees, of the quality are diſtributed upon equal parts of the medium; thus, when a direct motion is impreſſed on a moveable, all the parts of the moveable receive an equal impetus; and unequal, when unequal degrees of the quality are diſtributed on different parts of the ſubject; thus it is, that force is impreſſed on a lever, and cold propagated through a medium.

The ſecond kind of diffuſion is that performed by the motion of bodies: ſuch is the diffuſion of light, ſound, ſmell, magnetic, electric virtues, &c.

The third is performed partly by the motion of corpuſcles, and partly by the diffuſion of a quality; and thus they hold fire to be diffuſed.

But the modern philoſophers reject the notion of qualities, and their diffuſion. According to them, there is no other diffuſion, but that of corporeal ſubſtance, emitted in minute effluvia, or particles, into a kind of atmoſphere all around the body; which diffuſion of corpuſcles ſome call atmoſpherical, as being ſuppoſed to be terminated by a circle, whereof the diffuſing body is the centre. Every body, it is now proved, has its ſphere of activity, or diffuſion, within which the particles, or corpuſcles, torn from it, and flying away, have a ſenſible effect; as we ſee in odorous, ſonorous, &c. bodies. See QUALITY; where the phyſical law of the diffuſion of qualities is laid down.

DIG, in *Agriculture*, a term which is ſometimes provincially applied to a mattock, and which likewiſe ſignifies the breaking up the ground by a ſpade or other ſimilar tool.

DIG, in *Geography*, a town of Hindooſtan, in the country of Mowat; 63 miles ſouth of Delhi.

DIGAMMA. See F.

DIGAMY, the ſame with bigamy. See BIGAMY.

DIGASTRICUS, in *Anatomy*, one of the muſcles of the lower jaw, called alſo by the name of biventer maxillæ inferioris. It is deſcribed in the article DEGLUTITION.

DIGBA, in *Ancient Geography*, a town of Aſia, ſituated on the bank of the Tigris. Pliny places it in Babylonia, and Ptolemy in Meſopotamia.

DIGBY, *Sir* KENELM, in *Biography*, was the ſon of ſir Everard Digby, who was executed for the ſhare which he had in the gunpowder-plot. Kenelm was but three years old when he loſt his father. Great care was taken to initiate him in the Proteſtant religion, and at a proper age he was ſent to Oxford to complete his ſtudies. He then made the tour of Europe, and on his return was preſented to the king, who not only gave him a gracious reception, but conferred on him the honour of knighthood. This was in 1623. He afterwards appeared with ſplendour at the court of Charles I., by whom he was greatly eſteemed. This prince made him gentleman of his bed-chamber, firſt commiſſioner of the navy, and a governor of the Trinity-houſe. He likewiſe granted him letters of repriſal againſt the Venetians, and with a ſmall fleet fitted out at his own expence, he obtained ſome brilliant ſucceſſes. He had long been regarded as a prodigy of learning, and he now returned to his native country with a high reputation for true valour and enterprize. Upon a viſit to France ſir Kenelm, warmly aſſailed by ſome eccleſiaſtics, was reclaimed to the religion of his fathers, and in 1636 reconciled himſelf to the church of Rome. He ſoon diſplayed the zeal of a new convert, by publicly defending the faith he had adopted, in two diſtinct works. On the commencement of the troubles with Scotland, ſir Kenelm was inſtigated by the queen to write to the Catholics of England, to obtain from them a voluntary contribution, in ſupport of the expedition againſt the Scots: for this he was afterwards impriſoned by the parliament; but during his confinement, which was probably not very rigorous he occupied himſelf with philoſophical ſpeculations. He wrote obſervations on the "Religio Medici" of ſir Thomas Browne, which have been highly eſteemed, as well on account of the politeneſs of the language, as the acuteneſs with which he confutes ſome of the notions of the author. He exhibited alſo a good taſte for allegorical interpretations, by an elaborate commentary on a ſtanza in the ninth canto of the ſecond book of the Fairy Queen, in which Spencer has introduced ſome of the myſteries relative to numbers. He was at length liberated, and went to France, where he was well received; and at this period he became acquainted with Des Cartes. Theſe philoſophers had many long and learned converſations on the nature of the ſoul, and on other intereſting topics, upon ſome of which they could not agree; but they parted full of mutual eſteem for each other. At Paris he publiſhed, in 1644, his own philoſophical ſyſtem, in two parts, entitled "A Treatiſe of the Nature of Bodies," and "A Treatiſe declaring the Operations and Nature of Man's Soul, out of which the Immortality of reaſonable Souls is evinced." When the cauſe of Charles was hopeleſs, ſir Kenelm came over to England, to make compoſition for his eſtate, but he was not permitted to remain in England, and parliament denounced againſt him the penalty of death, ſhould he return again without permiſſion. This was granted him by Cromwell in 1655, when he continued engaged in his own affairs the greater part of the year, and it is believed that he was likewiſe employed in conciliating the Catholic party to the protector's adminiſtration, upon the condition of a free toleration, a meaſure to which Cromwell was by no means averſe. Sir Kenelm reſided in the ſouth of France in 1656 and 1657, frequenting the ſociety of the learned and ingenious, before whom he was fond of making a parade of his philoſophical knowledge. He afterwards reſided in Germany for two years; but on the reſtoration he came again to his native country, where he met with a polite reception at court, but was not brought forward into active life. Henceforward he ſpent his time in a learned retreat, frequenting the meetings of the Royal Society, of which he was a member, and receiving the viſits of men of ſcience, at his own houſe in Covent Garden. He ſuffered very much from repeated attacks of the ſtone, which, in 1665, put an end to his life, at the age of ſixty-two. In early life lord Clarendon deſcribed ſir Kenelm as a man of a very extraordinary perſon and preſence, which drew the eyes of all men upon him, which were more fixed by a wonderful graceful behaviour,

like thoſe of comfrey. *Flowers* yellow; on branched peduncles. Sent by Dr. Houſton to Miller from La Vera Cruz. 5. C. *folioloſa*. Willd. 3. "Leaves oblong, nearly entire, half embracing the ſtem, downy; peduncles one-flowered, finally much elongated." *Stem* much branched, diffuſe, downy; branches thick ſet with leaves. *Leaves* alternate, downy on both ſurfaces. A native of the Eaſt Indies. 6. C. *patula*. Mart. 30. Willd. 4. Hort. Kew. 3. 184. "Leaves elliptical, ſerrated, villous underneath; calyxes ſomewhat globular; ſcales lanceolate, awl-ſhaped; branches ſpreading." *Root* annual. *Stem* a foot and half high, taper, ſlightly covered with a mealy down. *Leaves* about four inches long, and two broad in the middle, diminiſhing gradually in ſize on the upper part of the ſtem and branches. *Flowers* purple; peduncles at the end of the branches generally three-flowered; calyxes ſoft and ſwollen in the middle; ſcales ſmall and acute. A native of the northern parts of China, producing a ſucceſſion of flowers from July to the end of autumn. 7. C. *paniculata*. Willd. 5. "Leaves oblong, ſeſſile, downy on both ſurfaces; lower ones petioled; toothed; teeth reflexed; ſtem panicled; corymbs pedunculed, axillary." *Stem* four feet high, about the thickneſs of a ſwan's quill, erect, cylindrical, hollow, ſtriated; branches alternate, erect, ſimple. *Leaves* on the ſtem petioled, on the branches ſeſſile. *Calyx-ſcales* linear-awl-ſhaped, ſpreading, reflexed. A native of the Eaſt Indies. 8. C. *bifrons*. Linn. Sp. Pl. 7. Mart. 9. Willd. 6. (Eupatoria conyzoides maxima canadenſis; Pluk. alm. 141. tab. 87. fig. 4.) "Leaves ovate-oblong, embracing the ſtem, ſerrated, wrinkled." *Root* thick, fibrous. *Stems* ſeveral, erect. *Leaves* rough. *Flowers* yellow, in round terminal bunches. A native of Canada, flowering in July. Diſtinct from Inula bifrons. 9. C. *bifoliata*. Linn. Sp. Pl. 9. Mart. 10. Willd. 7. (Eupatoria conyzoides integro jacobææ folio; Pluk. alm. 140. tab. 177. fig. 1. C. axillaris; Lam.?) "Leaves oval, toothed; peduncles two-leaved; bractes oppoſite;" Linn. "Leaves cuſpidate-toothed; lower ones petioled, roundiſh egg-ſhaped; upper ones ſeſſile, oblong, wedge-ſhaped at the baſe; racemes axillary, leafy at the baſe, peduncled;" Willd. "Leaves inverſely egg-ſhaped, unequally and finely toothed, petioled; racemes axillary, leafy at the baſe, forming a terminal panicle;" Lam. *Stem* a foot and half or two feet high, ſimple, ſlightly ſtriated, downy. *Leaves* alternate, ſoft, green, and almoſt ſmooth above, cinereous and downy underneath. *Flowers* ſmall; bractes truly alternate, though ſome ſeem oppoſite; calyxes villous, reddiſh; Lam. Deſcribed from a dried ſpecimen in the Herbarium of Commerſon. In ſmaller ſpecimens, probably the growth of a poor ſoil, the peduncles are one-flowered, with oppoſite bractes. In larger ſpecimens the racemes are from three to ſix-flowered; peduncled, furniſhed with two, either oppoſite or alternate bractes, and ſometimes with four alternate ones; bractes oblong, ſeſſile, generally entire; Willd. A native of the Eaſt Indies and the Iſle of France. 12. C. *pubigera*. Linn. Mant. 113. Mart. 11. Lam. 9. Willd. 8. Lour. Cochinchin. 495. (Sonchus volubilis; Rumph. Amb. 5. 299. tab. 103. fig. 2,) "Leaves oblong, ſomewhat toothed, nearly ſeſſile; peduncles woolly, about two-flowered." *Branches* with a few ſcattered hairs. *Leaves* alternate, wedge-ſhaped at the baſe, green on both ſurfaces, with a few ſcattered hairs, not ſcabrous; Linn. *Stem* ſomewhat ſhrubby, eight feet high, cylindrical, climbing, branched. *Leaves* broad-lanceolate, ſomewhat pubeſcent, ſcattered, petioled. All the florets immerſed in a ſimple down; Lour. A native of the Eaſt Indies and China. 11. C. *ſtricta*. Willd. 13. "Leaves linear-lanceolate, attenuated at the baſe, quite entire, hairy; flowers in corymbs; ſtem panicled, ſtiff." *Root* annual. *Stem* a foot and half high, erect; branches ſhort, erect, cloſe to the ſtem. *Leaves* alternate, numerous, an inch long, obtuſe, with a point, narrowed at the baſe. *Corymbs* ſmall, faſtigiate at the tops of the branches. *Flowers* ſmall; down reddiſh. A native of the Eaſt Indies. 14. C. *caneſcens*. Linn. jun. Sup. 367. Mart. 5. Willd. 18. Thunb. prod. 153. (C. pinifolia; Lam. 18. Elichryſum peregrinum anguſtifolium floſculis ſpadiceis in apices crinitos deſinentibus; Seb. Muſ. 1. 38.) "Leaves linear, ſtiff, folded back at the edges; downy underneath; panicle faſtigiate." Whole plant hoary. *Stem* from twelve to fifteen inches high, nearly ſimple, cylindrical, ſtiff, lateral branches ſhort. *Leaves* three inches long, a line broad. *Flowers* purple; calyx ſhort; ſcales imbricated, lanceolate, villous, only half the length of the flowers; down intermixed with the florets; giving the flowers a feathered appearance. 15. C. *oleæfolia*. Lam. 20. Willd. 15. (C. orientalis pumila incana oleæfolio; Tourn. cor. 33.) "Leaves lanceolate, attenuated at the baſe, obtuſe, downy; corymb terminal; ſtem ſimple." *Root* perennial. *Stem* ſeven or eight inches high, erect. *Leaves* not an inch long, three or four lines broad, ſcattered. *Flowers* in a cloſe faſtigiate corymb; peduncles ſcaly; calyx oblong; ſcales cloſely imbricated, egg-ſhaped, obtuſe; down reddiſh, longer than the calyx. A native of America. 16. C. *viſcoſa*. Mart. 34. Houſt. MSS. "Leaves egg-ſhaped, ſerrated, villous; flowers axillary and terminal." *Root* annual. Whole herb viſcid. *Stem* a foot high, branched. *Leaves* one at each joint, ſeſſile. *Flowers* white; peduncles ſlender; generally three-flowered. *Seeds* chaffy. A native of La Vera Cruz. 17. C. *mollis*. Willd. 19. "Leaves rhomboid-egg-ſhaped, nearly ſeſſile, toothed, pubeſcent, tomentous underneath; ſtem naked upwards; flowers in a corymb." *Branches* cylindrical, ſtriated. *Leaves* an inch long, very white underneath. *Corymb* terminal; branches alternate, few-flowered, divaricated; peduncles one-flowered; calyx-ſcales linear-lanceolate; down long, ſnow-white. 18. C. *chenopodifolia*. Lam. 12. Willd 20. "Leaves ovate-deltoid, unequally ſerrated, ſoft; racemes ſhort, terminating the ſtem and branches." *Stem* tomentous upwards. *Leaves* alternate, petioled, tomentous when young, afterwards nearly ſmooth. *Flowers* whitiſh, ſeſſile, four or five together at the top of the ſtem and branches; calyx-leaves linear, very narrow, tomentous, almoſt equal; bractes cloathed with fine ſilky decumbent hairs. A native of the Iſle of Bourbon. There is a variety with broader, roundiſh-egg-ſhaped leaves, a little cut at the baſe. 19. C. *cinerea*. Linn. Sp. Pl. 14. Mart. 16. Lam. 3. Willd. 21. (Senecio indica, foliis ternis crenatis; Burm. Zeyl. 211. tab. 96. fig. 1. S. indicus atriplicis folio; Mor. Hiſt. 106. tab. 17. fig. 7. Olus ſcrophinum; Rumph. 6. tab. 14. fig. 1.) "Leaves egg-ſhaped, ſlightly crenate; lower ones obtuſe, upper ones acute; panicles naked, terminal;" Lam. *Root* annual. *Stem* about a foot high, ſlender, pubeſcent. *Leaves* ſmall, rather diſtant, narrowed into a petiole, cinereous-green, whitiſh underneath. *Flowers* purple, ſmall; peduncles branched, almoſt capillary; calyx-ſcales acute; down white, longer than the calyx. A native of the Eaſt Indies. 20. C. *prolifera*. Lam. 7. Willd. 22. (Sonchus volubilis Javanus; Rumph. 5. 299. tab. 104. 1?) "Branches proliferous at the top; leaves egg-ſhaped, toothed-angular, narrowed into a petiole; corymbs cloſe, terminal." *Branches* finely ſtriated, full of pith, ſcabrous, producing near the top ſome ſmaller villous branches, and giving the plant a proliferous appearance. *Leaves* ſmall, acute, green, and almoſt ſmooth above, hoary, and cloathed with ſhort hairs underneath. *Corymb* almoſt ſeſſile; calyx-ſcales awl-ſhaped, down white, the length of the calyx. A native of the iſland of Java. 21. C. *heterophylla*. Lam. 8. "Some of the leaves a little heart-ſhaped; others

large, and often complicated ſtomach: while the carnivorous tribes have a ſhort and ſmall digeſtive canal, conſtructed in ſuch a manner as to afford a rapid paſſage to their animal food, which contains more nouriſhment under a ſmaller bulk, which is digeſted more eaſily and readily, and might have putrefied if detained too long. In this point of view, man holds a middle rank between thoſe ſpecies which eat vegetable food, and thoſe which ſubſiſt on fleſh; he is adapted for both theſe kinds of nouriſhment, and is not excluſively herbivorous or carnivorous, but, by the very nature of his frame, *omnivorous*. This queſtion, which is ſo eaſy of ſolution, has often occupied the attention of the phyſician, naturaliſt, and philoſopher, who have derived tolerably plauſible arguments on both ſides, from the form and number of the teeth, ſtructure of the inteſtines, &c. We have already ſhewn, in the deſcription of the teeth under the article CRANIUM, that their form, &c. would lead to the ſame concluſion, as we have now pointed out.

Hunger and Thirſt.

The want of food ariſes from the neceſſity of obviating the loſſes which our body is conſtantly ſuffering, in the performance of its various functions; and of preventing, by the reparation of theſe loſſes, the fatal effects which they would otherwiſe occaſion. It is announced in all animals by an active and imperious feeling, which we call hunger, when it regards ſolid food; thirſt, when its object is liquids. Animal life could not be continued to the term allotted by the Creator without a conſtant ſupply of nutriment; we are incited to take this by the pleaſure attendant on the gratification of our natural wants; which pleaſure is always increaſed in proportion to the neceſſity of gratifying them. The appetite of the luxurious glutton can hardly be rouſed by the ſpices of either India; while the ploughman or hunter, returning from his daily labour, finds a reliſh in the coarſeſt bread, and ſimpleſt drink, that might be envied by the pampered palate of the epicure. But man and animals, who ſeem naturally prone to inactivity, and averſe from labour, are not governed, in this reſpect, by pleaſure alone: they are rouſed by the loud and repeated admonitions of an urgent, terrible, and, at laſt, intolerably painful ſenſation, to exert themſelves and labour for the acquiſition of food and drink.

Theſe wants are more urgent in the early periods of life, when, beſides the reparation of daily loſſes, materials of growth muſt alſo be ſupplied. Hence, the nutritive phenomena, and, conſequently, the digeſtive functions, are more active, as long as the body continues growing. The admonitions of hunger are alſo more preſſing in robuſt individuals who are engaged in laborious exertions, eſpecially in the open air, and who, conſequently, experience a greater daily loſs. Labouring men, like children, take daily four meals, or more, and thoſe plentiful ones. Fatigue diſſipates in the former what is applied to purpoſes of growth in the latter.

Habit conſiderably modifies our feelings in regard to food. The periodical returns of hunger at the arbitrarily fixed periods of our meals; and the loſs of appetite experienced when the accuſtomed time has gone by without our having taken a meal, ſtrongly illuſtrate this. Hence ſome have drawn a diſtinction between hunger and appetite, conſidering the former as the natural expreſſion of a real want; the latter as the habitual reſult of an artificial deſire. The laſt is conſiderably influenced by the imagination and the will. The recollection of a diſguſting object will often diſſipate the appetite, and even change it into an averſion from food: profound meditation, agreeable amuſements, or ſtrong paſſions, deaden our ſenſe of hunger, and render us for a time inſenſible to its effects.

A want of food produces a diminution in the weight of the body, which is already very ſenſible at the expiration of twenty-four hours; emaciation from the general abſorption of the adipous ſubſtance; coldneſs; proſtration of ſtrength; and the moſt painful dragging ſenſation at the pit of the ſtomach. It has alſo been aſſerted that the blood and other fluids degenerate, become alkaline, acrid, and even putrid; that the blood-veſſels and nerves are eroded, and hence that hemorrhages enſue, &c. But we believe that theſe circumſtances are not drawn from obſervation, and that no ſuch changes enſue.

A healthy adult certainly could not abſtain from food for twenty-four hours without feeling very conſiderable weakneſs; and, if the abſtinence were continued for eight days, death would be the highly probable event. Indeed in many inſtances a ſhorter period has ſufficed. Generally ſpeaking, the fatal event approaches more rapidly in proportion to the youth and ſtrength of the ſubject. Thus count Ugolino, (whoſe dreadful fate has been immortalized by Dante) condemned to periſh by hunger, and ſhut up with his children in a dungeon, died the laſt on the eighth day, after ſeeing his four ſons periſh ſucceſſively amid the convulſions of rage and the cries of deſpair, victims of the moſt horrible vengeance recorded in the annals of human crimes.

Yet numerous inſtances have occurred, in which, contrary to the accuſtomed courſe, abſtinence has been ſuſtained for much longer periods; for weeks, months, and even, if the narratives may be credited, years. Haller has collected a long liſt of ſuch examples, (Elem. Phyſiol. lib. 19, ſect. 2.) and if all of them ſhould not be authentic, there is yet a ſufficient number of well atteſted facts to ſhew, that perſons, under certain circumſtances, can diſpenſe with food for a long time. In Duncan's Annals, vol. 4. is the account of a woman who ſurvived after being buried in ſnow for eight days; the ſenſation of hunger ceaſed after the firſt day. Thirſt was the predominant feeling, and it was alleviated by ſucking the ſurrounding ſnow. In the 5th vol. of the ſame work, is the account of a lunatic who would often abſtain from all food both ſolid and liquid for fourteen days without appearing to be much weakened by it. In the medical communications, Dr. Willan has mentioned a young man, who, having taken up ſome ſtrange religious notions, lived for ſixty days on a pint of water ſlightly flavoured with orange juice each day. Dr. Birch, in his Hiſtory of the Royal Society, vol. ii. ſpeaks of Johanna Naunton, a young lady of noble extraction, reduced to indigence, who abſtained from food to conceal her poverty, and ſupported herſelf on lemon juice for 78 days. Haller mentions an inſtance of one, and another of three years abſtinence, as particularly authentic and well aſcertained. Elem. Phyſiol. tom. vi. p. 171.

In explanation of theſe facts, we may obſerve, that moſt of the ſubjects were weak and delicate women, living in a ſtate of complete inaction; many of them almoſt inſenſible, ſtupid, and lethargic. The men in every inſtance were melancholic. In ſuch ſubjects, the organs were not ſenſible to the natural ſtimuli, and the cuſtomary loſſes of the body in perſpiration, ſweat, &c. were not obſerved: the exiſtence of life almoſt extinct was only proved by a pulſe hardly to be felt, and a reſpiration ſcarcely perceptible performed at long intervals. Such individuals may be compared to hybernating animals; where the pulſe and reſpiration are equally obſcure, where no food is taken, and conſequently no fœces are voided, &c. In many inſtances of abſtinence, water was freely taken, which would undoubtedly obviate many of the ills ariſing from hunger.

The

The ſymptoms of hunger are, firſt an unpleaſant ſenſation, and then a very peculiar dragging and lacerating pain in the ſtomach; increaſed ſenſibility, want of ſleep; debility, yawning and fainting. The pain remits but returns with increaſed violence; the mind becomes affected, and delirium or mania cloſes the ſcene. So dreadfully painful are the ſenſations experienced from a privation of food, that they overcome the moſt violent antipathies, and the deareſt affections. Bones, putrid meats, hides of animals, leather, in ſhort the moſt diſguſting ſubſtances, are greedily devoured. The rage of the ſufferer has ſometimes attacked his own ſpecies, his friends, his children, and even the ſubſtance of his own body. The ſtomach, during abſtinence, becomes very much contracted; and hence we can underſtand, how a very ſudden diſtention of the organ, in this ſtate, ſhould cauſe pain, fainting, illneſs, or even death. Hence the neceſſity of allowing a very ſmall quantity of food to perſons in this condition; and of proportioning our ſupplies not to what the appetite demands, but to what the ſtomach will bear.

A caſe is recorded in Dr. Currie's Reports, of a patient who died of inanition from ſtricture of the œſophagus; of which we juſt mention the heads, conſidering it valuable from the rareneſs of ſuch records, and the philoſophic accuracy of the obſerver. From the 17th of Oct. to Dec. 6, he was ſupported without the aid of the ſtomach, by means of broth clyſters, and was immerſed in a bath of milk and water; theſe circumſtances, would, no doubt, modify the ſymptoms. He had at one time a parched mouth; a bliſter diſcharged only a thick coagulable lymph; and the urine was ſcanty, extremely high coloured, and intolerably pungent. This want of aqueous parts in the fluids, is, no doubt, the circumſtance, which has given riſe to the notion of their acrimony. The heat was natural and nearly uniform from firſt to laſt; the pulſe was perfectly natural until the laſt days. His ſleep was ſound and refreſhing; his ſpirits even, and his intellect perfect until the four laſt days, when the clyſters were no longer retained. Viſion was deranged on the firſt of December, and delirium followed on the next day; yet the retina was unuſually ſenſible, and the ſenſe of touch remarkably acute. The ſurface and extremities were ſometimes of a burning heat, ſometimes clammy and cold. On the fourth the pulſe became feeble and irregular, and reſpiration laborious; and in ninety-ſix hours after all means of nutrition, as well as all medicine had been abandoned, he ceaſed to breathe. He was never much troubled by hunger; thirſt was at firſt troubleſome, but relieved by the tepid bath. Currie's Reports, vol. i.

Many circumſtances have been adduced to explain the proximate cauſe of hunger; *viz.* the friction of the coats of the empty ſtomach againſt each other; the irritation produced on its ſurface by the action of the accumulated gaſtric juice; the contraction of its muſcular fibres; the compreſſion and folding of the nerves from this contraction; and the dragging of the liver and ſpleen on the diaphragm, when they are no longer ſupported by the ſtomach and inteſtines on account of their empty ſtate. It would be a waſte of time to comment on the inſufficiency of theſe explanations. A more rational illuſtration conſiders hunger as a ſenſation, excited in the ſtomach by ſympathy with the wants of the conſtitution at large. For if any circumſtance impedes the nutrition of the body, hunger ſtill remains, although the ſtomach be diſtended. This happens in ſchirrous pylorus, where the nutritive maſs cannot paſs into the ſmall inteſtine, to be ſubjected to the action of the lacteals, where the loſſes of the body cannot therefore be repaired. In diſeaſed meſenteric glands the ſame phenomenon is noticed; *viz.* voracious hunger in ſpite of the quantity of food taken. In both theſe inſtances, we ſee how ineffectual all the above mentioned cauſes would be in explaining the ſeat of hunger; and again, in the caſe quoted from Dr. Currie, hunger was not felt, although the ſtomach continued empty for ſo long a time. That hunger is a nervous ſenſation of the ſtomach ſeems probable, from its being influenced, like all the phenomena dependent on nervous action, by habit, and by mental cauſes; from its being increaſed and excited by cauſes which act on the ſenſibility of the organ, as by ſpirituous drinks and ſpices, even when the ſtomach is filled; and by its being diminiſhed by means of the contrary kind, as we know that opium will act in deadening the acute feelings of hunger, and that the Turkiſh and Indian fanatics, called Mollahs and Faquirs, are enabled, by this means, to ſupport their long faſts.

Thirſt is a feeling of a ſtill more urgent kind, and requiring inſtant ſatisfaction ſtill more imperiouſly than hunger; particularly when it is felt in a hot climate. Its effects are depicted in the account of the horrible ſufferings experienced by our countrymen in the black hole at Calcutta, when, however, the great mortality may not be aſcribable to thirſt alone. According to the relation of Plutarch, Lyſimachus, one of the braveſt ſucceſſors of Alexander, was compelled to ſurrender with his army, from the want of water; and Paul Jovius relates that the emperor Charles V. loſt ſeveral men in his African expedition from the ſame cauſe. Thirſt becomes very urgent when any of the watery ſecretions are augmented, as in dropſy and diabetes; and it is one of the moſt diſtreſſing ſymptoms in fevers, and inflammatory complaints, particularly inflammation of the ſtomach. Hot ſpices, ſaline ſubſtances, and particularly common ſalt, encreaſe it, as do all cauſes augmenting the different ſecretions. Hence it ſhould ſeem that the end of drinking, is to repair the loſſes of our fluids.

The ſeat of thirſt is in the mouth and fauces; which parts are not lubricated by the uſual ſecretion, and conſequently become dry. If it be not ſatisfied, a general irritation comes on, the ſenſation of dryneſs increaſes, and is accompanied with a burning feel, and an acute fever enſues. Theſe ſymptoms do not ceaſe until a ſupply of fluid, conveyed into the ſtomach, reſtores the ſecretions of the mouth and throat. Yet, although thirſt at firſt appears ſo urgent, drink is by no means ſo neceſſary to the continuation of life, as food. Several ſpecies of warm-blooded animals, as mice, quails, parrots, &c. can ſubſiſt without drinking; and individuals of our own ſpecies have, in ſome inſtances, by perſeverance, conquered the ſenſation of thirſt. Sir G. Baker has recorded a moſt memorable example in the Tranſactions of the College of Phyſicians, of a man who lived in perfect health for many years without drinking.

Food. Every thing that can afford nouriſhment to an animal body muſt have previouſly poſſeſſed life, and conſequently all food is derived from either the animal or vegetable kingdom. Minerals ſerve for ſeaſoning and medicine; and ſome miſerable ſavages have appeaſed the feeling of hunger by taking a greaſy kind of earth into the ſtomach. Some of the lower animals, as the earth-worm, alſo ſwallow earth; but they may extract vegetable and animal remains from this without deriving nouriſhment from the earth itſelf.

Any thing which is analagous to the nature of the body to be nouriſhed, and is ſuſceptible of being changed into its ſubſtance, may conſtitute an article of food. The eſſential characters of alimentary ſubſtances are, that they will eaſily change their nature and properties; that they yield readily to the means of decompoſition applied to them; diſſolve eaſily in water; and are ſubject to that ſpontaneous motion which conſtitutes fermentation. The ſubſtances which unite

theſe properties muſt alſo be of a compound nature, that is, muſt conſiſt of ſeveral elements, otherwiſe they would be incapable of the neceſſary decompoſition: they muſt alſo have already experienced ſome alteration; and hence the utility of the preliminary action of the organs of maſtication and inſalivation.

The food of man takes in almoſt every variety of both animal and vegetable ſubſtances. It conſiſts therefore of ſeveral unchangeable principles, foreign to the buſineſs of nutrition, combined with others in which the nutritive power reſides. The latter varies in its characters and proportions. Mucilage, gelatine, gluten, albumen, fecula, fibrine, ſugar, and the baſe of oxalic acid, are the general modifications under which the nutritive ſubſtance preſents itſelf. Each of theſe varies according to the nature of the heterogeneous principles with which it is aſſociated.

In the numerous plants which do actually, or which might ſerve for food, mucilage ſometimes exiſts alone, or mingled with extractive, colouring, acrid, bitter or odorous matters; or diluted with various proportions of water. It is often united with oxalic acid and ſugar; ſometimes with a very active volatile principle of a very acrid taſte and penetrating odour. Laſtly, it furniſhes the matter of gums and vegetable jellies; in one of which the nutritive principle is imperfectly formed, while in the other it is brought into a very ſmall volume.

Gum tragacanth, ſeneca, cherry-gum, &c. are examples of this matter. It is no where cultivated, nor even collected for food; ſo that we might be apt to conſider it as incapable of affording any nouriſhment, if it were not known that the caravans croſſing the ſandy deſerts of Africa, over which they have brought gum ſeneca, have in many inſtances loſt their way, exhauſted their proviſions, and been obliged to live on this gum for many weeks, having nothing elſe but water alone, and a very ſparing ſupply of that. Mucilage is alſo contained in moſt vegetable juices, and in the ſtems and other parts of plants.

In the fleſh of animals which we uſe for food, the gelatine is united with fibrous, extractive, ſaline, and earthy particles. It is mingled with fat, and with ſerous or lymphatic fluids. It is found in various degrees of tenacity and conſiſtence; in which it determines all the ſenſible differences of the white organs, which contain an abundance of gelatine. In a word, it forms the animal jellies, which conſtitute a mild, light, and wholeſome food.

Vegetable gluten is always found combined with other ſubſtances ſoluble in water, without which it could not be diſſolved in, and blended with, our juices. It abounds in the gramina, where it is united with fecula, extractive principle, colouring matter, mucilage, and an earthy ſubſtance.

The albumen of animal matters reſembles, in many points, the vegetable gluten. The whole white, and a great part of the yolk of an egg, are a compoſition of albumen, and colouring, and oily principles. The caſeous matter of milk is a modification of albumen; which, together with the principles of butter and ſugar, compoſes that ſoft emulſive liquor, ſo favourable to the conſtitution of infancy. The moſt nutritive plants are thoſe whoſe baſe and prevailing principle is the amylaceous fecula. It exiſts ſometimes completely pure, and free from extraneous admixture; ſometimes united with mucilage, oils, or gluten; ſometimes with ſugar, extractive, or colouring matters; ſometimes with earthy, acid, or ſaline principles; and very rarely with noxious, or poiſonous matters. Wheat is compoſed of gelatinous matter and fecula. Theſe two principles, acted on by the fermentative proceſs, form bread, the nutritive qualities of which are not ſurpaſſed by any ſubſtance. It is ſo much the more proper for animalization, inaſmuch as the fermentation has already brought it into a ſtate fit for decompoſition.

The principle now alluded to, which conſtitutes the farinaceous matter of vegetables, is contained, perhaps, in the largeſt proportion in rice; and wheat is the next to this. Other grains are only ſubſtitutes for theſe; except maize, which is eaſily cultivated, and contains much farinaceous matter. The legumina contain much of the ſame principle; as alſo nuts, and the ſeeds of the cucurbitaceæ and poppy, although not uſed for food. It exiſts, probably, in the ſtems of ſome plants, as the palmæ, from the expreſſed juice of which ſago is formed; in the roots of many claſſes, as the potatoe, yam, and pignut, in which it is very abundant.

The fibrine of the muſcles and blood partakes of the properties of gluten and fecula: it admits of a very ſpeedy aſſimilation, and exerts a more marked, rapid and extenſive influence on the ſtrength in general than any other food; yet it reſiſts the digeſtive powers, when, deprived of gelatine or dried, it is reduced to a hard coriaceous ſubſtance. It forms a cloſe and firm, but delicate and diviſible texture, in the muſcles of healthy animals, which form a light and ſucculent kind of food. An extractive colouring matter generally adheres to the fibrous ſubſtance; and the differences in its quantity or quality influence the appearance and nutritive powers of our various animal foods.

Sugar, and the oxalic baſe, which can hardly be ſeparated from it, are produced by both kingdoms. The vegetable acids are convertible into a ſugary ſubſtance, which beſtows on them whatever nutritive powers they may poſſeſs. Other acids, beſide the oxalic, are unfit for nouriſhment; and they only acquire that property by an admixture of the latter or of ſugar or mucilage. The ſame principles exiſt in various proportions in the fruits employed for food. The reſpective quantities of mucilage, ſugar, acid, and water, indicate how far they are ſuſceptible of digeſtion, and, conſequently, nouriſhing.

Sugar exiſts in moſt vegetables, but is moſt abundant in the ſugar-cane, from which alone it is furniſhed to any great amount, in the ſugar-maple and the beet-root. Excepting what is ſupplied from the vegetables above-mentioned, and which hardly forms the food of any perſon, its ſources for the purpoſes of food are not very general, being confined principally to dates, grapes, figs, and ſome other fruits. Fruits indeed, in general, contain ſugar; many of them in ſufficient quantity to afford conſiderable nouriſhment. But the three ſpecies juſt enumerated are thoſe on which many individuals live almoſt entirely; the ſugar being nearly their only nouriſhment: this obſervation holds with regard to dates in ſome of the African tribes, grapes in ſome parts of Portugal and Spain, and figs in Greece and the Grecian iſlands.

Expreſſed oils, found in vegetables, are alſo capable of being digeſted; the ſeeds containing them, and eſpecially nuts, are in many inſtances the principal food of the inhabitants of a country, as cocoa-nuts in America and the Eaſt. Theſe ſeeds indeed contain farinaceous matter, but in too ſmall proportion to afford nouriſhment of itſelf. The oily animal fluids alſo afford nouriſhment; the moſt common ſource of theſe is the fat of meat and butter, but there are perſons who drink with avidity ſpermaceti and train oil.

The ſmall number of principles juſt enumerated, as aſcertained by the reſearches of modern chemiſtry, fix the particular characters on which the natural diſtinctions of our aliments muſt reſt. The numerous modifications which theſe muſt undergo, from a variety of cauſes, will influence our choice of particular ſpecies of food; but theſe conſiderations,

as well as thoſe which regard the quantity and proportions both of ſolid and liquid food, belong to the ſubject of diætetics. See DIET.

The food of man, in the firſt ages, ſeems to have been drawn from the vegetable kingdom; in thoſe times, milk, derived firſt from the breaſt of the female, and afterwards from flocks and herds, was the ſole nourihment furniſhed by animals. Soon, however, fleſh was added to the food, and the juice of the grape to the drink of the human ſpecies. Subſequently the earth, air, and water, have been exhauſted to adminiſter to the wants or luxury of mankind; and ſubſiſtence has been drawn indifferently from animal or vegetable ſubſtances.

The power of adopting all kinds of diet would naturally lead us to expect the differences which we actually find in this reſpect among the numerous nations ſcattered over the face of the earth. In the moſt remote antiquity we read of tribes in Africa, and of the Indian prieſts and philoſophers, who lived only on vegetables; while the Ethiopians, Scythians, and Arabians, ate nothing but fleſh or animal food. Some tribes on the ſea-coaſt ſubſiſted entirely on fiſh. Modern hiſtory diſcovers the ſame difference of regimen. A vegetable diet ſeems ſuitable to the burning countries under the equator, and we, accordingly, find nations there who have completely adopted it, and who abſtain ſo much the more ſeverely from all animal foods, inaſmuch as it is an article of their religious faith. It is alſo rigorouſly obſerved in ſome more temperate climates. Potatoes, cheſnuts, maize, and the legumina, ſatisfy the wants of the Alpine peaſant; and numerous inſtances might be quoted of individuals and tribes whoſe ſole food has been vegetables and water. The frozen regions of the north demand a different diet; and the animal kingdom ſupplies the food of man near the pole. In the north of Europe, where the cold is leſs rigorous, the Swede, Dane, Ruſſian, German, and Engliſhman, eat much meat and little vegetables. The Tartars in Aſia, and entire tribes of ſavages in North America, live on raw and half putrid meat. The herbivorous animals afford the beſt animal food; but the Tartars, Samoieds, Eſquimaux, and others, do not refuſe food derived from other claſſes.

The muſcles of the herbivora are moderately ſoft and contain much gelatine; their milk is mild, the urine and fœces not very fœtid. Beſides the cow and ſheep, which are almoſt our only ſupply, the horſe, aſs, camel, and goat, are uſed in other regions. The fleſh of the carnivora is harder, and peculiarly ſtrong and fœtid. Yet dogs were eaten in the time of Hippocrates, and ſtill by ſeveral ſavage tribes; and the ſeal and walrus have often yielded a ſupply to the ſailor. All the granivorous, herbivorous, and inſectivorous birds, are eaten; the carnivorous very rarely; and the piſcivorous never, except in the laſt neceſſity, on account of their diſguſting ſmell and taſte. Fiſhes ſupply an abundant ſource of aliment, and even reptiles and inſects are employed in ſome inſtances.

The miſerable inhabitants of New Holland lived wholly on fiſh when that country was firſt diſcovered; and the ſame circumſtance may be affirmed of various tribes on the ſhores of Arabia and the Perſian gulph. In the iſlands towards the North of Scotland a great part of the food ariſes from the ſame ſource; ſtill more in the Ferro iſlands, in Iceland, and Lapland; and the whole in Greenland, and in the neighbourhood of the mouths of the large ſtreams in the north of Aſia. This claſs has alſo ſupplied ſome very ſingular kinds of aliment: the roes of the ſturgeon, beluga, and carp, bruiſed, ſalted, dried, and immerſed in oil, form the Ruſſian delicacy named caviar; this, and a ſimilar preparation from other fiſhes, were eaten in great quantities by the adherents of the Greek church, although Tournefort thought them deteſtable. The Roman luxury garum, which bore ſo high a price, conſiſted of the putrid entrails of fiſhes (firſt of the garus only) mixed with wine; and a ſimilar preparation is ſtill eaten in ſome parts of the eaſt. After this we ſhall not be ſurpriſed at hearing that the Arabs, Moors, Californians, and Ethiopians, eat locuſts; and that toads, graſshoppers, ſcorpions, and ſpiders, have ſerved for the food of man.

The aſſertion that all vegetable matters will ſerve us for food, muſt be taken with ſome limitation: for, beſides the poiſonous and medicinal productions of this kingdom, the fibrous and membranous parts of vegetables are clearly not digeſted, let them be ever ſo tender and ſoft. They are, however, digeſted by ſome other animals; but every man knows, from his own obſervation, that the ſkin of grapes or raiſins, &c. paſſes unchanged through the inteſtines. Oats will ſtill retain their power of germination, after going through the alimentary tube in horſes, if the huſk be not broken before they enter the ſtomach. Neither are all animal matters digeſtible; this is the caſe with cuticle, hair, horn, feathers, &c. which, accordingly, are thrown up in balls from the ſtomach of birds of prey. The indigeſtible nature of theſe matters probably ariſes from their being inorganic, or deſtitute of living powers.

It may alſo be mentioned as a curious fact, that the poiſonous juices of ſeveral animals, which, when infuſed into a wound, prove almoſt inſtantly fatal, may nevertheleſs be taken into the ſtomach, not only of many other animals, but even of the human ſubject, without the ſmalleſt detriment. Dr. Fordyce knew the black ſervant of an Indian merchant in America who was fond of ſoup made of rattle-ſnakes, in which he always boiled the head along with the reſt of the animal, without any regard to the poiſon. It has alſo been aſcertained, that the deadly ticunas, with which the American arrows are poiſoned, may be taken into the ſtomach with impunity. Neither are the animal or vegetable poiſons ſo eſſentially injurious to life as to exert their deleterious effects invariably. The conium maculatum, which is highly poiſonous to man, is taken in abundance, without injury, by goats: ſeveral other poiſonous vegetable productions are eaten by birds; and the cantharides are devoured by two kinds of inſect, whoſe juices are, nevertheleſs, perfectly mild.

Since man is diſtinguiſhed beyond all animals by the power of living in the moſt diſtant parts of the globe, under every variety of climate which this earth affords, his food could not be derived excluſively from either kingdom, ſince he inhabits regions that afford aliments only of one or the other ſort. He claims more juſtly than any other the title of an omnivorous animal; becauſe, on the one hand, he can revel in the vaſt variety of aliments drawn from the endleſs ſtores of the animal and vegetable kingdoms; while, on the other ſide, he can live healthy and ſtrong on a ſingle, and that the moſt ſimple form of food. Thus, in modern times, numerous examples occur of perſons living entirely on potatoes, cheſnuts, dates, &c. Some wandering Moors are confined almoſt entirely to gum Senegal (Mem. de l'Acad. des Sc. 1778.) The Kamtſchatkans, and other inhabitants of the ſea-ſhore, ſubſiſt wholly on fiſh; the ſhepherds, in the province of Caraccas, on the Oronoko, entirely on fleſh. Some barbarous tribes eat their meat raw.

Since, then, it appears that the ſtructure of the teeth, the joint of the lower jaw, and the form and ſtructure of the ſtomach and inteſtines, hold a middle rank, in the human ſubject, between the carnivorous and herbivorous; and that men have actually ſubſiſted in full health and ſtrength on one or the other kind only, or on a mixture of both ſorts of food, the concluſion that he is naturally deſigned to be omnivorous follows neceſſarily. We are the more diſpoſed to wonder

that

that this ſhould have been at all conteſted, when we find that ſeveral other animals are by no means ſo ſtrictly confined to one ſort of food, as not to derive a ſufficient nouriſhment from the other ſpecies; not to mention the numerous examples of omnivorous quadrupeds and birds; cows, horſes, and ſheep have been nouriſhed on fiſh and fleſh, fowls on animal food; and cats and dogs have learned to eat vegetables: and if we reflect, moreover, that thoſe animals which form the food of the carnivorous ſpecies are fed on vegetables, theſe circumſtances will admit of eaſy explanation.

Man has not been able to introduce ſo great a variety into his drink as into his ſolid food. Water alone, perhaps, ſupplies nine tenths of the human race; and as this ſeems prepared for us by the hand of nature, as all animals employ it, and it exceeds all other drinks in its properties as a diluent and ſolvent, we cannot doubt that it is the moſt wholeſome beverage: whether it is to be regarded merely as a diluent, or whether it be nouriſhing in itſelf, ſeems a matter of doubt; although there is little queſtion that life would be prolonged with the uſe of water beyond the period at which it would ceaſe without any food or drink. The fact, which has been proved by the experiments of Fordyce, that gold-fiſh will increaſe in weight in pure diſtilled water, and void fœces, ſeems deciſive in proving that thoſe animals are nouriſhed by it, and there can be no doubt that it affords nouriſhment to vegetables alſo. In almoſt all parts of the globe ſome fermented liquor has been prepared, poſſeſſing the power of inebriation by the alcohol which it contains; yet, undoubtedly, affording a certain portion of nouriſhment.

Some ſingular circumſtances have alſo been obſerved concerning drink. Several iſlands between the tropics, particularly in the Pacific ocean, have no freſh water; and its place is ſupplied by the milk of the cocoa-nut. Others drink ſea-water. An inſtance occurs, in the eſſays of the Edinburgh Medical Society, of a woman who lived for fifty years on whey only.

Digeſtion. The aliment introduced into the ſtomach accumulates there, and ſeparates the parietes of the organ, which are always contiguous in its empty ſtate. Here the ſtomach yields to the mechanical diſtenſion without reacting. Yet it ſeems not to be entirely paſſive; or, at leaſt, its coats apply themſelves by a kind of tonic movement to the accumulating matter. As the quantity of food increaſes, the greater curvature of the ſtomach advances forwards. Although this organ has been regarded in all times as the chief inſtrument of digeſtion, it ſeems, in fact, to perform only a preparatory office; and not to accompliſh the grand and eſſential phenomenon of this function, namely, the ſeparation of the nutritive and excrementitious parts of the aliment. Yet the food in its cavity is prepared for that ſeparation; it is rendered more fluid, it experiences a great alteration, and is converted into a ſoft homogeneous pap, called *chyme*. Since the latter ſubſtance poſſeſſes new properties, it is evident that the food has undergone ſome changes in the ſtomach, and that the ingredients of which it was compoſed, have entered into new combinations. What then is the agent of this converſion? In other words, what is the action of the ſtomach on the food?

Various hypotheſes have been framed in order to anſwer this queſtion. The father of medicine, and the ancients in general, conſidered digeſtion as effected by *coction*. They did not by this term mean to deſignate any change ſimilar to that which ſubſtances experience when boiled: the temperature of the ſtomach is manifeſtly inadequate to the effect. Moreover, cold blooded animals digeſt as well as thoſe with warm blood; and the heat of fever, inſtead of invigorating, entirely deſtroys the digeſtive power. Coction, in the language of the ancients, means the alteration, maturation, and animalization of the food in the ſtomach. It is clear that the natural warmth of the part aſſiſts and facilitates theſe changes. Spallanzani's experiments on artificial digeſtion ſhew that the gaſtric juice has no more effect than common water in ſoftening and diſſolving the food, when the temperature is below 21°: on the contrary, that its agency is very conſiderable, when the mercury riſes to 30 and upwards above the freezing point. In cold blooded animals the proceſs is always much ſlower than in the warm blooded.

The authors and partiſans of the ſyſtem of *fermentation* have recognized in the food, when received into the ſtomach, a ſpontaneous inteſtine motion; by virtue of which, it paſſes into a new order of combinations. As we accelerate the fermentative proceſs, by adding to thoſe ſubſtances which are undergoing it, a portion of the ſame matter that has already fermented, ſome have ſuppoſed a ſort of leaven conſtantly exiſting in the ſtomach, formed by a ſubtle acid, or conſiſting of a ſmall portion of food remaining behind from the preceding digeſtion. The nature and cauſes of fermentation were imperfectly underſtood when this explanation was adopted. "All that could be meant, ſays Dr. Thomſon, by ſaying, that the converſion of food into chyme in the ſtomach is owing to fermentation, was merely that the unknown cauſe, which acted during the converſion of vegetable ſubſtances into wine or acid, or during their putrefaction, acted alſo during the converſion of the food into chyme, and that the reſult in both inſtances was preciſely the ſame. Accordingly, the advocates for this opinion attempted to prove that air was conſtantly generated in the ſtomach, and that an acid was conſtantly produced; for it was the vinous and acetous fermentations which were aſſigned by the greater number of phyſiologiſts as the cauſe of the formation of chyme. Some, indeed, attempted to prove that it was produced by the putrefactive fermentation; but their number was inconſiderable, compared with thoſe who adopted the other opinion.

"Our ideas reſpecting fermentation are now ſomewhat more preciſe: it ſignifies a ſlow decompoſition, which takes place when certain animal or vegetable ſubſtances are mixed together at a given temperature, and the conſequent production of particular compounds. If, therefore, the converſion of the food into chyme be owing to fermentation, it muſt evidently be totally independent of the ſtomach, any further than as it ſupplies temperature; and the food would be converted into chyme exactly in the ſame manner, if it were reduced to the ſame conſiſtence, and placed in the ſame temperature out of the body. But this is by no means the caſe; ſubſtances are reduced to the ſtate of chyme in a ſhort time in the ſtomach, which would remain unaltered for weeks in the ſame temperature out of the body. This is the caſe with bones; which the experiments of Stevens and Spallanzani have ſhewn to be ſoon digeſted in the ſtomach of the dog. Further, if the converſion of the food into chyme were owing to fermentation, it ought to go on equally well in the ſtomach and œſophagus. Now, it was obſerved long ago by Ray and Boyle, that when voracious fiſhes had ſwallowed animals too large to be contained in the ſtomach, that part only which was in the ſtomach was converted into chyme, while that which was in the œſophagus remained entire.

If, too, the converſion were owing to fermentation, it ought always to take place equally well, provided the temperature be the ſame, whether the ſtomach be in a healthy ſtate or not. But it is well known that this is not the caſe. The formation of chyme depends very much on the ſtate of the ſtomach. When that organ is diſeaſed, digeſtion is conſtantly ill performed. In theſe caſes, indeed, fermentation ſometimes

appears, and produces flatulence, acid eructations, &c. which are the well-known ſymptoms of indigeſtion. Theſe facts, which have been long known, are incompatible with the ſuppoſition that the formation of chyle is owing to fermentation; accordingly, that opinion has been for ſome time abandoned, by all thoſe at leaſt who have taken the trouble to examine the ſubject."

With as little reaſon has digeſtion been conſidered a ſpecies of putrefaction, or ſpontaneous change of the animal and vegetable food. Not to mention that digeſtion never exhibits any appearance of ammoniacal products, which are the moſt ſtriking reſults of putrefaction, we ſhall find that the digeſtive organs have the power of reſtoring putrid meats to a ſound ſtate, or at leaſt of arreſting the putrefaction of ſubſtances ſubmitted to their action. Serpents are enabled, by the great dilatability of their œſophagus, and the wide ſeparation of their equally moveable jaws, to ſwallow animals larger than themſelves. Several days are conſumed in digeſting theſe; and, during the proceſs, that part of the animal which is ſubmitted to the action of the ſtomach, is perfectly ſweet, and in a more or leſs advanced ſtate of diſſolution, while the portion in the œſophagus preſents appearances of commencing putrefaction. In ſpite of the heat and moiſture of the part, the aliment does not ſtay long enough in the ſtomach for putrefaction to commence. Moreover, Spallanzani, Hunter, and other phyſiologiſts, have found that putrid fleſh, when taken accidentally, or given purpoſely to animals, loſt its putrid characters in the ſtomach, previouſly to its digeſtion.

Fermentation was the ſyſtem of the chemiſts; trituration was that of the mathematical phyſiologiſts; who compared the changes effected on a ſubſtance in a mortar by the peſtle of the apothecary, to thoſe which the food undergoes in the ſtomach. But what analogy could ever have been conceived to exiſt between the forcible attrition of a ſubſtance againſt a reſiſting plane, and the gentle periſtaltic motion of the fibres of the ſtomach? This opinion could have been held no longer, when it was perceived that chyme differed entirely from the food that had been taken; that is to ſay, that if the ſame food were triturated mechanically out of the body, and reduced to pap of preciſely the ſame conſiſtence with chyme, it would not poſſeſs the ſame properties with chyme. For, whenever this fact was known, it muſt be evident that the food had undergone changes in its compoſition. The fact that various fruits, as grapes, currants, raiſins, &c. which are covered with a membranous coat, will paſs through the inteſtines unchanged, if the covering be not broken in maſtication, and that often, particularly in animals, ſlender worms remain unaltered in the ſtomach, ſhews that the food can experience only a very ſlight compreſſing force in its paſſage. But the direct experiments of Stevens, Reaumur, and Spallanzani, demonſtrated that chyme is not owing to trituration; for, on encloſing different kinds of food in metallic tubes and balls full of holes, in ſuch a manner as to ſcreen them from the mechanical action of the ſtomach, they found that theſe ſubſtances, after having remained a ſufficient time in the ſtomach, were converted into chyme, juſt as if they had not been encloſed in ſuch tubes.

The mode in which digeſtion is effected in the gizzard of the gallinaceous birds, is the moſt plauſible argument in favour of trituration. In them the food, after being macerated in the crop, deſcends into the gizzard, whoſe vaſt muſcular ſtrength enables it to ſupply the place of organs of maſtication. (See the article BIRDS.) The trituration which it experiences here is aided by ſtones which the animal ſwallows; and its effects are truly ſurpriſing. Globes of glaſs or cryſtal are pulverized; bullets or metallic tubes are flattened, &c. Theſe effects are analogous to thoſe of maſtication in the human ſubject; and the true digeſtion is completed by means of a fluid ſecreted in certain glands at the termination of the œſophagus. The wide difference of ſtructure between theſe gizzards and the human ſtomach ſhould have ſhewn the abſurdity of applying inferences drawn from what happens in the one, to the other.

Pitcarne calculated the power of the ſtomach as equal to 12,951lbs.; and that of the diaphragm and abdominal muſcles, which compreſs the ſtomach in the alternate motions of reſpiration, at 248,235lbs. What does ſuch an abſurd and exaggerated calculation ſhew, but that the vain apparatus of axioms, definitions, ſcholia, and corollaries, which have been introduced into works foreign to the nature of geometry, has only ſerved to entrench vague, confuſed, and falſe notions behind impoſing and reſpected forms? The introduction of the hand into the abdomen of a living animal, or of the finger into a wound of the ſtomach, is ſufficient to ſhew that the force with which that organ acts on its contents does not exceed a few ounces.

The learned and laborious Haller ſuppoſed that the food was merely diluted and ſoftened by the gaſtric juice; he conceived that this *maceration* was favoured and accelerated by the warmth of the part, by the commencement of putrefaction, and by the gentle, but continual motions, by which the aliment is agitated. Maceration ſurmounts at length the cohefive force of the moſt ſolid ſubſtances; but it never changes their nature, and cannot therefore be the agent of digeſtion. This opinion was chiefly formed on the analogy or ruminating animals; in whom the imperfectly maſticated food is conveyed into an ample receptacle called the firſt ſtomach, or paunch, where it is truly macerated, and perhaps undergoes incipient fermentation. It is brought back from this cavity to the mouth to be again chewed, after which it deſcends into the ſecond and third, and laſtly into the fourth, or true digeſtive ſtomach. Here the whole ſtructure is ſo totally different from that of the human ſubject, that we may juſtly proteſt againſt drawing any analogy between the two caſes.

The formation of chyme, then, is owing to ſome peculiar proceſs taking place in the ſtomach; and it has been concluded from the experiments of Stevens, Reaumur, Spallanzani, Scopoli, Brugnatelli, Carminati, and others, that its formation is brought about by the action of a particular liquid ſecreted by the ſtomach, and for that reaſon called *gaſtric juice*.

No organ perhaps receives a greater number of veſſels, in proportion to its bulk, than the ſtomach; and hence we conclude, that this large ſupply is not merely deſigned for the nutrition of its ſubſtance, but alſo to furniſh the materials of ſome ſecretion. The fluid thus formed is the gaſtric juice, which is probably poured out moſt abundantly when the preſence of food in the ſtomach irritates that organ, and invites an afflux of blood from its numerous arterial tubes. It ſeems to be produced directly from the exhaling arteries, without any intermediate ſecretory apparatus. It is mingled with the mucus furniſhed by the glands of the villous coat, and thus it becomes viſcous, like ſaliva, with which, on the whole, it has conſiderable analogy. It is extremely difficult to obtain it pure for the purpoſes of analyſis; and even, if we could ſucceed in depriving the ſtomach of all reſidue of the food which might impair the purity of the gaſtric juice, we ſhould not be able to prevent the admixture of a ſmall portion of bile, which, entering at the pylorus, tinges the internal coat near that opening, and imparts a certain bitterneſs to the juices of the ſtomach.

Dr. Thomſon, in his ſyſtem of chemiſtry, ſeems to place very

very little reliance on the accuracy of the analyſes which have hitherto been made of the gaſtric juice. "It is," ſays he, "different in different animals, but it is a very difficult, if not an impoſſible taſk, to obtain it in a ſtate of purity. Various attempts have, indeed, been made by very ingenious philoſophers to procure it; but their analyſis is ſufficient to ſhew us that they have never obtained it in a ſtate of purity. The methods which have been adopted to procure gaſtric juice, are, firſt, to kill the animal whoſe gaſtric juice is to be examined, after it has faſted ſome time. By this method Spallanzani collected 37 ſpoonfuls from the two firſt ſtomachs of a ſheep. It was of a green colour, undoubtedly owing to the graſs which the animal had eaten. He found alſo half a ſpoonful in the ſtomach of ſome young crows, which he killed before they had left their neſt.

Small tubes of metal, pierced with holes, and containing a dry ſponge, have been ſwallowed by animals; and when vomited up, the liquid imbibed by the ſponge is ſqueezed out. By this method Spallanzani collected 481 grains of gaſtric juice from the ſtomachs of five crows. A third method conſiſts in exciting vomiting in the morning, when the ſtomach is without food. Spallanzani tried this method twice upon himſelf, and collected one of the times 1 oz. 32 gr. of liquid; but the pain was ſo great, that he did not think proper to try the experiment a third time. Mr. Goſſe, who could excite vomiting whenever he thought proper, by ſwallowing air, has employed that method to collect gaſtric juice. In any of theſe means it muſt be contaminated by the admixture of ſaliva, mucus, bile, food, &c. It may, too, be queſtioned, whether any gaſtric juice at all can be obtained by theſe methods; for as the uſe of that fluid is to convert the food into chyme, in all probability it is only ſecreted, when food is preſent.

According to Brugnatelli, the gaſtric juice of carnivorous animals, as hawks, kites, &c. has an acid and reſinous odour, is very bitter, and not at all watery; and is compoſed of an uncombined acid, a reſin, an animal ſubſtance, and a ſmall quantity of muriate of ſoda. In herbivorous animals, on the contrary, as goats, ſheep, &c. it is very watery, a little muddy, has a bitter ſaltiſh taſte, and contains ammonia, an animal extract, and a pretty large quantity of muriate of ſoda. Carminati found the ſame ingredients; but ſuppoſed that the ammonia had been formed by the putrefaction of a part of the food, and that the gaſtric juice in theſe animals is therefore of an acid nature.

In man it has ſometimes been found of an acid nature, at other times not. The experiments of Spallanzani ſhew that this acidity is owing to the food. He never found any acidity in birds of prey, ſerpents, frogs, or fiſhes. Crows gave an acidulous gaſtric juice only when fed on grain; and he obſerved the ſame fact in dogs, herbivorous animals, and domeſtic fowls. Carnivorous birds threw up pieces of ſhell and coral without alteration; but theſe ſubſtances were ſenſibly diminiſhed in the ſtomachs of hens, even when encloſed in perforated tubes. Spallanzani ſwallowed calcareous ſubſtances encloſed in tubes; and when he fed on vegetables and fruits, they were ſometimes altered, and a little diminiſhed in weight, juſt as if they had been put into weak vinegar; but when he uſed only animal food, they came out untouched. According to this philoſopher, whoſe experiments have been by far the moſt numerous, the gaſtric juice is neither acid nor alkaline. When poured on the carbonate of potaſh, it cauſes no effervescence.

The ſame concluſion concerning the influence of the food on the nature of the gaſtric juice, is rendered ſtill more indiſputable by the experiments of Dumas (Principe de Phyſiologie, tom. 4. ch. 9.) Having procured gaſtric juice from a dog by means of ſponge, in the mode employed by Spallanzani, he found that it did not change the vegetable blue; nor affect lime water; nor effervesce with alkalies. After feeding the animal with vegetables for fifteen days, the gaſtric juice ſhewed indiſputable marks of acidity. A diet of animal food was now ſubſtituted in place of the vegetable, for the ſame length of time, when inſtead of marks of acidity, there were rather indications of an alkaline tendency. When a mixed diet was employed, no predominant quality appeared: the gaſtric juice was faint, inſipid, thick and viſcous.

With reſpect to the ſubſtances contained in the ſtomach, only two facts have been perfectly aſcertained: the firſt is, that the juice contained in the ſtomach of oxen, calves, and ſheep, invariably contains uncombined phoſphoric acid, as Macquart and Vauquelin have demonſtrated. The ſecond, that the juice contained in the ſtomach, and even the inner coat of the ſtomach itſelf, has the property of coagulating milk and the ſerum of the blood. Dr. Young found that ſeven grains of the inner coat of a calf's ſtomach, infuſed in water, gave a liquid which coagulated more than 100 ozs. of milk; that is to ſay, more than 6857 times its own weight; and yet, in all probability, its weight was not much diminiſhed.

What the ſubſtance is that poſſeſſes this coagulating property, has not yet been aſcertained; but it is evidently not very ſoluble in water; for the inſide of a calf's ſtomach, after being ſteeped in water for ſix hours, and then well waſhed with water, ſtill furniſhes a liquor, on infuſion, which coagulates milk: and Dr. Young found that a piece of the inner coat of the ſtomach, after being previouſly waſhed with water, and then with a diluted ſolution of carbonate of potaſh, ſtill afforded a liquid, which coagulated milk and ſerum.

The moſt remarkable property of gaſtric juice, is the very ſingular activity of its ſolvent power. The hardeſt bones yield to its influence; and it acts as a real menſtruum on thoſe ſwallowed by the dog, uniting with their organiſed and gelatinous parts, and leaving a calcareous reſidue, which is the material of thoſe excrementitious concretions to which the older chemiſts gave the ridiculous name of album Græcum. The ſolvent energy of this fluid is in an inverſe ratio to the muſcular ſtrength of the coats of the ſtomach; and where theſe are the thineſt and weakeſt, it poſſeſſes the greateſt force and activity. In the numerous claſs of zoophytes it is the ſole agent of digeſtion, as the food undergoes no preliminary preparation: this, indeed, is alſo the caſe in many other inſtances. It is always more active when aſſiſted by warmth, as Trembley obſerved in the polype, which, according to his obſervations, digeſted in twelve hours in the ſummer, what occupied three days in colder times. In the actinea and holothuria it deſtroys even the ſhells of muſcles, which thoſe animals ſwallow. It attacks the ſurface of bodies, unites to the particles of them, which it carries off, and from which it cannot be ſeparated by filtration. It operates with more energy and rapidity, the more the food is divided. The aliment is not merely reduced to very minute parts; its taſte and ſmell are quite changed; its ſenſible properties are deſtroyed, and it acquires new and very different ones. It does not act as a ferment; ſo far from it, that it is a powerful antiſeptic, and even reſtores fleſh already putrified. Only a few air bubbles make their eſcape, which adhere to the alimentary matter, and buoy it up to the top, and are probably extricated by the heat of the ſolution.

However powerfully the gaſtric juice may act in diſſolving alimentary ſubſtances, it does not affect the coats of the ſtomach itſelf; which probably owe their power of reſiſtance to their vitality. The lumbrici, which are very tender, are not

not affected for the ſame reaſon; yet, when the ſtomach is dead, it yields, like other matter, to the gaſtric juice, and in particular caſes becomes ſoftened, and partly deſtroyed. This circumſtance was firſt noticed by Mr. Hunter, and the caſes in which it has happened are thoſe of ſudden deaths, where the perſon was previouſly in good health, and had lately eaten. In ſome, confeſſedly rare examples, a large hole has been found in the ſtomach from this cauſe, with the margins ragged and ſoft. As the facts mentioned by Mr. Hunter have been queſtioned, the writer of this article can add one, in which he found the great end completely deſtroyed in a child. In animals it is by no means rare to find the ſtomach even very conſiderably diſſolved in this way; and we can eaſily kill them under circumſtances in which the effect is likely to take place. In the human ſubject the great end of the ſtomach will often be found pulpy and ſoft on its internal ſurface, although it be not actually diſſolved through.

We have already noticed the coagulating power of the calf's ſtomach: it is found that coagulable animal fluids, as milk or jelly, introduced into the ſtomach, are coagulated before they are digeſted. This fact is obvious with reſpect to the milk vomited by ſuckling children. They muſt afterwards be diſſolved like the more ſolid parts of the food.

The proof of the facts already ſtated concerning the action of the gaſtric juice, is derived from experiments, in which food encloſed in perforated tubes taken into the ſtomach, and returned again by vomiting, has been completely changed into chyme. Spallanzani has repeated his reſearches almoſt unneceſſarily on this point, in the various claſſes of animals, and uniformly with the ſame reſult as to the performance of digeſtion by a ſolvent fluid. Similar reſearches have alſo been inſtituted on the human ſubject, with the ſame event. It has been found, too, that digeſtion could be imitated out of the body, by means of gaſtric juice obtained in the methods explained above; that alimentary ſubſtanees, expoſed to its action in the temperature of the human body, were diſſolved, while they remained unchanged in water under the ſame circumſtances.

Dr. Stevens met with a very favourable opportunity of aſcertaining the action of the gaſtric juice on ſubſtances encloſed in tubes and ſwallowed, in a man who had the power of ſwallowing ſtones. Twenty-eight gr. of pork and cheeſe were entirely diſſolved, when the tubes were voided in 43 hours: the ſame was aſcertained of parſnip and potatoe, boiled ſalt, herring, and roaſt turkey. Grain covered by its huſk, was unaltered: neither was bone affected. Leeches and earth-worms were completely diſſolved. In the ſtomach of a dog 3 ſcruples 16 gr. of ivory loſt 2 ſcruples: and bone was ſenſibly affected. Cartilage was not changed, nor fat ſo much as lean.

The gaſtric fluid then will exert its influence on the dead ſtomach, and it will even act on alimentary matters out of the body. Yet we muſt not completely identify theſe caſes with that of digeſtion in the ſtomach; we are not to regard that organ as a chemical veſſel, in which decompoſitions and recombinations are going on; we muſt take into conſideration the living powers of the part, and we ſhall find, that the ſecretion of gaſtric juice is ſubject to the influence of theſe, and that it requires the free and continued action of the nerves of the part. The ligature of the par vagum, the uſe of narcotics and opium, profound meditation, or violent emotions of the mind, will interrupt or ſuſpend digeſtion. Dumas has performed ſeveral experiments on this ſubject; he found the gaſtric ſecretion diminiſhed by introducing opium into the ſtomach, alſo by acids and alcohol; increaſed by volatile alkali, emetic tartar, and corroſive ſublimate; and interrupted or ſuſpended by cauſes that affected the nervous ſyſtem in general, as violent pain. When the natural functions of the part were thus diſordered, fermentation and putrefaction took place in the aliment. Indeed, the changes which the food undergoes in the ſtomach, differ eſſentially from any which chemical means can produce; no artificial proceſs can imitate the formation of chyme; no ſolution, analyſis, or combination, will ever enable the chemiſt to form or extract that nutritive fluid common to all animals, but poſſeſſing ſpecific characters in each. Without, however, pretending to admit or to exclude the poſſibility of bringing, one day or other, the converſion of aliment into the nutritive fluid, under the general laws of chemiſtry, we may at leaſt note certain circumſtances which belong inconteſtibly to vital phenomena. 1ſt. Digeſtion varies according to the nature and diſpoſition of the animal in which it is performed, a circumſtance contrary to the uniformity of chemical reſults. 2dly. It varies according to individual peculiarities, one perſon digeſting well what would diſagree with another, &c. 3dly. The taſte, appetite, and fancy, influence the proceſs conſiderably; an antipathy conceived againſt even a wholeſome food, will prevent its digeſtion. If the living powers of the ſtomach be ſtrong, the food will be perfectly digeſted; while, under contrary circumſtances, the ſame food would undergo chemical changes. Hence, if too large a quantity, or an indigeſtible ſort of food, or ſuch as the ſtomach has not been accuſtomed to, be taken into a weak ſtomach, it will be converted into a matter, which may be taken up with the chyle, and produce noxious effects on the ſyſtem, as too much ſalted animal food does in ſailors; or it may be converted into ſubſtances noxious to the ſtomach and inteſtines, as in heart-burn, vomiting, &c.; or its effects on the organs of digeſtion may be noxious to the whole ſyſtem, cauſing fever, &c. On the other hand, ſtrong ſtomachs, and particularly ſuch as are habituated to any particular kind of food, derive perfect nouriſhment from ſuch food, whatever it be. Thus, a Laplander lives upon reindeer alone, without intermixing, for moſt part of the year, any vegetable food; and others live on ſhell-fiſh, dead and putrid ſeals and whales, &c. Hence, particular kinds of food are not more capable, in themſelves, of affording good chyle; but particular ſpecies muſt be adapted to the ſtate of the digeſtive organs, in order to be that which is moſt proper or wholeſome; or, in other words, no food is, in itſelf, wholeſome or unwholeſome, but as it is compared with the preſent ſtate of the ſtomach and organs of digeſtion.

Dr. Fordyce, in his Treatiſe on Digeſtion, argues againſt the opinion which aſcribes digeſtion to any ſolvent fluid formed in the ſtomach, and he appears to conſider it as a chemical proceſs, effected by the living powers of the ſtomach. He obſerves, that the ſubſtances employed for food, yield the ſame elements on analyſis as chyle, and that food and chyle differ only in the mode of combination of theſe elements. "Digeſtion (ſays he, p. 166) is performed on ſubſtances containing all the elements of chyle. Theſe ſubſtances in the ſtomach, and other organs of digeſtion, have their elements ſeparated from one another by the effects of the ſtomach, and other organs of digeſtion upon them, occaſioning in them a decompoſition and recombination of their elements into a new ſubſtance."

Reſt of the body ſeems an eſſential condition to the right performance of digeſtion; exerciſe interrupts it, and this has been proved by direct experiment on two dogs, who were fed at the ſame time. One was allowed to lie down quiet, while the other was taken out hunting, and they were then both killed. The aliment in the dog who had been exerting himſelf was unchanged.

The

The food remains in the ſtomach a longer or ſhorter time, according as its nature diſpoſes it to yield more or leſs readily to the action of that organ. Goſſe, of Geneva, found, by experiments on himſelf, that animal and vegetable fibres, concrete albumen, the white and tendinous parts of animals, paſtes made with fat and buttery ſubſtances, unfermented, or ſlightly fermentable matters, remain longer in the ſtomach than the gelatinous parts of animals and vegetables, fermented bread, &c. That the latter only required an hour for their diſſolution, while the former were hardly diſſolved in ſeveral hours. It ſeems hardly poſſible to lay down any general rule, on account of the great variety of alimentary articles. It ſhould appear, that the various parts of a meal go off in proportion as they are digeſted; water and mild fluids muſt paſs very quickly through the ſtomach, for they are ſeparated by the kidneys ſo ſoon after drinking, as to have induced many phyſiologiſts to ſuſpect a ſhorter communication between the ſtomach and kidneys than by means of the inteſtines, lacteals, and general circulation. According to Viridet, watery fluids paſs in half an hour; ripe fruits, light meats and bread, in from three to five hours; harder meats not till the 7th or 8th hour. In wounds of the inteſtines, milk has come out in half an hour, and ſoon after in a coagulated ſtate. In another caſe of that kind, beer appeared in an hour; ripe fruits and vegetables in two hours; meat and bread in nine hours. Theſe circumſtances, however, would be influenced by the unnatural ſtate of the ſubject. "I have obſerved (ſays Haller) what paſſed in my own perſon, when my digeſtion was not good, and when eructations, impregnated with the taſte of the food, aſcended from time to time. I ſtill perceived a kind of commotion in the meat, which my ſtomach did not act on well, four hours after the meal: this gradually ſubſided, and in ſix hours after a moderate dinner, my ſtomach was empty, and pure air alone aſcended." Elem. Phyſiol. tom. 6. p. 281.

An intereſting caſe of fiſtulous opening in the ſtomach, communicating externally, and related by Richerand in his "Nouveaux Elemens de Phyſiologie," throws much light on the ſubject of digeſtion. The aperture, more than 18 lines long, and an inch broad, expoſes the interior of the ſtomach. It came on in conſequence of an injury, and had exiſted for many years. At the admiſſion of this patient into the Hoſpice de la Charité, ſhe ate three times as much as ordinary perſons, made about a pint of urine daily, and had a ſtool once in three days. Three or four hours after a meal, an irreſiſtible feeling compelled her to remove the dreſſings of the fiſtula, and to allow the eſcape of the food, which the ſtomach could no longer contain. The contents came out quickly, accompanied by more or leſs air. They poſſeſſed a faint odour, but had neither acid nor alkaline properties; for the greyiſh paſte, of which they conſiſted, when diluted with diſtilled water, did not affect the vegetable blue. The digeſtion was often far from complete, yet frequently the odour of wine was deſtroyed, and bread was reduced to a ſoft, viſcous, and thick ſubſtance, reſembling fibrine recently precipitated by the acetous acid, and ſwimming in a ſtringy fluid of the colour of ordinary ſoup. The experiments made on this half-digeſted food, at the Ecole de Medecine, ſhewed, that the changes which it had undergone were an increaſe of gelatine, the formation of a ſubſtance like fibrine, and of a conſiderable proportion of muriate and phoſphate of ſoda, and phoſphate of lime. This patient could never ſleep until after ſhe had emptied her ſtomach, and waſhed it out by drinking infuſion of camomile. In the morning it contained a ſmall quantity of thick and frothy liquid, analogous to ſaliva, which did not affect the vegetable blue, and contained parts of more conſiſtence, and even compleatly opaque albuminous flocculi mingled with the liquid portion. The reſults of chemical experiment on this liquid, were ſimilar to thoſe obtained from the ſpittle.

This patient, thin and emaciated, dragged on a feeble and languiſhing exiſtence, ſupported by the ſmall quantity of food which paſſed through the pylorus, to receive the influence of the biliary ſecretion, the action of which, on the chyme, is eſſential to the ſeparation of its nutritive portions. The ſmall quantity of nouriſhment that could be taken up by the abſorbents of the ſtomach, contributed very little to ſupport the frame; and the patient, therefore, was circumſtanced like thoſe who have a diſeaſed pylorus, which, refuſing to yield, when digeſtion is accompliſhed, cauſes the food to be vomited up. While the diſſolution of the food is proceeding, both orifices of the ſtomach are cloſed; no gas, diſengaged from the food, aſcends through the œſophagus, except from imperfection in the proceſs. Slight ſhiverings are felt; the pulſe becomes quick and firm; and the vital powers ſeem to be diminiſhed in the body at large, that they may be increaſed in the organ of the digeſtive proceſs. Soon the coats of the ſtomach begin to act; the circular fibres contract in different parts; theſe periſtaltic oſcillations, at firſt vague and irregular, are repeated from above downwards, and from left to right; that is, from the œſophageal towards the pyloric orifice. The longitudinal fibres ſhorten it in its long diameter, ſo as to approximate the two orifices. In theſe motions the ſtomach is elevated on the pylorus, ſo as to efface the angle which it forms at the commencement of the duodenum, and thereby to facilitate the food's paſſage.

The pyloric ſphincter remains contracted while digeſtion is going on, and prevents the paſſage of thoſe portions which are not ſufficiently ſubdued. Endowed, probably, with a peculiar and delicate ſenſibility, the pylorus, as its name imports, may be regarded as a vigilant ſentinel, obſtructing the egreſs of all which is not duly changed. Hence ſeveral authors have obſerved, that the aliments do not quit the ſtomach in the order of their admiſſion into that cavity, but according to their greater or leſs digeſtibility; we might, therefore, aſſert that there is a real ſeparation of the food in the ſtomach. The moſt ſpeedily diſſolved aliments are directed towards the pylorus, which yields to them, and rejects thoſe, which being inſufficiently digeſted, do not convey a ſuitable impreſſion to the part. The paſſage of coins may be objected to this delicate ſenſibility of the pyloric ſphincter: but let it be remembered that theſe, and other indigeſtible ſubſtances, remain in the ſtomach ſome time before they paſs, are repeatedly preſented to the pylorus, and thus accuſtom that part to their contact. The gaſtric ſyſtem may be compared in this reſpect to a ſecretory gland; and as the excretory tubes, poſſeſſing a ſpecies of *elective* ſenſibility, do not admit the ſecreted fluid until it has been duly prepared in the glandular parenchyma; ſo the pylorus will not allow the food to paſs into the inteſtine, which may be regarded as the excretory duct of the ſtomach, until it has been ſufficiently elaborated in that organ.

As the ſtomach frees itſelf the ſpaſm of the ſkin ceaſes, a gentle warmth ſucceeds; the pulſe becomes fuller, and the inſenſible tranſpiration increaſes. Digeſtion, therefore, produces a general movement, analogous to a febrile attack; and this effect, remarked by the ancients, is particularly obſervable in females of great ſenſibility. The action of the ſtomach does not ceaſe until it has entirely expelled its contents. The gaſtric juice, no longer called for by the preſence of food, is poured out in ſmaller quantity, or perhaps not at all; and the parietes, brought into contact with each

each other, are lubricated by the mucous ſecretions of the part.

For further obſervations on the action of the ſtomach, on vomiting, on its ſympathies with other organs, &c. See STOMACH.

Chylification.

The aliments having ſuffered the firſt degree of aſſimilation, quit the ſtomach, paſs into the duodenum, and there experience new changes, as eſſential as thoſe which they underwent in the ſtomach; this proceſs is named chylification. The food conſiſts now of a half liquid pultaceous maſs, with a conſiderable mixture of matter foreign to the purpoſe of nutrition, the groſs reſidue of its decompoſition. The latter part is only fit to be expelled; and the action of the inteſtines conſiſts in extracting from it the nutritive fluid, in ſeparating the excrementitious portion, and in forming a mild, white, emulſive, and highly nutritive liquor, which is to be abſorbed by the lacteals and conveyed by them into the circulating ſyſtem. We may indeed affirm, ſince the chief end of digeſtion conſiſts in the ſeparation of the nutritive ſubſtance into two parts, an excrementitious and a chylous portion, that the duodenum, in which that ſeparation is effected, is its principal organ. The moſt attentive examination of the greyiſh chyme, as it leaves the ſtomach, diſcovers to us nothing but a ſoft homogeneous pap; and the abſorbents of that organ never contain, like thoſe of the inteſtines, true chyle. The duodenum may, in truth, be regarded as a ſecond ſtomach, as it is diſtinguiſhed from the reſt of the ſmall inteſtine by being ſituated externally to the peritoneum, by its magnitude, by its fixed curves, large number of valvulæ conniventes and lacteals; and particularly by its receiving the terminations of the pancreatic and biliary ducts. All theſe peculiarities retard the courſe of the alimentary ſubſtance, and prolong the term of its expoſure to the action of the laſt-mentioned fluids.

The irritation of the chyme in the duodenum is tranſmitted to the liver and gall-bladder, and induces an increaſed flow of hepatic and cyſtic bile diluted by the fluid of the pancreas, which probably participates in the general irritation and increaſed ſecretion of all the gaſtric organs. This mixed pancreatico-biliary fluid, poured on the chymous maſs, penetrates, dilutes, and animalizes it; ſeparates the chyle from the excrementitious part, and precipitates from it whatever is not nutritious. In this proceſs the bile itſelf ſeems to ſeparate into two portions. Its oily, colouring, and bitter part combines with the excrement, and imparts to it, thoſe ſtimulating properties, by means of which it excites the action of the alimentary tube; while the albuminous and ſaline portions mixed with the chyle, and being abſorbed with it, re enter the circulating ſyſtem. In fact, the contents of the ſmall inteſtine exhibit two very diſtinct ſubſtances after the admixture of the pancreatico-biliary fluid; one is a whitiſh milky matter, found at the ſurface, and adhering to the inteſtine; the other, more abundant, is yellowiſh: and when digeſtion is well performed, contains no traces of the nature of the food. A further account of the pancreatic and biliary fluids will be found under PANCREAS, LIVER, and BILE.

There is probably another fluid, beſides thoſe now enumerated, concerned in the buſineſs of chylification; a ſecretion from the villous coat of the inteſtines, ſuppoſed to be analogous to that of the ſtomach, and named *ſuccus inteſtinalis*. There muſt alſo be a conſiderable effuſion of mucus into the ſmall inteſtines, as the glands of that nature abound in the inteſtinal coats, particularly towards the latter portion of the tube. All, however, that we know on the ſubject of the inteſtinal fluid is mere matter of ſpeculation, derived from analogy and conjecture, and unſupported by direct experiment and obſervation, which the very nature of the ſubject ſeems entirely to preclude.

The action of the inteſtines is not confined to a change in the external and phyſical qualities of the food; it affects alſo their internal chemical properties. The developement of a gelatino-mucus ſubſtance, the formation of ſeveral ſalts, the diminution of acids in general, and of the carbonic acid in particular, an increaſe of azote and hydrogen, and the production of the principle of ſugar, are the eſſential changes which the food undergoes in the inteſtines. Yet the united agencies of the ſtomach and inteſtinal tube do not always ſucceed in changing the nature of the various matters ſubmitted to their action. The qualities of the food often affect very ſenſibly the chyle, blood, urine, milk, &c. Indigo tinges the chyle of a blue colour. The urine, ſweat, and milk are affected by the colour, odour, taſte, or medicinal qualities of rhubarb, ſcammony, violets, and other vegetable matters. The fat of fowls becomes infected with the ſmell of garlic; the fleſh of ſome birds is purgative, when they feed on particular vegetables; and the fiſhy taſte of ſuch as uſe fiſh for their food, is well known.

Of the effect produced by the inteſtines in the function of aſſimilation, we may obſerve, as we did of that ſhare of the proceſs performed in the ſtomach, that it is a living action, explicable only by means of the vital powers. Theſe regulate and modify the changes and combinations of the food; and hence the matter extracted from the aliment poſſeſſes a ſpecific character derived entirely from the properties of life. Hence the mixture of ſaliva, gaſtric juice, bile, and pancreatic liquor, with the food, out of the body, would never form chyle, nor any thing like it.

Action of the ſmall Inteſtine.

The alimentary maſs, ſeparated in the duodenum, in the manner already deſcribed, into two portions, enters the jejunum, and ſubſequently the ilium. Its paſſage is retarded by the numerous curvatures of the canal, which ſome phyſiologiſts, indulging in a poetic ſtrain, have compared to the windings of a ſtream enriching the ſoil through which it meanders. Theſe retain the aliment, in order that the chyle, expreſſed by the periſtaltic contraction of the inteſtines, may be repeatedly preſented to the inhalant orifices of the lacteals; which are particularly numerous on the ſurface of the valvulæ conniventes. The paſſage of the inteſtinal contents is not only retarded by theſe projections; but, as the contraction of the tube forces them into the alimentary maſs, the lacteals may be ſaid to ſeek in its interior the particles fit for abſorption.

The number of valves diminiſhing with that of the abſorbing veſſels, towards the lower part of the canal, the progreſs of the food is gradually accelerated in proportion as its nutritive parts are removed. The inteſtinal mucus, ſecreted more abundantly in this part, envelopes it and facilitates its tranſmiſſion. The periſtaltic action, by which it is urged through the inteſtine, is not a regular contraction proceeding from above downwards; but an undulatory or vermicular motion, commencing at once in ſeveral points, and deſtroying the inteſtinal curves in thoſe parts, by converting them into ſtraight lines. The portions immediately adjoining the contracted parts are dilated by the fluid impelled into them, and contract in their turn. The motion from above downwards prevails at laſt, ſo as to urge the reſidue of the chyme, from which the lacteals have extracted the chylous or nutritive parts, into the large inteſtine. The cauſe of the periſtaltic motion, which is obſerved in the muſcular fibres of the

inteſtine,

inteſtine, is the irritation of the aliment on the ſurface of the villous coat.

Nature and Properties of Chyle.

The difficulty of collecting a ſufficient quantity of this fluid from the lacteals, for the purpoſe of examination and analyſis, has left us in much ignorance concerning its nature. It ſeems to continue the ſame, in animals of the ſame ſpecies, notwithſtanding variations in their food. Yet it varies in the different claſſes of animals; being of a milky white in man and quadrupeds; tranſparent as water in birds and fiſhes; and ſome have deſcribed it as greeniſh in the herbivora. Other differences may perhaps exiſt in its properties in various genera; but, as far as our knowledge hitherto extends, it ſeems never to vary in man, however his food may be changed.

In ſpite of the importance of the reſearch, which we ſhould have expected to attract very early the notice of the philoſopher and chemiſt, our knowledge of the chyle is very limited, and its analyſis has hardly been attempted in a regular and ſcientific manner. Some deſcribe it as having the mild and ſlightly ſalt taſte of milk; as ſwimming in the ſerum of the blood, and poſſeſſing the lightneſs of oil; as uniting difficultly with water; as coagulating after death in its own veſſels, in the thoracic duct, or in parts where it has been effuſed. Others aſcribe to it a caſeous and a buttery matter; an abundance of earth; and ſome even admit a vegetable farina, combined with animal oil and lymph. It has alſo been repreſented as an oily matter, held in ſolution in water by means of a mucous principle. Dr. Fordyce's deſcription ſeems on the whole to be the moſt complete, and we ſhall therefore extract it from his "Treatiſe on Digeſtion."

"The chyle conſiſts of three parts; a part which is fluid and contained in the lacteals, but coagulates on extravaſation. Whether the veſſels act upon it ſo as to prevent it from coagulating; that is, ſo as to keep it diſſolved in water and fluid; or whether the fluid itſelf is alive, and coagulates by death, in conſequence of extravaſation, is an argument which I ſhall here not enter into. The ſecond part conſiſts of a fluid, which is coagulable by heat, and in all its properties reſembles the ſerum of the blood. (N. B. The chyle received into a veſſel ſeparates into theſe two parts; the coagulum is thick and firm and floats on the ſurface of the fluid portion. When an animal is killed, while the chyle is paſſing from the inteſtines into the lacteals, thoſe veſſels are found filled with a coagulated fluid; and in this way Mr. Cruikſhank has been enabled to repreſent them in his work on the abſorbents.) The third part conſiſts of globules, which render the whole white and opaque. Theſe globules have been ſuppoſed by many to be expreſſed oil; but this has not been proved. Neither has it been perfectly demonſtrated that ſugar is contained in the chyle, although it has been made very probable. The part coagulating on extravaſation, the part agreeing with ſerum in its qualities, and the globular part, which, in ſome animals, but not in quadrupeds, exiſts without giving whiteneſs to the chyle, alone, or along with ſugar, form the eſſential parts of the chyle.

"A great many ſubſtances may enter the lacteals along with the chyle; even ſolids reduced to fine powder. When indigo has been thrown into the inteſtine of a ſheep, I have ſeen the chyle rendered quite blue; now indigo is not ſoluble in water, but is a ſolid reduced into a very fine powder. So muſk gets into the chyle, giving it a ſtrong ſmell, and a great variety of other ſubſtances, of various colours, various taſtes, and various ſmells, each of them giving colour, or taſte, or ſmell to the chyle. Nevertheleſs, the lacteals ſeem to poſſeſs ſome power of rejection, ſince green vitriol, either exhibited along with the food, or thrown into the inteſtine after the animal has been opened, while the chyle was forming and abſorbing, gives no colour on infuſion of gall being applied to the chyle: nor if galls be thrown into the ſtomach along with the food; or if an infuſion of them be in like manner, thrown into the inteſtine, when an animal is opened during the time that the chyle is flowing into the lacteals, do they give any colour upon a ſolution of green vitriol being applied to the chyle; the galls might be ſuppoſed to be digeſted, but the green vitriol could not; neither can we well believe that the galls could be digeſted when thrown into a portion of the jejunum of about a foot in length tied at both ends.

"The lacteals, therefore, would ſeem to be ready to take in many things not digeſted, but not all. One would be diſpoſed to believe that what was injurious to the ſyſtem would be rejected by this power; yet when we conſider the great reaſon we have to believe that cantharides, mercury, and many other ſubſtances, are abſorbed by them, which certainly are in many caſes deleterious; we cannot well ground any doctrine on green vitriol and galls not being abſorbed.

"The ſubſtances which I have above pointed out to be the eſſential parts of the chyle, are totally different in all their properties from farinaceous matter, as well as the greateſt part of the other ſubſtances employed for food. A change conſequently of the properties of ſubſtances employed for food muſt take place in the organs of digeſtion, ſo as to convert the food into theſe different ſubſtances eſſentially contained in the chyle."

The ſame author obſerves again, "that the three parts conſtituting the chyle are exactly the ſame, whether the matter of a muſcular fibre, or farinaceous matter be digeſted; for I have fed a dog with farinaceous matter, and another with muſcular fibre, and opening them both during the time that the chyle flowed through the lacteals, collecting as much chyle as could be collected from each; on examination of their properties, they both conſiſted of the three eſſential parts I have already enumerated, each of theſe parts in the one was perfectly ſimilar, as far as I could contrive any experiment, to thoſe of the other."

"Moreover, in like manner, the properties of the part of the chyle ought to be different, when any one other of the ſeveral ſpecies of matter which may be employed for food is uſed; but that is by no means the caſe. The chyle of a cat, for inſtance, wholly living on animal food, is the ſame with, and cannot be diſtinguiſhed from, the chyle of an ox or ſheep, living wholly on graſs."

With all deference to the authority of the reſpected phyſiologiſt, whoſe words have juſt been quoted, we think ſome of his opinions not yet ſufficiently ſupported by obſervation and experiment; and we ſhall venture to ſubmit that the following queſtions are ſtill undecided, and form curious problems, towards the ſolution of which the united labours of the chemiſt and phyſiologiſt might be very advantageouſly directed. Does the nature of the food influence the character and properties of chyle? Does chyle receive an impreſſion from the properties of ſubſtances employed for food; and does it preſent, after its formation, any qualities analogous to thoſe of the alimentary matters? Are not the diſtinctive characters of chyle decided by the characteriſtic properties of foods?

In reſpect to the tranſmiſſion of colouring and odorous properties to the chyle, different ſtatements have been given by various phyſiologiſts. Some repreſent, with Fordyce, that indigo will turn it blue, that yolk of egg, or beet root, will

will make it yellow and red, &c. But, according to Fourcroy, (Syſt. de Conn. Chem. tom. 10. p. 66.) Hallé never found coloured matters affect the chyle in numerous experiments; and Dumas (Principes de Phyſiol. tom. 4. p. 406.) confirms this account by the reſult of his own experiments with various coloured and odorous ſubſtances.

Converſion of the Reſidue of the Food into Excrement.

The reſidue of the alimentary matter, conſiſting of the excrementitious part of the chyme with the oily, reſinous, and colouring portions of the bile, is tranſmitted by the periſtaltic action of the ſmall inteſtine, into the laſt diviſion of the digeſtive tube, the large inteſtine. Here it undergoes a further change, by which it is converted into a peculiar ſtate, denominated *fæces*. The large inteſtine, then, is the organ of this laſt change in the food, and it is further to be conſidered as a reſervoir deſigned to hold the excrement until it has accumulated to a certain quantity, and thereby to relieve us from the diſguſting neceſſity of its conſtant efflux. Here alſo abſorption of any nutritive parts that may have eſcaped the lacteals is carried on, but to a much ſmaller extent, as the diminiſhed number of abſorbent tubes ſufficiently teſtifies. That matters, however, are abſorbed, even from this portion of the canal, is abundantly evident from various conſiderations. The reſidue of the chyme is not more conſiſtent than a thick cream in the ileum; the greater firmneſs of the fœcal matter evinces the abſorption of the more fluid parts. Rhubarb injected in clyſters has imparted a yellow tint to the urine; and camphor, garlick, &c. have affected the pulmonary exhalation with their peculiar odours. Spirituous liquors and opium have alſo produced their effects on the conſtitution. Nutritive clyſters, conſiſting of milk, broth, &c. have, in various inſtances, ſupported life for ſeveral days, and even weeks. They have been retained in the rectum, and fœces have been expelled at certain intervals. In the caſe of ſtricture of the œſophagus, related in Dr. Currie's Medical Reports, life was ſupported in this way from October 18th, to December 6. The patient began with three clyſters a-day, each of which conſiſted of eight ounces of ſtrong broth, two yolks of egg, and forty drops of laudanum. As the retentive powers of the rectum improved, each clyſter was increaſed to ten ounces of broth, three yolks of egg, ſixty drops of laudanum, and eight ounces of wine. He had three or four ſolid, homogeneous ſtools of the accuſtomed fetor, but lighter than uſual in colour, in each week. His hunger was relieved by the injections. Are we to ſuppoſe that theſe never paſſed beyond the valvula coli; that the body could be nouriſhed for ſix or ſeven weeks by the abſorbents of the large inteſtine; and that this organ could make natural fœces from aliment which had never undergone the action of the ſtomach and ſmall inteſtine? Or ought we rather to ſuppoſe that the clyſters had entered the ſmall inteſtine? On the former ſuppoſition, we can eaſily explain why the body could not be nouriſhed for a longer time *per anum;* the comparatively ſmall number of abſorbents in the large inteſtine, and the want of the preliminary preparation of the aliment by means of the ſaliva, gaſtric juice, bile, pancreatic, and inteſtinal fluids, will ſufficiently account for the fact. At all events, we can only look to the employment of nutritive clyſters as a means of temporary ſupport; yet undoubtedly an efficacious and highly uſeful one for a ſhort time.

It has been generally repreſented by phyſiologiſts, that the fœces are the mere remains of the food undergoing certain changes of a putrefactive kind from their reſidence in the body. And the fœtor which they poſſeſs ſeems to have been the chief circumſtance leading to ſuch an opinion. We are, however, fully convinced that this ſentiment is erroneous, and that the converſion of the reſidual part of the chyme into fœces is no leſs a vital proceſs than the changes which the food experiences in the ſtomach or ſmall inteſtine; and that it will not admit of explanation on the ſuppoſition of ſpontaneous proceſſes, ſuch as putrefaction or fermentation, any more than digeſtion or chylification. The food or chyme expoſed out of the body to putrefaction would exhibit appearances altogether different from that homogeneous and ſolid texture which we ſee in healthy excrement. The diſengagement of ammonia, and the formation of various volatile products, would be the moſt ſtriking features of its decompoſition, neither of which take place in the body. Why ſhould fœces appear only in the large inteſtine, and never in the ſmall? And why ſhould the valve of the colon form ſo accurate a boundary between the reſidue of the chyme, a mild inodorous fluid, and the fœtid excrement, unleſs the properties of the latter were owing to the peculiar vital action of the large inteſtine? The fœcal vomitings attendant on ſome diſeaſes do not contradict this ſtatement, inaſmuch as they are partly explicable by the rejection of the yellow contents of the ſmall inteſtine, miſtaken for real excrement; and partly, if true fœces are actually thrown up, by an inverted periſtaltic action overcoming the reſiſtance of the valvula coli. So far from the fœces being the remains of the food in a putrid ſtate, we may affirm that they do not approximate to putridity in any character but the ſmell, which, too, is a peculiar and not a putrid odour. The vital changes which the aliments undergo, actually protects them from ſpontaneous degeneration, inſomuch, that in caſes of coſtiveneſs, the fœces remain unaltered in the inteſtines for weeks. If any chemical changes are obſerved in the digeſtive proceſs, they indicate an imperfect ſtate of that function, and they produce unuſual and unhealthy appearances in the evacuated matters, and ſympathetic diſturbances of the whole conſtitution. Natural excrement, indeed, is never voided, except when the vital changes operated in the ſtomach and ſmall inteſtine have preceded the vital action of the large inteſtine; and when the whole has been accompliſhed without any chemical change or ſpontaneous degeneration.

To the queſtion how theſe changes are produced, we ſhall not perhaps be able to give a very ſatisfactory reply. We have already noticed the abſorption carried on from the large inteſtine. There is alſo no doubt a ſecretion, particularly of mucous fluids from the ſurface, which may have ſome further effect than that of merely facilitating the progreſs of the inteſtinal contents. We are ignorant of the exact nature of thoſe in a ſtate of health; but we often find very copious morbid ſecretions evacuated *per anum* in diſeaſe. The appendix vermiformis has appeared to ſome perſons a chief agent in the proceſs of fœcification, not upon any ſufficient grounds, for it exiſts in very few animals, and it has been loſt in caſes of mortified hernia, in the human ſubject, without injury.

Air is diſengaged in ſmall quantities in the ſmall inteſtine, but ſtill more copiouſly in the large, which is frequently found diſtended from this cauſe, in the bodies of very healthy ſubjects. This may partly be atmoſpheric air ſwallowed with the food; but it conſiſts in a greater portion of other gaſes, as ſulphurated hydrogen.

Action of the large Inteſtine.

The contents of the large, as thoſe of the ſmall, are carried forwards by a ſpecies of periſtaltic motion. And this proceſs is partly owing to the alternate preſſure of the diaphragm and abdominal muſcles; partly to the action of the muſcular coat of the inteſtine. How eſſential the latter is, may be collected from the inability to void the fœces by the mere act of ſtraining, and from the evacuation being performed by

the inteſtine only in animals whoſe abdomen has been laid open, and in perſons who have taken purgative medicines. This irritability of the large inteſtine continues after apparent death, ſo as to produce even a degree of alvine evacuation.

The longitudinal muſcular fibres, being collected into ſtrong bands, and more numerous than in the ſmall inteſtine, act more powerfully. They are contracted towards the appendix vermiformis, in which they all terminate as in a common centre; they ſhorten and dilate the inteſtine, thereby render it fit to receive the alimentary reſidue from the ileum, and contribute to its progreſſion. The circular muſcular fibres, when diſtended by fœces or flatus, contract and propel it towards the rectum. The portion thus contracted is dilated by means of the longitudinal bands, and thus prepared for receiving new arrivals of fœcal matter. The periſtaltic action is perhaps moſt efficacious in the rectum, as that part has the ſtrongeſt muſcular covering. There is too in the large, as in the ſmall inteſtine, a retrograde or antiperiſtaltic effect, but it is weaker. It contributes to the longer retention, and more perfect elaboration of the fœces. The reality of this antiperiſtaltic motion is ſhewn by the vomiting of clyſters thrown into the rectum.

The fœces are gradually collected in the rectum, which admits readily of diſtenſion, for which it is particularly adapted by its nearly horizontal poſition, in the erect poſture of the body. They are retained for various ſpaces from twelve to twenty-four hours, until their weight, quantity, hardneſs, or acrimony, ſtimulate the inteſtine to action. The time of retention varies, even under circumſtances of health, according to the irritability, age, habits, &c. of the individual; according to the nature of the bile, the kind and quantity of the food, &c. If the ſubject be young, ſenſible, and irritable; the food containing much ſalt or ſpices, and abundant; the drink ſalt or ſtimulating; the bile fully formed; the excrement itſelf liquid; and the ſubject accuſtomed to evacuate it on the firſt call, ſtools will take place at ſhorter intervals. A coſtive ſtate of bowels will be found in aged, weak, and torpid ſubjects, in ſuch as take moderate quantities of mild and oily foods; where the bile is leſs in amount, and not fully developed in all its properties, and the excrement itſelf hard. Hence the bowels have been coſtive for weeks, and even months, but the perſons were indeed valetudinarians. The ingeſta paſs through the whole alimentary tube, in from ſix to twenty-four hours. If their retention exceeds the latter period, ſomething unnatural may be ſuſpected, although often they are evacuated at much longer intervals without any ill conſequences. Habit has much influence in this reſpect, both in determining the length of the interval, and the preciſe time of day at which the evacuation takes place.

Evacuation of the Fæces.

This is to a certain degree arbitrary in a healthy perſon, as it admits of being delayed for ſome time; but when the contractions of the rectum come on pretty ſtrongly, it is no longer in the power of the will to avoid the expulſion of the fœces. The act itſelf is preceded by a ſenſation of ſtimulus, and dull pain in the lower part of the belly, to which are added ſlight ſhiverings. This unpleaſant feeling excites us to employ that effort termed ſtraining (See RESPIRATION); and to exert the diaphragm and abdominal muſcles in combination, in order, by their preſſure on the rectum, to overcome the reſiſtance of the ſphincter ani, and expel the contents of the rectum. The levatores ani fix and ſupport the gut, and prevent it from yielding too much to this protruſive effort. When the anus is ſufficiently opened by means of this action of the reſpiratory muſcles, the rectum is emptied by its own living powers; by the irritability of its muſcular fibres. The ſtraining is therefore moderated, or entirely remitted, and the reſt of the expulſive act is accompliſhed without the aid of the will. When the large inteſtine is completely unloaded, the protruded rectum is reſtored to its ſituation, by the levatores ani, aſſiſted by the proper longitudinal fibres of the gut, and the anus is cloſed by means of its ſphincter. A ſenſe of pleaſure, not only in the part, but extending more or leſs over the whole body, accompanies the act.

Nature and Properties of the Fæces.

Some degree of variation in the conſiſtence of the fœces is compatible with a ſtate of health. They may be ſo firm as to have a conglomerated appearance, probably from being formed in the cells of the colon, or ſo much ſofter as not to preſerve this. Longer retention will contribute to that appearance, and the ſame circumſtance in exceſs cauſes a diſeaſed ſtate of the evacuations, in which they form hard balls called ſcybala.

Their colour depends on the admixture of bile; and muſt therefore vary according to the nature and properties of that fluid. In the moſt healthy ſtate it ſhould reſemble wetted rhubarb. Entire abſence of bile generally makes the fœces of a clayey appearance; and an altered biliary ſecretion will cauſe them to appear dark brown, green, black, &c., all which are morbid. Yet the colour is influenced, as well as the conſiſtence, by retention; becoming dark brown. The conſiſtence ſhould be homogeneous; and there ſhould not be any appearance of the food, as that indicates imperfect digeſtion. Yet ſome exceptions are made to this rule; ſpinach is ſaid to impart a green, and beet-root a red tint to the ſtools. The fibrous parts of animal and vegetable matter; huſks of grain, &c.; membranous parts, as ſkin of apples, grapes, &c. are often diſcerned. Traces of ſalted or ſmoked meats are diſcovered more frequently than thoſe of recent animal food. Haller ſtates their quantity at 5 oz. or rather more, when they are well formed; the quantity is greater when they are fluid. They are more fœtid and leſs in quantity from animal, than from vegetable ſubſtances, (being from 8 to 16 oz. in the latter caſe, according to Rye). Yet where milk alone, and bread and water are taken, the fœces poſſeſs a ſimilar odour to that of thoſe formed from meat or mixed diet. The taſte is ſaid to be ſweetiſh bitter and vapid, with ſometimes an acid admixture.

Chemical Analyſis.

In a recent ſtate they do not affect vegetable blue infuſions: loſe about three-fourths of their weight when dried upon a water bath. When diffuſed in water, and ſtrained through linen, a greyiſh brown matter remains; exhibiting, when dried, ſome vegetable remains, and amounting, in quantity, to $\frac{7}{100}$ of the whole. The ſtrained liquid depoſited, on ſtanding, a yellowiſh green ſlimy matter, ſeparable by the filter, and amounting to $\frac{14}{100}$. This was compoſed of a fatty matter, ſeparable by alcohol, and conſidered as the reſin of the bile a little altered: of a yellow ſubſtance diſſolved by water, and poſſeſſing the properties of gelatine or mucus: and of a greeniſh grey reſidue, inſoluble in water and alcohol, and leaving, when incinerated, ſome ſilica and phoſphate of potaſh. The liquid that paſſed the filter was at firſt yellow, then grew brown, and afterwards muddy: it contained albumen, bile, a peculiar reddiſh brown ſubſtance, ſuppoſed to be reſin of bile in an altered ſtate, and various ſalts.

The following is the result of the analyſis:

Water	73.3
Vegetable and animal remains	7.0
Bile	0.9
Albumen	0.9
Peculiar extractive matter	2.7
Salts	1.2
Slimy matter, conſiſting of reſin of bile, peculiar animal matter, and inſoluble reſidue	14.0
	100.0

The ſalts were carbonate of ſoda, muriate of ſoda, phoſphate of lime, ſulphate of ſoda, and ammoniaco-phoſphate of magneſia.

Having thus concluded our account of the digeſtive proceſs, we ſhall cloſe the preſent article with a ſingle remark, which flows naturally from the preceding ſtatements. The converſion of our food into the nutritive fluid by which the growth of our body is effected, and the loſſes of its organs are ſupplied, is an extremely complicated function, dependent on the right performance of ſeveral ſecretions, and the healthy action of various muſcular and irritable organs. The viſcera, in which theſe ſecretions are accompliſhed, are obnoxious to diſeaſe from many cauſes; the ſecretions themſelves, and the irritable action of the alimentary tube, although not influenced by the will, are obviouſly affected in a great degree by the ſtate of the brain and nerves. The digeſtive canal is expoſed to numerous ſources of indiſpoſition, from the improper nature and quantity of the food and drink, in which, from the artificial ſtate of ſociety, and the general prevalence of unnatural and luxurious habits, hardly any individual can be ſaid to purſue a ſtrictly healthy plan. When any one part of this ſeries of organs and functions is deranged from any of the cauſes now alluded to; when any diſeaſe of an idiopathic kind occurs in either of the long chain of parts immediately or remotely ſubſervient to the digeſtive proceſs; when diſorder ariſes from improper diet; or when it is more remotely induced by the influence of irritation or diſorder in the nervous ſyſtem, affecting the ſecretions and contractions on which the chylopoietic proceſs hinges: when, we repeat, any one part of the ſyſtem is thus diſturbed, derangement of the whole, from the mutual connection and dependency of all the parts, will be the probable reſult. As the chyle, the formation of which is the leading object of the whole digeſtive ſyſtem, cannot be rightly formed when that proceſs is diſturbed; and as this fluid is the great means of ſupport and repair to the body, the ſtate of our whole frame will be influenced by the diſturbance of the digeſtive organs; the nutritive fluid, not being duly prepared, will affect the nervous ſyſtem, and thereby again operate on the digeſtive organs. From the conſiderations now thrown out, it will be obvious that diſturbances of the digeſtive organs muſt be concerned, either as a cauſe or a conſequence of diſeaſe in a very large (probably much the largeſt) ſhare of diſorders that are preſented to the obſervation both of the phyſician and ſurgeon; and the important practical conſequences that may be drawn from theſe premiſes, are too obvious to eſcape the notice of the moſt ſuperficial. To follow their explanation any farther would be encroaching on the province of the pathologiſt and practitioner. Haller's Elementa Phyſiologiæ, tom. 6 & 7. Wriſberg and Meckel's Notes in the laſt edition of the Phyſiology, by Leveling. Dumas Principes de Phyſiologie, tom. 4. Richerand Nouveaux Elemens de Phyſiologie, tom. 1. Soemmering de Corp. Human. Fabrica, tom. 6. Fordyce on Digeſtion. Hunter on the Animal

Economy. Thomſon's Chemiſtry, vol. 5. Metzger Ventriculus Humanus Anatomicè & Phyſiologicè Conſideratus. Regiom. 1788. 4. Spallanzani Diſſertationi di Fiſica Animale et Vegetabile. Modena. 1780. French tranſlation of it by Senebier. Geneva. 1783. Engliſh verſion, with Dr. Stevens's Experiments. Veratti in Comment. Bonon. tom. 6. G. I. Hildebrandt Geſchichte der unreinigkeiten im magen und den Gedärmen. 3 bände. Braunſchweig. 1790. 8. Hallé Theorie de l'Animalization et Aſſimilation. Pearſon's Practical Synopſis of the Materia Medica & Alimentaria.

Digestion *of Birds*, in *Comparative Anatomy*. See *Anatomy of* Birds.

Digestion, in *Chemiſtry*, is a long continued maceration of any ſubſtance in any ſolvent liquid, at a temperature kept ſteadily above the natural heat of the atmoſphere. It differs from ſimple maceration only in the temperature uſed.

Digestion, in *Surgery*, expreſſes a diſpoſition in abſceſſes to ripen and come to ſuppuration.

Tumours, ariſing on the parotides of children, are of eaſy digeſtion: they ripen in a little time. Dionis.

DIGESTIVE Faculty. The ancient philoſophers admitted a digeſtive faculty, or quality, in the human body; as not knowing how otherwiſe to account for the act of digeſtion. See Digestion.

Digestive is alſo uſed, in *Medicine*, for ſuch remedies as ſtrengthen and increaſe the tone of the ſtomach, and aſſiſt in the digeſtion of foods. To this claſs belong all ſtomachics and ſtrengtheners, or corroborants.

Digestive *Remedies*, in *Surgery*, are thoſe applications which the older ſurgeons conſidered as being efficacious to promote ſuppuration in wounds. (See Digestion and Suppuration.) Whatever has a tendency to excite the healthy action of the arteries in wounds, may produce a ſecretion of *pus*, and in this ſenſe, may not improperly be called a digeſtive remedy. All unguents, containing turpentine, roſin, aloes, and balſamic ſubſtances, poſſeſs this quality: but the common yellow baſilicum and tar-ointment are the moſt celebrated now in uſe. See Ointment.

Digestive *Salt*, in *Chemiſtry*, one of the names formerly given to muriat of potaſh.

DIGESTOR. A digeſtor is a thick iron boiler furniſhed with a ſtrong lid, which is made to ſcrew down perfectly tight, ſo as to confine all the ſteam or vapour from the incloſed liquid, and thereby enable it to acquire a degree of heat much higher than its natural boiling point.

This veſſel was at firſt contrived by Papin in the following way: A cylindrical veſſel is made, about a foot high, and ſix inches in diameter, of caſt-iron, or braſs, an inch thick, and turned very ſmooth on the inſide. At the upper end of the cylinder is a large opening of an oval form. A plate is then made of the ſame thickneſs as the cylinder, and of an oval form, like the aperture, but half an inch broader. To this plate is fixed a ſcrew, which paſſes through a thick piece of leather, with which the plate is covered. When the veſſel is filled with the ſubſtance intended to be heated, the plate is introduced into the cylinder (which the oval form of the aperture allows of) and is turned in ſuch a manner, that when it is pulled, the veſſel is cloſely ſhut up from the inſide. The projecting ſcrew is then thruſt through a hole made in the middle of a very ſtrong bolt attached to the veſſel, and, by means of the nut, the ſcrew is drawn ſo tight, as to preſs the cover ſtrongly up againſt the oval aperture, and thus to cloſe it perfectly.

Some alterations have been made in the conſtruction of the digeſtor, and mode of adapting the cover, and,

in particular, a ſafety-valve has been added, the ſtopper of which may be loaded by weights, or kept down by a lever, ſo that the degree of condenſation of the confined vapor (and, conſequently, the intenſity of heat within) may be regulated with tolerable accuracy.

The inventor, Papin, tried ſeveral curious experiments with this veſſel, particularly on the ſolvent power of water thus heated, far beyond its boiling point, over various animal and vegetable matters of difficult ſolubility. He found, that by this inſtrument, the firmeſt bones, when ground to powder, were rendered completely ſoluble in water, and cartilages with eaſe, and, in general, it may be obſerved, that almoſt all vegetable and animal matter may be thus diſſolved.

Digeſtors, or ſtrong iron boilers with a very cloſely-fitting lid, are often uſed in the making of ſoups, and other economical purpoſes.

DIGGES, Leonard, in *Biography*, who flouriſhed in the 16th century, was born at Digges Court, in the pariſh of Berham, in Kent. He finiſhed his education at Univerſity college, where he employed his time ſo well, that, in the world of buſineſs, he obtained the reputation of a ſkilful architect and ſurveyor, and a profound mathematician. He was alſo celebrated for his practical knowledge in fortification. As an author, he bore a reſpectable character: his works were, 1. "Tectonicum," which treats of menſuration and ſurveying: this was publiſhed in 1556 in quarto. 2. A geometrical treatiſe, entitled "Pantometria:" this was a poſthumous work, publiſhed by his ſon, who alſo gave the world an enlarged edition of the Tectonicum. 3. "A Diſcourſe on the Platonic Bodies:" and 4. A meteorological work, entitled, "Prognoſtication Everlaſting, of right good Effect, or Choice Rules to Judge of the Weather by the Sun, Moon, Stars, &c." This was re-publiſhed by his ſon, with corrections and conſiderable additions in 1592. He died about the year 1574, leaving behind him one ſon: viz.

Digges, Thomas, on whoſe education great pains were taken from his earlieſt years. At a proper time, he was ſent to Oxford, where he ſtudied with ſo much diligence and ſucceſs, that he became, in due time, one of the firſt mathematicians of the age. But his knowledge was not merely theoretical: when queen Elizabeth ſent aſſiſtance to the Netherlands, ſhe appointed Mr. Digges muſter-maſter-general; in performing the duties of this office, he not only acted the part of a faithful and excellent officer, but found means of perfecting himſelf in every department of military affairs. Beſides being the editor of his father's works, he wrote and publiſhed ſeveral books, which obtained for him a good reputation as a ſcholar and man of ſcience: but he was particularly eſteemed on account of his piety, which was equal to his learning. He died Aug. 24, 1595, and was buried in the church of St. Mary, Aldermanbury, where a monument was erected to his memory. He left behind him a ſon: viz.

Digges, Dudley, who was born in 1583, and in 1598 he was entered at Univerſity college, Oxford, where he very much improved himſelf in ſound learning, under the tuition of Dr. G. Abbot, who was afterwards archbiſhop of Canterbury. He took his degree of bachelor of arts in 1601, went and ſtudied in the inns of court; and thence he travelled on the continent for the improvement of his mind, and in order that he might attain a ſkill in foreign languages. In 1618, he was appointed ambaſſador to the czar of Muſcovy, and in two years afterwards he was joined in a commiſſion to Holland for obtaining reſtitution of ſome property ſeized from the Engliſh in the Eaſt Indies. He was elected member of parliament in 1621, and he was alſo member of the firſt parliament in the reign of Charles I. In 1626, he took an active part in the impeachment of Villiers, duke of Buckingham; and for a ſpeech which he delivered at a conference with the houſe of lords, he was committed to the Tower. The commons, however, vindicated his cauſe, and he was ſoon diſcharged from his confinement. In 1628, he was elected member of parliament for the county of Kent, and continued for ſome time to act with the patriotic party, but the temptation of a reverſionary grant of the office of maſter of the rolls was greater than he could withſtand. He accepted this in 1636, and from that time we hear nothing more of his public conduct. He enjoyed the emoluments of office but a ſhort time; having obtained them in 1636, and dying March 1639. As an author, this gentleman publiſhed in 1615 "A Defence of Trade; in a Letter to Sir Thomas Smith," and after his death was publiſhed in his name, "A Diſcourſe concerning the Rights and Privileges of the Subject." This was the ſubſtance of the ſpeech for which he was impriſoned. Some other of his ſpeeches may be found in parliamentary collections. He collected the letters which paſſed between the miniſters and others reſpecting the projected marriages between queen Elizabeth and the dukes of Anjou and Alençon, which were publiſhed in the year 1655, under the title of "The complete Ambaſſador, &c." In the former editions of the Biographia Britannica, the character of this gentleman has been too highly coloured, but the editor of the laſt edition has ſummed it up in few words, and to his deciſion we cheerfully aſſent: "He appears to have been a firm, but temperate oppoſer of the ſtretches of prerogative, by which the reign of king Charles I. was ſo unhappily diſtinguiſhed." This gentleman left a ſon, who proved himſelf a zealous friend of the court party, and wrote a work in 1643, to prove the unlawfulneſs of taking up arms by ſubjects againſt their ſovereign, in all caſes whatſoever, which has been frequently reprinted. Biog. Brit.

Digges, *Cape*, in *Geography*, a cape in the channel from Hudſon's ſtraits to Hudſon's bay. N. lat. 62° 45′. W. long. 79°.—Alſo, a cape in Baffin's bay, called cape Dudley. N. lat. 76° 48′. W. long. 59° 7′.

DIGGING, in *Agriculture*, the operation of breaking and turning up the ſoil by means of a ſpade. In caſes where labour is cheap, and a ſufficient number of hands readily provided, this would be an excellent method of preparing the ground for potatoe, carrot, and other root crops of a ſimilar kind, as the land would be looſened and broken up to a better depth than by the plough, and at the ſame time more effectually pulverized and reduced; in conſequence of which, weeds and graſs would be leſs apt to riſe, and injure the crops.

In this method, waſte lands may often be broken up and brought into tillage with great advantage and profit, in ſuch circumſtances as thoſe which have been mentioned. The increaſing price of farm-labour, however, operates greatly againſt the uſe of the ſpade in field-work.

Digging, in *Gardening*, the means of rendering garden ground in a proper ſtate for having different ſorts of crops ſown or ſet upon it. This ſort of work ſhould conſtantly be performed as nearly as poſſible to the time of putting in the ſeeds or plants, as in this ſtate a ſort of new fermentation takes place in the ſoil, by which heat is evolved, and other materials neceſſary for the growth of the crops formed and provided in it.

In caſes where the intention is chiefly that of bringing the ground into a ſuitable ſtate of reduction and mellowneſs of mould, it is only neceſſary to have the buſineſs of digging executed

executed in the autumnal or winter ſeaſons, being well ridged or laid up, ſo as to be fully expoſed to the action and influence of froſt and other cauſes, and be thereby brought into a proper condition for being levelled down and ſown or planted upon in the early ſpring months.

It is a beneficial practice in ſome caſes, in order to bring new land of this ſort into a ſuitable ſtate of preparation for the reception of crops, particularly where the under ſtratum or ſub-ſoil is of the more rich friable kind, to have it trenched over, paring off the ſurface, and turning it to the bottom, to be covered by the earth from below; but this ſhould never be attempted, except for tap-rooted plants, where the under ſoil is of a ſtiff unfriendly nature, as by ſuch means the bed for the immediate reception of the ſeeds or plants muſt become very unfit for their growth; while the more rich ſurface vegetable material, will be placed out of their reach and be loſt.

Work of this kind may be performed either in the autumnal or ſpring months, but the former is moſtly the better; in the more adheſive ſoils, however, it ſhould always be performed when the weather is dry, as under other circumſtances the mould is liable to become lumpy and uneven, and of courſe unfit for the putting in of crops.

In the performance of the firſt mode, or that of plain digging, the workman proceeds by beginning at one end of the piece of ground, forming a trench quite acroſs, to the depth of ſix or eight inches, or deeper where neceſſary, and the ſame width, conveying the earth taken out to the oppoſite end, where the digging is to finiſh; then proceeding with a ſecond courſe acroſs as before, turning the different ſpits of earth in a clean, neat, even manner into the former opening, continuing the ſame regular courſes, till the whole is dug over, breaking and reducing the lumps and clods as much as poſſible, being careful to preſerve a level even ſurface, having a proper regard to ſuch hollows as may be preſent. The earth taken out from the firſt opening or trench will ſerve to fill up and render the laſt even and level; and when dung is applied, it may either be ſpread evenly over the ſurface and be regularly turned in, or placed in the hollow or trench, and covered by the digging of the following trench. This is much the beſt practice where the dung is of the long or littery deſcription. As the buſineſs of digging proceeds the roots of different ſorts of perennial weeds, as twitch, bear-bind, and others of a ſimilar kind, ſhould all be carefully picked out, as they multiply exceedingly by being divided; and thoſe which are upon the ſurface of the ground be well turned to the botton of the former trench.

But in the latter, or trench method of digging, the uſual practice is to begin at one end of the piece of ground, and form or open by a line and the ſpade, a trench two ſpits wide, to the depth of one or two, removing the earth thus taken out to the contrary end, as noticed above, for the purpoſe of filling up the laſt trench; then to form a ſecond trench in the ſame manner after having pared off the ſurface, and placed it in the bottom of the former; proceeding in the ſame way till the whole is trenched over. In this mode it is the cuſtom to ſhovel up and take out the reduced mould or crumbs from the bottoms of the trenches in each courſe of digging. In executing the labour in this manner of digging, the workman ſtands with his ſide to the trench, while in the former caſe he faces it. This practice is particularly uſeful, where the ground is much infeſted with weeds, and where the ſoil is ſtiff, or not of great depth. The dung, in this method of digging, where it is performed to the depth only of one ſpit, may be depoſited in the bottom; but where two ſpades' depth are uſed, it ſhould be put in upon the firſt ſpit, after it has been dug off, and placed in the bottom of the former trench, as in this way it will not be buried to too great a depth, which, under other circumſtances, would be the caſe.

And the trench digging of garden ground may likewiſe be performed either in a level ſurface, as in the common manner of digging, or in the rough ridged mode: the former is the beſt method where immediate ſowing is intended; but the latter commonly where the land is to remain ſome time previous to its being cropped, as by this means it will derive the moſt advantage from the influence of the atmoſphere and the action of froſt, and be more fully reduced in its particles, ſo as to only require levelling down at the time of ſowing or putting in the crops. In caſes, however, where the ſoils are of a light thin gravelly, or ſandy quality, as they are apt to part with their moiſture too quickly, and do not ſtand much in need of pulverization, it would appear the beſt method to dig them conſtantly in the plain or level manner, as by ſuch means the effects of exhalation and the diſſipation of their moiſture may be the moſt effectually counteracted.

All ſorts of digging and levelling down of garden ground ſhould likewiſe, eſpecially in the ſtiffer ſorts of ſoil, be executed, when the land is in a condition ſomewhat inclining to dryneſs, as it can never be done to benefit when in a moiſt cloggy ſituation.

DIGGING. in *Mining*. See MINING.

DIGHTON, in *Geography*, a poſt-town of America, in the ſtate of the Maſſachuſetts and county of Briſtol; ſeven miles from Taunton, and 20 from Warren, in Rhode iſland. The townſhip contains 236 houſes, and 1666 inhabitants.

DIGIT, DIGITUS, in *Anatomy*. See FINGER.

DIGIT, in *Arithmetic*, ſignifies an integer, or number under ten; as 1, 2, 3, 4, 5, 6, 7, 8, 9.

DIGIT, in *Aſtronomy*, is the meaſure by which we eſtimate eclipſes: amounting to the twelfth part of the diameter of the luminary eclipſed.

The diameter of the body, or diſk, of the ſun or moon, is divided into twelve parts, called digits; and an eclipſe is ſaid to be of ten digits, when ten of thoſe parts are hid. Theſe digits, Wolfius, and ſome others, call digits eclipſed. When the luminary is juſt wholly covered, the digits eclipſed are preciſely 12; and when it is more than covered, which is frequently the caſe in lunar eclipſes, then more than 12 digits are ſaid to be eclipſed.

DIGIT is alſo a meaſure taken from the breadth of the finger. A digit is properly three-fourths of an inch, and equivalent to four grains of barley, laid breadth-wiſe, ſo as to touch each other.

DIGITALIS, in *Anatomy*, a term applied to the arteries and nerves of the fingers and toes.

DIGITALES *Volares Arteriæ*, are three branches ariſing from the arcus ſuperficialis volæ of the ulnar artery: ſee ARTERIES, *Deſcription of*.

DIGITALES *Pedis*, are three ſimilar arteries in the foot, given off from the arcus plantaris profundus. See ARTERIES.

DIGITALES *Nervi*, or the nerves of the fingers, are of two claſſes. The thumb, and each finger, has a large branch running along both its radial and ulnar ſide, towards the palmar ſurface, to the extremity of the organ. Theſe larger digital nerves are produced by the median and ulnar trunks, and accompany the digital arteries. The former of theſe trunks ſends two branches to the thumb, two to the fore, and two to the middle finger, and one to the radial ſide of the ring finger. The ulnar ſide of the latter finger, and both ſides of the ring finger, are ſupplied from the ulnar nerve. The dorſal ſurfaces of the fingers have a ſimilar ſup-

ply of two nerves each; but they are ſmaller. Thoſe of the thumb, fore, and middle fingers, and radial ſide of the ring finger, are ſupplied from the dorſal branch of the radial nerve; while the remainder are produced from the dorſal branch of the ulnar nerve.

In the foot the plantar digital nerves are derived from the two plantar branches of the poſterior tibial nerve; and the dorſal nerves from the ſuperficial peroneal nerves. See NERVES.

DIGITALIS, in *Botany*, (from *digitale*, the finger of a glove. The name appears firſt to have been given by the German writer Fuchs or Fuchſius, and hence the plant, being called *Digitalis Fuchſii*, ſeems to have acquired its Engliſh appellation, there being, as far as we can diſcover, no other name for it in our language.) Fox-glove. Fuchſ. Hiſt. 892. Linn. Gen. 313. Schreb. 410. Willd. Sp. Pl. v. 3. 283. Sm. Fl. Brit. 665. Juſſ. 120. Gærtn. t. 53. Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Luridæ*, Linn. *Scrophulariæ*, Juſſ.

Gen. Ch. *Cal.* Perianth in five deep, ovate or rounded, permanent ſegments; the upper one narroweſt. *Cor.* of one petal, bell-ſhaped; tube large, inflated, bellying beneath, contracted at the baſe; limb ſmall, unequally four-cleft, either obtuſely or acutely; the upper lobe often cloven, the lower largeſt. *Stam.* Filaments four, inſerted into the tube of the corolla, tapering at each end, bent, two of them longer than the others; anthers incumbent, in two diſtinct, pointed lobes. *Piſt.* Germen ſuperior, pointed; ſtyle ſimple, parallel with the ſtamens; ſtigma ſmall, acutely cloven. *Peric.* Capſule ovate, pointed, the length of the calyx, with two cells, and two valves, whoſe inflexed edges form the double partition, but the valves ſplit externally as well as at the ſummit. *Seeds* very numerous, ſmall, obovate, but ſomewhat angular, and rough.

Eſſ. Ch. Calyx in five deep ſegments. Corolla bell-ſhaped, five-cleft, inflated. Capſule ovate, of two cells with many ſeeds.

1. D. *purpurea*, Purple Britiſh Fox-glove, is the ſpecies beſt known. Linn. Sp. Pl. 866. Engl. Bot. t. 1297. Curt. Lond. faſc. 1. t. 48. Woodv. Med. Bot. t. 24. Fuchſ. Hiſt. 893. Ger. em. 790. "Segments of the calyx ovate, acute. Corolla obtuſe; its upper lip undivided. Leaves downy." It occurs in various parts of Europe on a dry chalky, loamy or gravelly ſoil, and is very abundant and magnificent about hills and the borders of fields or woods in the north of England, flowering in June and July. It is frequently kept for its beauty in gardens, and ſows itſelf plentifully, if the ſituation be dry, without requiring any care. The root is biennial. Stem erect, three or four feet high. Leaves large, ovate, crenate, downy. Flowers very numerous, in a long ſimple ſpike, large, crimſon, ſometimes white, elegantly ſprinkled with eye-like ſpots within. The whole herb when bruiſed has a bitter, nauſeous, and virulent flavour, and is one of the moſt dangerous of our native plants, acting violently on the ſtomach and bowels, and affecting the nerves by its narcotic powers. Hence it lowers the pulſe, affects the ſpirits in a moſt painful manner, and is ſtrongly diuretic. Some of the above qualities render it a valuable medicine, in careful hands, in dropſical, conſumptive, or epileptic caſes. It is ſaid to be uſeful as an external application to ſome ſorts of ulcers. 2. D. *minor*, a native of Spain, much reſembles the foregoing, but is ſmaller, with ſmooth leaves, and a more evident notch in the upper lobe of the flowers. 3. D. *Thapſi*. Linn. Sp. Pl. 284. Sm. Exot. Bot. t. 43. "Segments of the calyx oblong. Corolla obtuſe, its upper lip undivided. Leaves downy, decurrent." A native of Spain and Italy. This had been long loſt to our gardens, and was but little known to ſcientific botaniſts, till Mr. Lambert obtained it from Spain. It is a tolerably hardy perennial, and is cultivated with great ſucceſs at Kew. 4. D. *lutea*. Jacq. Hort. Vind. t. 105. "Segments of the calyx lanceolate. Corolla acute; its upper lip cloven." Grows in France and Italy, and has a long denſe ſpike of ſmall yellow flowers, and ſmooth leaves. It is a hardy perennial of no great beauty. 5. D. *ambigua*. Linn. Suppl. 282. (D. lutea; Fuchſ. Hiſt. 894. D. ochroleuca; Jacq. Auſtr. t. 57.) "Segments of the calyx lanceolate. Upper lip of the corolla emarginate. Leaves downy beneath." Found in Auſtria, Switzerland, and Germany. A very pretty perennial ſpecies, with elliptical denticulated leaves, and ſtraw-coloured flowers, beautifully ſpotted within. It ſeems to have been long overlooked or not well underſtood by Linnæus, who never ſaw it alive. The name given by Jacquin is preferable to that which has been retained.

There are ſeveral more of this genus, which reſemble each other in their narrow, ſmooth and rather rigid foliage; as D. *ferruginea*; D *obſcura*, Jacq. Hort. Vind. t. 91. D. *parviflora*; ibid. t. 17; D. *lanata*, Ehrh. Beitr. faſc. 7. 152, ſuppoſed to be a native of Hungary, and introduced by Dr. Smith to the Britiſh gardens in 1790; and another unſcientifically named *orientalis* (D. orientalis, tragopogi folio, flore albido, Tourn. Cor. 9,) which ought to have been called D. *ſpatulata*: it was found by Tournefort in Armenia, and is neareſt allied to the *lanata*.

Another tribe of ſpecies are natives of a warmer climate, and have tall ſhrubby ſtems, broader and ſerrated leaves, and handſome orange-coloured flowers; as D. *canarienſis*, Mill. Ic. t. 120; and D. *Sceptrum*, Sm. Exot. Bot. t. 73. Theſe are greenhouſe plants, and well worthy of cultivation. They are propagated by ſeeds, and require only to be kept from froſt, being natives of Madeira and the Canary iſlands.

Some other ſpecies of this fine genus are ſtill not at all or imperfectly deſcribed. A complete illuſtration of it, with coloured figures, has long been expected from the exquiſite pencil of Mr. Ferdinand Bauer, who in his travels to Greece, with Dr. Sibthorp, ſaw many of the plants wild, and attended to them with this object in view. They make a ſplendid part of the drawings deſtined for the *Flora Græca*. S.

DIGITALIS, in the *Materia Medica*. Though this valuable plant has ſtood on the liſt of the Materia Medica for ſeveral centuries, it may be ſaid to have been brought into notice, at leaſt among regular practitioners, almoſt entirely by the late Dr. Withering. This excellent phyſician was induced, in the year 1775, to make a trial of digitalis in the cure of dropſies, (in conſequence, indeed, of finding it mentioned in a popular recipe againſt this diſeaſe,) and the ſucceſs attending this practice was ſo marked, that after inveſtigating the properties of this plant for ten years, he gave the reſult of his experience in a very valuable treatiſe, publiſhed in 1786.

Since this period the ſingular properties of digitalis have been further inveſtigated by Darwin, Beddoes, Ferriar, Hamilton, and many other inquiring men, all of whom have entirely confirmed Dr. Withering's ſtatement in almoſt every particular; and in fact, though the uſe of this vegetable has been extended to many other diſeaſes, little has been added to the knowledge of its general properties ſince Dr. Withering's treatiſe.

Digitalis poſſeſſes two very ſtriking properties, which in no other ſubſtance are found combined, (at leaſt not in any conſiderable degree,) and to which are to be referred all the benefits derived from its uſe in various diſeaſes. One of theſe

theſe properties is a moſt ſurpriſing diminution in the ſtrength, and eſpecially in the frequency, of the pulſe, a diminution which extends not only to the reduction of an inordinate vaſcular action to the bounds of health, but even to bring it to a moſt unuſual and preternatural depreſſion; and if perſiſted in, finally to deſtroy life. Under the uſe of the digitalis, cautiouſly adminiſtered, a ſtrong pulſe of the uſual, or of increaſed quickneſs, will frequently ſink as low as forty beats in a minute, and ſometimes much leſs, without intermitting; and when once ſo reduced, the ſame effect may be ſteadily kept up for many days by a leſs doſe than that which at firſt reduced it. But if it be thrown into the conſtitution too ſuddenly, or if the quantity be too great, a moſt diſtreſſing and alarming anxiety at the heart, fainting, giddineſs, coldneſs of the extremities, pain of the head and temples, failure and irregularity of pulſe, inceſſant vomiting, and extreme debility will follow, and thus it may prove fatal.

The other effect of digitalis, is that of a very powerful diuretic; and it may be remarked that it ſeldom, if ever, acts in this manner, without a concomitant reduction of the frequency of the pulſe; and hence it is that the exhibition of this medicine, as a diuretic, requires ſo much caution, leſt the debility attendant on the ſudden diminution of the vaſcular action ſhould overſet a conſtitution already weakened and oppreſſed by dropſical effuſion.

In the uſe of digitalis, particular care muſt be taken not to increaſe the quantity or frequency of doſe too rapidly, as it often happens that no effect is produced for the firſt doſes; but when a conſiderable quantity has been taken, very violent ſymptoms are apt to follow ſo ſuddenly, as ſcarcely to allow time for any indication of the neceſſity of forbearance of this powerful medicine. This is particularly the caſe when the form of infuſion is adopted.

There are ſome conſtitutions, however, on which the digitalis, even in its moſt active ſtate, appears to have no manner of effect, whatever be the doſe, either on the pulſe, or the flow of urine, or on any other function of the body.

Conſiderable attention is required in the ſelection and preparation of the digitalis for medicinal uſe. Dr. Withering's uſeful directions, dictated by long experience, ought to be carefully adhered to. The leaves are to be gathered when the flower ſtems are ſhot up, but before the time of flowering; and the largeſt and deepeſt coloured leaves are preferable. Theſe are to be carefully dried in a warm room, through which a current of air is paſſing; and when completely criſp and dry, they are to be reduced to powder, and kept in bottles cloſely corked, and not expoſed to the light. In this ſtate the digitalis has a fragrant ſmell, not unlike new hay. The dried plant, well kept, will preſerve its virtues for a conſiderable time, but as an uniformity in ſtrength is always deſirable; and as all herbaceous plants gradually loſe their medicinal properties, it will be right for the apothecary to prepare it afreſh every year.

The digitalis is preſcribed in three different forms, in powder, in tincture, and in infuſion. The latter mode is preferable, when the full diuretic powers of the plant are wanted, as it acts with the moſt ſpeed and certainty. The infuſion recommended by Dr. Withering, and which is that commonly employed, is one drachm of the dried leaves, infuſed in eight ounces of boiling water to ſeven ounces, to which, when ſtrained, one ounce of any aromatic ſpirit is added. The firſt doſe of this infuſion to an adult, may be about half an ounce three times a day; and the quantity may be gradually increaſed by about a drachm daily, till the deſired effect follows, unleſs the reduction of the pulſe, and the other ſymptoms, ariſe to an alarming degree.

The powder may be given mixed with an aromatic, in doſes of about half a grain thrice a day, the quantity being gradually increaſed. When the digitalis is uſed for coughs and chronic complaints, where the ſedative power alone, and not the diuretic is wanted, the powder is often made into a pill, ſometimes combined with opium, or other remedies.

Dr. Ferriar has found the diuretic effect increaſed by combining it with calomel, and the pulvis ipecac. comp.; the doſe for an adult being half a grain of digitalis, a grain of calomel, and eight grains of the p. ipec. c. in two pills.

Dr. F. obſerves, that when the digitalis ſucceeds as a diuretic, it is generally in a few days; ſo that if it does not ſpeedily ſhew its effects, it is only a waſte of time to continue it longer.

The tincture of digitalis, recommended by Dr. Darwin, is made by digeſting two ounces of the dried leaves, coarſely powdered, in eight ounces of proof ſpirit for ſome days. The quantity of the plant here recommended is ſo great, as to ſoak up a great portion of the liquor, and ſtrong preſſure is required to obtain it ſeparate. The Edinburgh college uſe a tincture with only an ounce of digitalis to eight ounces of the ſpirit. The medium doſe of the ſtronger tincture to an adult, is at firſt no more than eight or ten drops; but it often muſt be increaſed to many times this quantity, before any ſenſible operation is produced.

In employing the digitalis, therefore, very accurate attention ſhould be paid to thoſe ſymptoms which we have already enumerated as following an exorbitant doſe; and eſpecially the ſtate of the pulſe ſhould be exactly noted as affording the ſafeſt guide to the practitioner. Where this medicine acts at all on the conſtitution, the pulſe is almoſt invariably reduced in frequency, ſo that the digitalis may be ſafely given in increaſing doſes till this effect is produced, after which point it will hardly be prudent to make a further increaſe, and the medicine muſt be diſcontinued as ſoon as the pulſe becomes irregular, intermitting, or when other marks of alarming debility come on. This, however, principally applies to the uſe of digitalis as a diuretic in the cure of dropſical effuſions of various kinds, where the full effect of this powerful plant is wanted; for in moſt other occaſions it will ſeldom be requiſite to puſh it ſo far.

We may juſt enumerate the diſeaſes for which this excellent medicine has been employed with advantage. In dropſy of every kind, except the encyſted, this medicine is often ſingularly uſeful; and when properly doſed, it evacuates the water with leſs diſturbance to the ſyſtem than any other diuretic. Like all other medicines of this claſs, however, it frequently fails to produce any effect without any obvious reaſon for ſuch failure, though not more frequently than any other medicine. In hydrothorax, either in its moſt decided form, or where the effuſion into any part of the cavity of the cheſt is only indicated by dyſpnæa, this medicine is often of ſingular utility, and under its operation the pulſe reſumes its regularity, and increaſes in ſtrength, unleſs the medicine be continued too long, or in too large a doſe.

In the above-mentioned diſeaſes, the benefit derived from the digitalis is chiefly owing to its diuretic powers, though not entirely ſo, ſince ſome advantage is attributable (eſpecially in effuſions into the cavity of the cheſt) to the diminution of the force of circulation.

There are many other caſes, however, in which the advantage derived from this medicine may be almoſt entirely referred to its power of reducing the force of the circulation. We have long wanted a remedy (as Dr. Ferriar juſtly obſerves) capable of lowering the pulſe, without increaſing evacuation to a dangerous degree. Hitherto we have only been able to effect it, either by withdrawing a quantity of the

the circulating fluids ſuddenly, or by producing nauſea. The digitalis is therefore an invaluable remedy in enabling the phyſician in moſt caſes to accompliſh this object; and this circumſtance has led to its employment in that moſt formidable and leaſt curable of all diſeaſes, pulmonary conſumption.

The ſucceſs which has attended this practice has been very various; many well marked and fully authenticated caſes have been recorded, in which all the ſymptoms that characterize inefficient pulmonary conſumption, pain of the ſide, frequent rigors, ſhort cough, bloody and puriform expectoration, a rapid pulſe, a parched ſkin, and great proſtration of ſtrength, have been entirely removed by digitalis given in doſes to affect the pulſe, and after the uſual antiphlogiſtic remedies, and the patients have entirely recovered. It appears, however, that though a conſiderable number of theſe caſes have received benefit from digitalis, yet, where the ſymptoms have ſo far advanced as to be unequivocal in their nature, the benefit has not been permanent; and, on the whole, it may be ſafely affirmed, that the chance of ſucceſs with this powerful medicine is much leſs in pulmonary inflammation and ſuppuration than in dropſical effuſions in any part of the body. There frequently occurs, however, in delicate, irritable habits, a ſlight hæmoptyſis, attended with cough, pain in the ſide, a quickened pulſe, and conſiderable debility, in which the ſymptoms are ſufficient to excite alarm for the ſafety of the lungs, though neither dyſpnæa nor purulent expectoration are preſent. In ſuch caſes bliſters and expectorants are uſually employed, and it is in theſe that the digitalis has been uſed with the happieſt effect, given in ſuch doſes as juſt to affect the pulſe and keep it within its natural ſtandard. The tincture is the preparation generally preferable in this caſe, as it is, on the whole, more manageable than the infuſion, and more certain than the powder.

Not only hæmoptyſis, but other hemorrhages are often relieved by digitalis, particularly menorrhagia, in which this medicine is peculiarly indicated, on account of the great debility occaſioned by the frequent recurrence of this diſtreſſing complaint, which forbids the uſe of an active antiphlogiſtic plan.

Digitalis has alſo been found of ſingular ſervice in ſpaſmodic aſthma, eſpecially when combined with opium, and in meaſles, particularly in the latter ſtages of this diſeaſe. Many other inſtances will occur to the judicious practitioner in which this ſingularly powerful medicine may be tried with rational hopes of ſucceſs.

DIGITALIS *Ferruginea*, in *Botany*. Dr. Plot, (Nat. Hiſt. of Staffordſhire, p. 196.) has deſcribed a foſſil remain of ſome kind, which preſents many, but not all, of the characteriſtic forms of the ſeed-veſſel of this ſpecies of plant: but the ſame ought, more properly, to be conſidered as an animal remain.

DIGITATUM FOLIUM. See LEAF.

DIGITI *indicis manus abductor*,
DIGITI *indicis pedis abductor*,
DIGITI *medii pedis abductor*,
DIGITI *minimi manus abductor*,
DIGITI *minimi pedis abductor*,
} in *Anatomy*. See ABDUCTOR.

DIGITI *minimi manus adductor*,
DIGITI *minimi pedis adductor*,
} See ADDUCTOR.

DIGITI *minimi manus extenſor proprius*. See EXTENSOR.

DIGITI *minimi manus flexor proprius*,
DIGITI *minimi pedis flexor brevis*,
} See FLEXOR.

DIGITORUM *manus extenſor communis*,
DIGITORUM *pedis extenſor brevis*,
DIGITORUM *pedis extenſor longus*,
} See EXTENSOR and FLEXOR.

DIGITORUM *manus flexor perforans*,
DIGITORUM *manus flexor perforatus*,
DIGITORUM *pedis flexor acceſſorius*,
DIGITORUM *pedis flexor brevis*,
DIGITORUM *pedis flexor longus*,
} See EXTENSOR and FLEXOR.

DIGITUS, is the term uſually given to the fingers and toes. Digitus *index* is the fore-finger; *medius*, the middle finger; *annularis*, the ring-finger; and *minimus*, the little finger. The toes are generally deſignated by the names of digitus primus, ſecundus, &c. beginning with that which is next to the great toe.

DIGITUS *Veneris*, *Venus's finger*, in *Botany*, a name by which ſome authors have called the nymphæa, or water-lily.

DIGLIGGY-NEUR, in *Geography*, a town of Candy, in the iſland of Ceylon, next in importance to Candy, lies to the eaſtward of the capital about 10 or 12 miles, and in the direction of the Engliſh fort Batacolo. The diſtrict around it is more wild, barren, and impenetrable, than that which ſurrounds Candy; on this account it has been ſometimes choſen as a royal reſidence. At one period, when the king was driven out of Candy, and his capital burnt, he found here a retreat to which no European army has ever been able to penetrate. A few villages are ſcattered among the neighbouring hills; and in thoſe places where the woods have ſome clear ſpace, the ſoil, though very poor, produces rice.

DIGLITO, or DIGLATH, in *Ancient Geography*, a torrent of Aſia, whoſe ſource is in the fountain of the Tigris, in the eaſtern part of the mountains of Niphates; it runs from north-eaſt to ſouth-weſt, and diſcharges itſelf into the lake Arethuſa.

DIGLYPH, from δις, *twice*, and γλυφω, *I engrave*; a kind of imperfect triglyph, conſole, or the like, with only two channels, or engravings, inſtead of three. See TRIGLYPH.

DIGNAC, in *Geography*, a ſmall town of France, in the department of the Charente; nine miles S. of Angoulême.

DIGNANT, a town of Venetian Iſtria, about a league from the ſea. N. lat. 45° 10′. E. long. 13° 14′.

DIGNE, in Latin *Dinia*, or *Digna*, a ſmall but handſome town of France, in the deparment of the Lower Alps, chief place of a diſtrict, ſituated in a rich valley on the river Bléonne, which, not far from thence, falls into the Durance, 552 miles S. of Paris, and 42 S. by W. of Embrun. Lat. 44° 5′.

Digne is a very ancient town. Cæſar, in his Commentaries, calls it "Digna, inter montes poſita, &c." At the diſtance of one kiliometre is a mineral bath, celebrated for the wonderful cures which it performs in caſes of anchyloſis, or that ſtiffneſs which often takes place in a limb cured of a wound produced by a gun or piſtol-ſhot. All the ſprings in the neighbourhood of Digne are hot; the temperature of the water varies from 30 to 40 degrees of Réaumur's thermometer. It is taken externally and internally, but it has not yet undergone an exact chemical analyſis; it evidently contains much ſulphur and alkali, as it emits a very diſagreeable ſmell. Taken internally it operates as a ſtrong purgative. On the mountains from which the water iſſues the ſerpents have no venom, and children may play with them with impunity, whilſt thoſe which are found but at a ſmall diſtance from the ſprings, bite, and are venomous. Theſe mountains abound with curious petrifications; the crater, of an extinct volcano, is diſtinctly viſible on the top of one of the higheſt.

The town of Digne contains 2872, and the canton 10,362 inhabitants, diſperſed in 31 communes upon a territorial extent of 522½ kiliometres. As chief place of a diſtrict Digne

has a ſub-prefect, a court of juſtice, a regiſter office, a revenue inſpector, and a ranger. It is the ſee of a biſhop.

The diſtrict of Digne is compoſed of eight cantons, and has a population of 46,807 individuals, a territorial extent of 2480 kiliometres, and 88 communes. The ſoil produces corn and an abundance of excellent fruits, which are ſent to different parts of France, Italy, and Germany. There is much graſs-land and a great number of vineyards. The manufactures are thoſe of hardware, cutlery, houſehold furniture, and leather. The diſtrict contains likewiſe a mine of copper, in which gold and ſilver are frequently found: it is near Verdêche. In the neighbourhood of Mouſtiers a very fine clay is dug, of which they make excellent potter's ware. (Herbin Statiſtique de la France.)

DIGNITARY, in the *Canon Law*, a perſon who holds a dignity, that is, a benefice which gives him ſome pre-eminence in the choir above mere prieſts and canons Such is a dean and archdeacon, though the word is now abuſively applied to a mere prebendary or canon.

Dignities are ſometimes ſimple, ſometimes with cure of ſouls, and ſometimes with juriſdiction and adminiſtration of ſacred things. The canoniſts even define dignity, "adminiſtratio cum juriſdictione & poteſtate conjuncta." If the dignity have no contentious or exterior juriſdiction, it is a ſimple parſonage, and only gives pre-eminence. See Benefice, Parsonage, &c.

Of dignities, including prebends, Camden reckons in England 544 in number.

DIGNITY, a quality that denotes a man (*dignus*) worthy.

Dignity, in its moſt uſual acceptation, ſignifies honour and authority, reputation, &c.; and dignity may be divided into ſuperior and inferior; as the titles of duke, marquis, earl, viſcount, baron, &c. are the higheſt names of dignity; and, after the nobility, the firſt perſonal dignity is a knight of the garter; next after certain official dignities, as privy counſellors, the chancellors of the exchequer and duchy of Lancaſter, the chief juſtice of the king's-bench, the maſter of the rolls, and the other Engliſh judges, follow a knight banneret, baronets, knights of the bath, and knights bachelors. Theſe, ſays ſir Edward Coke, (2 Inſt. 667.) are all the names of dignity in this kingdom, eſquires and gentlemen being only names of worſhip. But before theſe laſt the heralds rank all colonels, ſerjeants at law, and doctors in the three learned profeſſions. See Precedence.

Nobility only can give ſo high a name of dignity as to ſupply the want of a ſurname in legal proceedings; and as the omiſſion of a name of dignity may be pleaded in abatement of a writ, &c. ſo it may be where a peer who has more than one name of dignity is not named by the moſt noble. 2 Hawk. P.C. 185. 230. No temporal dignity of any foreign nation can give a man a higher title than that of eſquire. 2 Inſt. 607.

DIGNITY, in *Oratory*, that part of elocution, which conſiſts in the right uſe of tropes and figures. It is not ſufficient for an orator to expreſs himſelf with propriety and clearneſs, or in ſmooth and harmonious periods; but his language muſt be ſuited to the nature and importance of the ſubject. As elegance gives rules for the firſt of theſe, and compoſition for the ſecond, dignity does the ſame for the laſt of them. This neceſſary variety of expreſſion ariſes, in a great meaſure, from tropes and figures, which not only enliven and beautify a diſcourſe, but likewiſe give it force and grandeur; for which reaſon this part of elocution ſeems to have been called *dignity*. See Figure and Trope.

DIGOIN, or Digouin, in *Geography*, a ſmall town of France, in the department of Saône and Loire, chief place of a canton, in the diſtrict of Charolles; 12 miles W. of Charolles, with a population of 2233 individuals. The canton has five communes, with 5352 inhabitants, upon a territorial extent of 90 kiliometres.

DIGOVILLE, a ſmall town of France, in the department of La Manche; 3 miles E. of Cherbourg.

DIGRESSION, in *Oratory*, is defined by Quintilian, agreeably to the etymology of the word, to be a going off from the ſubject we are upon to ſome different thing, which, however, may be of ſervice to it. Inſt. Or. lib. iv. cap. 3.

Digreſſion is not a neceſſary part of a diſcourſe, though it may ſometimes be convenient on ſeveral accounts; as where a ſubject is of itſelf flat and dry, and requires cloſe attention; in this caſe, it is of uſe to relieve the mind by ſomething agreeable and entertaining. But as it ſhould never be introduced without ſufficient reaſon, it ſhould never be too frequent, nor too long. Digreſſions in hiſtory, when rightly managed, afford the reader both delight and profit. Although they ſhould neither be too long nor too frequent; yet now and then to introduce a beautiful deſcription or ſome remarkable incident, which may give light to the ſubject, is ſo far from an interruption, that it is rather a relief to the reader, and excites him to go on with greater pleaſure and attention. Ward's Or. vol. i. p. 283, &c. vol. ii. 279.

DIGYNIA, in *Botany*, (from δι or δις, *double*, and γυνη, *a female*,) the name of ſuch Orders, in the principal Claſſes of the Linnæan artificial ſyſtem, as are characterized by two ſtyles in each flower, or, where the ſtyles are wanting, two ſeſſile ſtigmas. The principal of theſe Orders are the *Triandria Digynia*, and *Pentandria Digynia*, the former conſiſting entirely of the very natural order of true Graſſes, the latter of no leſs natural a tribe, the Umbelliferous plants, though theſe laſt do not occupy the whole artificial order. In the Claſſes *Icoſandria* and *Polyandria*, the ſtyles, if more than one, and leſs than ten, are very uncertain in number, ſo that it is found beſt in theſe inſtances to collect ſeveral Linnæan orders into one, they being, moreover, very ſmall. Some plants are called digynous, in Linnæan language, and others trigynous, though their ſtyle is ſimple, thoſe terms applying to their two or three ſtigmas, as in *Carex*, in which ſenſe, the great natural claſs *Syngeneſia* is likewiſe digynous. Some late writers on the genus *Carex* have undertaken to correct this trifling inaccuracy, by ſubſtituting the term *flores diſtigmatici*, which is certainly more correct, but far leſs commodious and conciſe. Such faſtidious accuracy applied to many graſſes would lead to more trouble than utility, for ſome have a ſtyle, or ſtyles, others none, which analogy and common ſenſe ſhew to be of no moment as to generical or claſſical diſtinction. S.

DIHELIOS, from δια, *through*, and ηλιος, *ſun*, in the *Elliptical Aſtronomy*, a name which Kepler gives to that ordinate of the ellipſis, which paſſes through the focus wherein the ſun is ſuppoſed to be placed.

DII, in *Ancient Geography*, a people of Thrace, placed by Thucydides in the province of Rhodope.

Dii *Adſcriptitii*, in *Mythology*, a claſs of deities of lower rank and dignity. See Dii *Indigetes*.

Dii *Averrunci* were, among the Greeks, the ſame with the alexicaci, or apopompæi, or apotropæi. Among the Egyptians theſe deities were repreſented in a menacing poſture, and ſometimes with whips in their hands. Of this kind was Iſis. Their buſineſs was to avert misfortunes. Apollo and Hercules belonged to this claſs of deities among the Greeks, and Caſtor and Pollux among the Romans.

Dii *Conſentes*, gods of the firſt rank and order. See Consentes.

Dii *Indigetes*. See Indigetes.

Dii *Manes*. See Manes.

Dii *Nixii*. See Nixii.

Dii *Olympii*, Olympian gods, the name given by the Athenians to the twelve chief deities, to whom they had dedicated a very magnificent altar.

Dii *Patrii*, among the Romans, were the three ſupreme deities, Jupiter, Juno, and Minerva. They were firſt received over all the Eaſt, and afterwards, ſucceſſively, in Greece and Italy. They are deſcribed as indigetes by Virgil, Georg. i. ver. 499, and as noſtri by Juvenal, Sat. iii. ver. 145.

DIJAMBUS, in *Poetry*, the foot of a Latin verſe of four ſyllables; it is compounded of two iambics, as *ſĕvērĭtās*.

DIJON, in *Geography*, an ancient and conſiderable town of France, in the department of the Côte d'Or, chief place of the department, and of a diſtrict of the ſame name, ſituated in an agreeable plain between the river Ouche on the ſouth, and a ſtreamlet, called Suſon, on the north, 228 miles S.E. of Paris, 60 N.E. of Autun, 63 W. of Beſançon, 138 N. of Lyons. It contains many remarkable ancient and modern buildings, ſeveral of which are of an aſtoniſhing elevation and boldneſs. St. Mary's, or the church of our lady (Notre Dame), is a Gothic edifice, of exquiſite taſte and uncommon lightneſs and delicacy. It was raiſed in the 13th century. The galleries have ſmall columns of two decimetres in diameter, and from five to ten metres high, all of a ſingle block. The arch is particularly admired, and the whole conſtitutes an unparalleled maſter-piece of architecture. The cathedral is equally remarkable for its grandeur and beauty. The ſpire is nearly 400 feet high. Behind the choir of this church is an ancient rotunda with three arches, one above the other, with a circular opening in the middle, and ſupported by 104 columns, the ſhaft of which is of a ſingle ſtone. A third of this edifice is buried under ground; it is the ruin of a Pagan temple.

Dijon is the native city of Boſſuet, Crebillon, and Piron. It is divided into three ſections, which form each a ſeparate canton, one of which compriſes 13 communes, and 11,864 inhabitants, the other 17 communes, and 12,175 inhabitants, and the third 14 communes, and 11,939 inhabitants. upon a territorial extent of 497½ kiliometres. The town itſelf has altogether a population of 21,000 individuals. Its principal manufactures are thoſe of woollen ſtuffs, hoſiery, play-cards, leather, wax-candles, muſtard, ſweet-meats, and a cotton ſpinnery.

As chief place of the department and of a diſtrict, Dijon has a prefect, four courts of juſtice, and a regiſter office. It is the ſee of a biſhop.

The principal trade of the diſtrict is with corn and cattle, but chiefly with wine, which is ſent to Paris, Straſbourg, Holland, and Switzerland. The produce of a French arpent in wine averages in this diſtrict a net profit of 89 French livres. It yields Burgundy of the very firſt quality.

The population of the diſtrict of Dijon amounts to 122,532 individuals, diſperſed in 14 cantons, and 270 communes, upon a territorial extent of 3112½ kiliometres. N. lat. 47° 19′. E. long. 4° 57′. Herbin Statiſtique de la France.

By obſervations of four years, ending in 1781, the temperature of this town is 52°·8′. The ſtandard temperature is 55.°3; the difference 2.5; but the diſtance of Dijon, from the ſtandard, is 260 miles, which gives a diminution of 1.7 degrees. It is cooled ſomewhat farther, by a ridge of mountains to the weſt of it, and the chain of Jura, about 60 miles to the eaſt. Kirwan's Eſtimate of the Temperature of Places, &c. p. 80.

Dijon was founded by the emperor Aurelian, when he viſited Gaul, which, in its origin, was a caſtle, and not a city.

DIIPOLIA, Διιπολεια, in *Antiquity*, an Athenian feſtival, celebrated in honour of Jupiter Polieus, or protector of the city. For the ceremonies obſerved at this ſolemnity, ſee Potter's Archæol. Græc. lib. ii. c. 20. tom. i. p. 381.

DIKE, in *Agriculture*, a name frequently applied to a ditch. It likewiſe ſignifies a dam, or mound of earth, raiſed to prevent inundations; and ſometimes even a water-ditch uſed as a diviſion-fence.

The word ſeems formed from the verb, *to dig*; though others chooſe to derive it from the Dutch, *diik*, a dam, ſea-bank, or wall.

Dike, or *Dyke*, alſo denotes a work of ſtone, timber, or faſcines, raiſed to oppoſe the entrance or paſſage of the waters of the ſea, a river, lake, or the like.

The word comes from the Flemiſh, *dyk*, or *diik*, a heap of earth to bound or ſtem the water. Junius and Menage take the Flemiſh to have borrowed their word from the Greek τειχος, *wall*. Guichard derives it from the Hebrew *daghah*.

Theſe dikes are uſually elevations of earth, with hurdles or ſtakes, ſtones, and other matters.

The dike of Rochelle is made with veſſels faſtened to the bottom. The dikes of Holland are frequently broke through, and large tracts of land are then drowned.

DIKOWO, in *Geography*, a town of Bohemia, in the circle of Konigingratz; nine miles E. S. E. of Gitſchin.

DILAPIDATION, a waſteful deſtroying, or letting buildings, eſpecially parſonage houſes, run to ruin and decay, for want of neceſſary reparation.

An action lies for dilapidations, either in the ſpiritual court by the canon law, or in the courts of common law; and it may be brought by the ſucceſſor againſt the predeceſſor, if living, or, if dead, againſt his executors.

It is ſaid to be good cauſe of deprivation, if the biſhop, parſon, vicar, or other eccleſiaſtical perſon, dilapidates the buildings or cuts down timber, growing in the patrimony of the church, unleſs for neceſſary repairs. (1 Roll. Rep. 86. 11 Rep. 98. Godb. 259.) And that a writ of prohibition will lie againſt him in the courts of common law. (3 Bulſtr. 158. 1 Roll. Rep. 335.) By ſtatute 13 Eliz. c. 10. if any ſpiritual perſon makes over or alienates his goods, with intent to defeat his ſucceſſors of their remedy for dilapidations, the ſucceſſor ſhall have ſuch remedy againſt the alienee, in the eccleſiaſtical court, as if he was the executor of his predeceſſor. And alſo money recovered for dilapidation, muſt be employed, by 14 Eliz. c. 11. in the repair of the ſame houſes, within two years, on penalty of forfeiting double the value to the crown.

DILATATION, (from the Latin *dilatatio*,) is the enlargement of bodies after a ſtate of compreſſion, or in conſequence of the introduction of other ſubſtances amongſt their component particles; thus, when part of the air is drawn out of the receiver of an air-pump, the remaining air becomes dilated; thus alſo wood, paper, &c. are dilated by moiſture; and all bodies are dilated by heat. See Elasticity, and Expansion.

Dilatation, in *Surgery*, denotes the laying open any orifice, or the lips of a wound wider, or the extenſion of any veſſel, or the like.

This is done by an inſtrument called a dilatatorium.

DILATED Vein, in *Mining*, called alſo a *flat vein*, or *ſtreak*, denotes ſuch a depoſitory of ore as lies between ſtrata, like ſeams of coal, and commonly occurs in argillaceous

ſtrata; it differs from a pipe-vein, in conforming to the lamina of the ſtrata inſtead of occupying an irregular cavity, approaching to an horizontal poſition.

DILATATOR *alæ naſi*, in *Anatomy*, is the name by which Cowper has deſcribed that portion of the levator labii ſuperioris et alæ naſi, which is inſerted in the cartilaginous ala of the noſe. See the deſcription of that muſcle in the article DEGLUTITION.

DILATATOR *pinnarum proprius*, is a name given by Santorini to the depreſſor alæ naſi.

DILATATOR *urethræ*, is the accelerator muſcle, which ſee.

DILATATOR *urethræ poſticus*, is a faſciculus of fibres running forwards in the perineum, from the ſphincter ani to the accelerator urinæ, and deſcribed by Heiſter as a diſtinct muſcle.

DILATORY PLEAS, in *Law*, are ſuch as are put in merely to delay the ſuit, by queſtioning the propriety of the remedy, rather than by denying the injury; whereas, pleas *to the action* are ſuch as diſpute the very cauſe of ſuit.

The former cannot be pleaded after a general imparlance, which is an acknowledgment of the propriety of the action. (See IMPARLANCE). Dilatory pleas are, 1. To the juriſdiction of the court; alleging, that it ought not to hold plea of this injury, it ariſing in Wales or beyond ſea; or becauſe the land in queſtion is of ancient demeſne, and ought only to be demanded in the lord's court, &c. 2. To the diſability of the plaintiff, by reaſon of which he is incapable of commencing or continuing the ſuit; as, that he is an alien enemy, outlawed, excommunicated, attainted of treaſon, or felony, under a præmunire, not in *rerum natura* (being only a fictitious perſon), an infant, a feme-covert, or a monk profeſſed. 3. In abatement (which ſee). Theſe ſeveral pleas were formerly very often uſed as mere dilatory pleas, without any foundation of truth, and calculated only for delay; but now by ſtatute 4 and 5 Ann. c. 16. no dilatory plea is to be admitted without affidavit made of the truth thereof, or ſome probable matter ſhewn to the court to induce a belief of its truth. And with reſpect to the pleas themſelves, it is a rule, that no exception ſhall be admitted againſt a declaration or writ, unleſs the defendant will, in the ſame plea, give the plaintiff a better, (Brownl. 139.); that is, ſhew him how it might be amended, that there may not be two objections upon the ſame account. Nor thus, by ſtatute 8 and 9 W. III. c. 31. ſhall any plea in abatement be admitted in any ſuit for partition of lands, nor ſhall the ſame be abated by reaſon of the death of any tenant. When theſe dilatory pleas are allowed, the cauſe is either diſmiſſed from that juriſdiction, or the plaintiff is ſtayed till his diſability be removed, or he is obliged to ſue out a new writ, by leave obtained from the court, (Co. Entr. 271.), or to amend and new-frame his declaration. But when, on the other hand, they are over-ruled as frivolous, the defendant has judgment of *reſpondeat ouſter*, or to anſwer over in ſome better manner. It is then incumbent on him to plead.

DILATRIS, in *Botany*. (ſo called by Bergius, from δις, *double*, and λατρις, a *ſervant* or *attendant*, as it ſhould ſeem, becauſe he found two of the anthers ſmaller than the third, and therefore he preſumed them to be inefficient, and merely an accompaniment to that. We find them, as Linnæus did, all perfect. See *Exot. Bot.*) Berg. Pl. Cap. 9. Linn. Suppl. 10. Schreb. 37. Willd. Sp. Pl. v. 1. 246. Juſſ. 59. Lamarck, t. 34. Claſs and order, *Triandria Monogynia*. Nat. Ord. *Enſatæ*, Linn. *Irides*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* Petals 6, ſuperior, ovato-lanceolate, or linear, concave, ſlightly ſpreading, equal, hairy externally, permanent. *Stam.* Filaments three, awl-ſhaped, longer than the petals, one of them ſmaller than the reſt: anthers ovato-lanceolate, with two furrows, all (as far as we can find) equal in ſize. *Piſt.* Germen inferior; ſtyle thread-ſhaped, as long as the ſmaller ſtamen; ſtigma ſimple, acute. *Peric.* Capſule globoſe, very hairy, of three cells and three valves. *Seeds* ſolitary, orbicular, compreſſed, ſmooth, vertical.

Eſſ. Ch. Calyx none. Petals ſix, regular, hairy. One ſtamen ſmaller than the other two. Stigma ſimple. Capſule inferior, of three cells and three valves. Seeds ſolitary, round, compreſſed.

1. D. *corymboſa*. Berg. Pl. Cap. 9. t. 3. f. 5. Thunb. Prod. 10. Willd. Sp. Pl. v. 1. 246. Sm. Exot. Bot. v. 1. 29. t. 16. (D. umbellata; Linn. Suppl. 101. Mart. Mill. Dict. Wachendorfia umbellata; Linn. Syſt. Veg. ed. 13. 80. Ixia hirſuta; Linn. Mant. 27. 320. 511.) Broad-petalled Dilatris. "Petals ovate. Flowers in a flattiſh hairy tuft." A native of the Cape of Good Hope, probably in a ſandy ſoil. It flowered in Meſſrs. Lee and Kennedy's hot-houſe at Hammerſmith. Root perennial, with woolly fibres. Stem ſimple, a foot high, round, downy. Leaves moſtly radical, ſheathing, two-ranked, ſword-ſhaped, ſmooth, rather glaucous, orange at their baſe. Flowers numerous, pale lilac. Stalks red, hairy. 2. D. *viſcoſa*. Linn. Suppl. 101. Thunb. Prod. 10. Willd. Sp. Pl. v. 1. 247. Mart. Mill. Dict. Narrow-petalled Dilatris. "Petals linear. Flowers in a viſcid hairy tuft." Gathered by Thunberg on the top of Table Mountain, Cape of Good Hope. It is larger than the preceding, with broader leaves, the ſtem and inflorescence more hairy and viſcid. Petals very narrow, and extremely hairy. This is the ſpecies figured by Lamarck in his plate above quoted. 3. D. *paniculata*. Linn. Suppl. 101. Thunb. Prod. 10. Willd. Sp. Pl. v. 1. 247. Mart. Mill. Dict. Lanceolate-petalled Dilatris. "Petals lanceolate. Panicle oblong." Gathered likewiſe by Thunberg at the Cape. It is, as far as we know, a ſtranger in our gardens, like the laſt. Its flowers are ſaid to be purpliſh, with a yellow tinge, and the panicle is elongated and viſcid.

DILE, in *Botany*, a name by which ſome authors have called the iſatis or woad. Ger. Emac. Ind. 2.

DILEMMA, Διλημμα, in *Logic*, an argument conſiſting of two, or more propoſitions, ſo diſpoſed, that grant which you will of them, you will be preſſed by the concluſion.

The word is formed from the Greek δις, *bis*, *twice*, and λημμα, *ſumptio*.

A dilemma is an argument conſiſting of two contrary parts, or ſides, either of which catches the adverſary. And hence it is alſo called ſyllogiſmus cornutus, a horned ſyllogiſm, its horns being ſo diſpoſed, that if you avoid the one, you run upon the other.

It is alſo called crocodilinus, by reaſon that as the crocodile leads ſuch as follow it, into the water, and purſues ſuch as fly it, to deſtroy them; ſo, whatever the adverſary either affirms, or denies, in this kind of ſyllogiſm, is turned to his diſadvantage.

For an example: A philoſopher once diſſuaded a man from marrying, by this argument: Either the woman you marry will be handſome, or ugly; if handſome, ſhe will give you jealouſy; if ugly, diſpleaſure.

Cicero uſes this fine dilemma, to prove, that all pain is to be borne with patience: "Omnis dolor aut eſt vehemens, aut levis; ſi levis, facile feretur; ſi vehemens, certe brevis futurus eſt."

The ſame orator, by another dilemma, proves that no meſſengers ſhall be ſent to Antony: "Legatos decernitis; ſi ut deprecentur, contemnet: ſi ut imperetis, non audiet."

Nor

Nor muſt we here omit that beautiful dilemma of Tertullian, whereby he clears the Chriſtians, and accuſes Trajan, who had forbad the ſeeking them out, and yet ordered them to be puniſhed when found: "O ſententiam neceſſitate confuſam! negat inquirendos, ut innocentes; et mandat puniendos, ut nocentes: parcit et ſævit, diſſimulat et animadvertit! quid temetipſum cenſura circumvenis? ſi damnas, cur non et inquiris? ſi non inquiris, cur non et abſolvis?"

For a dilemma to be legitimate, there are two things required: 1. A full enumeration of parts; thus that of Ariſtippus above-mentioned, whereby he diſſuades from marriage, is invalid, as being defective in the enumeration; there being a middle degree, or form, between handſome and ugly.

2. That the dilemma preſs the adverſary alone, and that the perſon who makes it be not liable to have it retorted upon him. This was the caſe in that celebrated dilemma of the ſophiſt Protagoras, which the Areopagites, with all their wiſdom, were not able to reſolve.

A youth named Euathlus, engaged with Protagoras, to learn dialectics, upon condition, that he ſhould pay him a large ſum of money, the firſt cauſe he pleaded, in caſe he gained the ſame. Euathlus, when fully inſtructed, refuſing to pay the promiſed reward, Protagoras brings his action, arguing thus: You muſt pay the money, however the cauſe terminate; for if I gain, you muſt pay me in conſequence of the ſentence, as being caſt in the cauſe; and if you gain it, you muſt pay in purſuance of our covenant, and, therefore, whether the cauſe goes for me, or againſt me, you muſt pay me the reward. Nay, retorts Euathlus, which way ſoever the cauſe go, you will have nothing: for if I prevail, the ſentence gives it that nothing is due to you; and if I loſe, then there is nothing due by the covenant; and therefore, whether I gain or loſe the cauſe, I will not pay you; for nothing will be due to you. It is ſaid, that the court, unable to decide in favour of either party, ordered them both to appear in court again an hundred years afterwards, to receive judgment.

After the like manner, an ancient prieſteſs diſſuading her ſon from haranguing the people, by this dilemma, "nam ſi injuſta ſuaſeris," ſays ſhe, "habebis Deos iratos: ſin vero juſta, iratos habebis homines:" the youth thus returned the dilemma on his mother: "imo," ſays he, "expedit ad populum verba facere, nam ſi juſta dixero, Dii me amabunt; ſi injuſta, homines."

DILEN, in *Geography*, a river of Hindooſtan, which riſes beyond, that is, to the north or north-weſt of Ghizni, and receives near Gardaiz another river named Semil; after which the confluent river takes the name of *Cow*, and purſuing its courſe towards Nughz, receives near that place another river, which comes from the quarter of Candahar. See Cow.

DILETTANTE, Ital.; equivalent with *amateur*, Fr. The word is formed, in modern times, from *dilettare* of *dilettator*, Lat.; one who gives and receives delight from the ſucceſſion and combination of ſounds in muſic.

An Italian dilettante is one delighting in muſic, who has made a conſiderable progreſs in the art, not as a profeſſor, but merely for his own amuſement and that of his friends. See Amateur.

DILICTUM, a term uſed, by Agricola, to expreſs a brine, made by pouring water upon ſand, ſtones, earth, &c. that had been before ſtrongly impregnated with ſea-ſalt; from this brine, a ſalt, for the uſe of the table, was made by evaporation in his time, and is ſtill ſo in many parts of the world. At Junthall, in Germany, they have a ſalt work of this kind, where they make at the rate of eight hundred loaves of ſalt in a week, each loaf weighing four hundred weight.

DILIGENCE, in *Ethics*, a virtue which conſiſts in the active and continued exerciſe of the faculties, and uſe of means for the attainment of any object, whatever that object may be.

Diligence, in *Scots Law*, ſignifies either that attention and care which perſons are bound to exerciſe in the conduct of certain contracts or truſts, and which varies according to the nature of the contract; or, it denotes certain forms of law by which a creditor endeavours to make good his payment, either by affecting the perſon of his debtor, or by ſecuring the ſubjects belonging to him from alienation, or by carrying the property of theſe ſubjects to himſelf.

They are either real or perſonal. Real diligence is that which is proper to heritable or real rights: and perſonal is that by which the perſon of the debtor may be ſecured, or his perſonal eſtate affected. Of the firſt ſort we have two, viz. *inhibition* and *adjudication*, which ſee reſpectively. The latter diligences are *arreſtment* and *poinding*, which ſee.

DILIGENZA, in the *Italian Muſic*, is uſed for a ſoft or ſweet manner of ſinging or playing.

DILIMNITÆ, in *Ancient Geography*, one of the moſt conſiderable of thoſe nations which inhabited Perſia, on this ſide of the Tigris.

DILIN, in *Geography*, a town of Hungary; two miles north of Schemnitz.

DILIS, in *Ancient Geography*, *Lauron*, a port on the coaſt of Gallia Narbonnenſis, eight miles weſt from Incarus, according to the Itinerary of Antonine. M. d'Anville ſays that it is the port of Pontheu, which is eight miles from Carri.

DILL, in *Botany*. See Anethum.

Dill, in *Agriculture*, a name applied to a plant frequently cultivated as a field crop in Glouceſterſhire, and which Mr. Rudge, in his ſurvey of that diſtrict, ſuppoſes to be the *Anethum ſegetum* of Linnæus, and a native of Portugal: but on the Cotſwould hills the ſame term is often given to a large ſort of vetch, which has been there grown for hay for a great length of time.

It is found, according to the writer juſt mentioned, to afford an excellent hay for all ſorts of cattle, but particularly for ewes with ſucking lambs, producing an abundance of highly nutritious milk; and it has the very excellent property of thriving well on ſoils of the poor, thin, and impoveriſhed kind, where other ſorts of artificial graſs-ſeeds would afford but a ſcanty return. In colour the ſeeds incline to red, reſembling thoſe of the vetch in ſhape, but ſmaller.

It is uſual to ſow them broadcaſt in March or the following month, in the proportion of about a buſhel and a half to the acre. They ſoon cover the ground, and require no hoeing or other attention till they are ready for cutting, which, in the moſt favourable ſeaſons, is ſeldom the caſe before the middle or latter end of September, when left for ſeed.

Some cultivators are, however, found to cut it for hay before the bloſſom withers, and then it produces about a ton on the acre: but this is conſidered as the leaſt beneficial mode, as the ſtraw, after the ſeed has been threſhed out, is but little, if at all, inferior to the early mowed. The kid, or pod, has the reſemblance of a pea, and ſhould always be fully ripe before it is harveſted, though, when in too great a ſtate of maturity, it is apt to ſhed on being moved.

The quantity of ſeed which is afforded per acre is frequently ſo much as twenty-four buſhels; the price varying from five ſhillings to eight ſhillings the buſhel.

When ground with barley it has been found to be excellent food for fattening cattle and hogs.

It

It is, perhaps, a ſort of crop that may be grown with advantage on the inferior ſorts of ſoil in moiſt ſituations.

DILL, in *Geography*, a town of Germany, in the circle of the Upper Rhine, and ſeat of a juriſdiction in the county of Spanheim; 26 miles W.N.W. of Creutznach.

DILLA, a mountain and promontory of India, on the coaſt of Malabar, ſituated in N. lat. 12° 1′. E. long. 75° 2′, or 1° weſt of Cochin.

DILLENBURG, a ſmall town of Germany, in the circle of Weſtphalia, on the river Dill; 27 miles N.W. of Marpurg; 54 N. of Francfort on the Mayn; and 60 E. of Bonn. Lat. 50° 45′. It has an ancient caſtle, and belonged to the princes of Naſſau Dillenburg; but it is now in the conſcription of the new kingdom of Weſtphalia. See NASSAU.

DILLENIA, in *Botany*, a magnificent Eaſt Indian genus of plants, named by Linnæus in honour of John James Dillenius, the firſt Sherardian Profeſſor at Oxford; "becauſe," as he himſelf informs us in his Critica Botanica, p. 80. "it is of all plants the moſt diſtinguiſhed for the beauty of its flower and fruit, like Dillenius among botaniſts." Linn. Gen. 277. Schreb. 372. Willd. Sp. Pl. v. 1. 1251. Juſſ. 281. Claſs and order, *Polyandria Polygynia*. Nat. Ord. *Magnoliæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of five roundiſh, concave, large, coriaceous, permanent leaves; at length becoming pulpy, enveloping the capſule. *Cor.* Petals five, roundiſh, concave, large, ſomewhat coriaceous. *Stam.* Filaments very numerous, linear, crowded, ſhorter than the petals, permanent; anthers terminal, erect, oblong, with a recurved point. *Piſt.* Germen ſuperior, roundiſh, depreſſed, aggregate, of about 20 cells; ſtyles none; ſtigmas one to each cell, oblong, depreſſed, ſpreading in the form of a ſtar. *Peric.* Capſules about 20, juicy when ripe, compreſſed, ranged circularly round a pulpy receptacle, and covered by the pulpy permanent calyx. *Seeds* ſeveral in each capſule, inſerted along its inner edge, compreſſed, fringed at their outer margin.

Eſſ. Ch. Calyx inferior, of five coriaceous permanent leaves. Petals five. Capſules ſeveral, compreſſed, many-ſeeded, ranged circularly round a pulpy receptacle.

Linnæus derived his characters of this genus from the deſcription and figures in the *Hortus Malabaricus*, v. 3. t. 38, 39, with the inſpection of a dried ſpecimen only. Hence he has not well characterized the ſeeds as "imbedded in pulp *under* the capſules." The fruit was firſt explained more correctly in Dr. Smith's Exotic Botany, v. 1, where, however, in the full deſcription, the capſule is ſaid to conſiſt "of 20 cells," whereas it is rather, as in the generic character, an aſſemblage of 20 capſules, coaleſcing when ripe into one pulpy maſs. Curtis and Willdenow have confounded with this genus the *Hibbertia* of Andrews, *Repoſ.* v. 3. t. 126, which the former, by a moſt ſtrange and unaccountable miſapprehenſion, took for the original D. *indica*. The three following are the moſt certain ſpecies of *Dillenia*.

1. D. *ſpecioſa*. Thunb. Tr. of Linn. Soc. v. 1. 200. Sm. Exot. Bot. v. 1. 3. t. 2, 3. (D. indica; Linn. Sp. Pl. 745. Syalita; Rheed. Malab. v. 3. 39. t. 38, 39.) "Leaves elliptic-oblong, ſimply ſerrated. Flowers ſolitary. Stigmas lanceolate." A native of the foreſts of Malabar and Java, where it forms a tree 40 or 50 feet high, with a very thick ſtem, and a rugged bark, which, when wounded, diſcharges an aſtringent watery fluid. The leaves are a foot, more or leſs, in length, crowded about the ends of the branches, on winged footſtalks, oblong inclining to elliptical, ſharply but ſimply ſerrated, furniſhed with one rib and numerous parallel tranſverſe veins, roughiſh but not hairy, except on the back of the veins. Flowers terminal, ſolitary, four or five inches in diameter, fragrant and very handſome, on ſimple round ſtalks. Their petals are white, with ribbed yelloviſh claws. Stamens of a bright full yellow, forming a globeſe denſely imbricated maſs, crowned with the ſtigmas in the form of a white ſtar. The fruit is as big as a man's fiſt, reſembling a large greeniſh apple, but lobed, owing to the five leaves of the calyx, enlarged and become juicy, which compoſe its outſide, enveloping the capſules and their central receptacle, all likewiſe very ſucculent, and conſtituting an eatable, though very acid, fruit, which, as Rheede informs us, requires ſugar, broth, or ſome other addition, to make it palatable. A living plant of this ſpecies was ſent by Dr. Roxburgh to lady Amelia Hume, and is in a thriving condition, being the firſt and only *Dillenia* ever yet ſeen in the gardens of Europe, except ſome young plants raiſed by Mr. Clifford, in Holland, which ſcarcely ſurvived three weeks. In a wild ſtate the tree begins to bear when about four years old, ripening its fruit in December and January.

2. D. *aurea*. Sm. Exot. Bot. v. 2. 65. t. 92, 93. (D. ſerrata; Thunb. Tranſ. of Linn. Soc. v. 1. 201? Sangius; Rumph. Amboin. v. 2. 142. t. 46?) "Leaves elliptic-oblong, doubly ſerrated. Flowers moſtly ſolitary. Stigmas linear." This was gathered by lieutenant-colonel Hardwicke, F.L.S., in thickets to the eaſt of the river Gogra, and other parts of the Eaſt Indies, flowering in April, and ripening fruit in May. The flowers are but half the ſize of the former, yellow, ſtanding either ſolitary or in pairs, on round ſtalks, at the ſummits of the ſmaller branches, and come out before the leaves appear. The latter are deciduous, ſtalked, about ſix inches long, acute, doubly ſerrated, ribbed, and veined like the laſt, their form inclining to obovate. Fruit the ſize of a walnut, of a rich orange-colour throughout, and very juicy. This agrees much with the *Sangius* of Rumphius, which Thunberg adopted from him by the name of *Dillenia ſerrata*, but the leaves in our's are doubly ſerrated, and the flower-ſtalks ſcarcely ternate.

3. D. *pentagyna*. Roxb. Coromand. v. 1. 21. t. 20. Leaves elliptic-oblong, ſimply ſerrated. Flower ſtalks lateral, many together. Stigmas five. Found by Dr. Roxburgh in the vallies far up among the mountains of Coromandel, flowering in March and April. The leaves are as large as thoſe of the firſt ſpecies; the flowers ſmall, yellow, on ſimple ſtalks, growing many together in bundles along the branches. The fruit is pendulous, the ſize of a gooſeberry.

Leſs certain ſpecies are, 4. D. *elliptica*. Thunb. in Tr. of Linn. Soc. v. 1. 200, taken up by that author, without ſeeing it, from the *Songium* of Rumphius, v. 2. t. 45, which Thunberg conceives to be different from D. *ſpecioſa*, to which Linnæus referred it. 5. D. *integra*. Thunb. ib. 199. t. 18. "Leaves obovate, obtuſe, nearly entire." Found in Ceylon. 6. D. *retuſa*. Ibid. 200. t. 19. "Leaves obovate, truncate, ſerrated." From the ſame country. 7. D. *dentata*. Ibid. 201. t. 20. "Leaves obovate, abrupt, toothed. Flowers ſeveral on a ſtalk." Found alſo in Ceylon. Theſe four belong to a genus eſtabliſhed by Rottböll in the New Copenhagen Tranſactions, under the name of *Wormia*. We are not ſufficiently acquainted with its piſtils or fruit to ſay how far it is in thoſe parts diſtinct from the real *Dilleniæ*, which laſt were, in that reſpect, equally unknown to Rottböll. In the 7th ſpecies Thunberg deſcribes three flowers on a ſtalk; our ſpecimen has ſix, forming a ſimple *racemus*.

DILLENIUS, JOHN JAMES, in *Biography*, one of the moſt celebrated botaniſts of the 18th century, eſpecially for his knowledge of Moſſes and their allies, was born at Darmſtadt, in Germany, in 1687. He was educated for a phyſician

ſician in the Univerſity of Gieſſen, and is ſuppoſed to have taken there his degree of doctor of phyſic. At leaſt, he uſed that title before it was conferred on him at Oxford in 1735. During his ſtay at Gieſſen he publiſhed ſeveral papers in the *Ephemerides* of the Imperial Academy *Naturæ Curioſorum*, of which he was an active member. The ſubjects of theſe eſſays were, 1ſt, an examination of ſuch American plants as have been naturalized in Europe; 2d, on the Coffee of the Arabians, with a recommendation of rye as the beſt ſubſtitute for it; 3d, a botanical examination of the *Spergula pentandra*, and ſome plants allied to it; 4th, an account of ſome Cryptogamous plants, as they have ſince been denominated; 5th, on obtaining opium from poppies grown in Germany; and, 6th, a zoological paper on leeches, and two ſpecies of *Papilio*.

In 1719, he publiſhed his *Catalogus Plantarum ſponte circa Giſſam naſcentium*, arranged according to their times of flowering, a method certainly as little ſcientific, and as puzzling as could well be contrived. Accordingly, nothing can be found in ſuch a book but by the index, a method recommended by a recent writer for finding out plants in certain natural ſyſtems; and we believe it to be the moſt infallible. This work of Dillenius, however, contains accurate deſcriptions of many plants before not well determined, with figures, drawn and engraved by himſelf, of the parts of fructification, he having always been laudably anxious to eſtabliſh the genera of plants on ſolid foundations. A criticiſm of the methods of Tournefort, Knaut, and Rivinus, is prefixed to this Flora, by which he gave offence to the latter; and was anſwered by him with ſome degree of aſperity. This drew an acrimonious and rather unfair reply from Dillenius, ſubjoined to ſome copies of the work in queſtion. The reader who troubles himſelf to inveſtigate theſe and ſimilar diſputes, in which the art of man contends with the intricacies of nature, while paſſion and prejudice bewilder both the writer and the reader, will think with ſir Roger de Coverley that "much may be ſaid on both ſides," and perhaps that it might be ſaid a great deal better. Dillenius himſelf ſhewed his wiſdom and ſuperiority ſome time after, when attacked by Threlkeld, an Iriſh writer, by treating his remarks with that ſilent contempt which coarſe miſrepreſentation and envious malignity always feel their ſevereſt puniſhment.

The work above-mentioned procured Dillenius the correſpondence and friendſhip of the excellent and learned William Sherard, who returned in 1718 from Smyrna, where he had been Britiſh conſul, and who, after making a tour on the continent, viſited our author in Germany, and in Auguſt 1721 brought him to England. Here in 1724 Dillenius publiſhed his valuable and popular edition of Ray's *Synopſis*, illuſtrated with 24 plates of his own, and with abundance of remarks, additional plants, eſpecially of the cryptogamous kind, and additional places of growth for many of the rare ſpecies. It has been already obſerved, Tranſactions of the Linn. Soc. v. 4, 277, that "he has, with commendable modeſty and diffidence, diſtinguiſhed from the original work all his own additions, being well aware of the danger of miſtakes. It cannot be concealed that he has added ſeveral plants upon inſufficient grounds, either as ſpecies or natives, and has inſerted others, ſuppoſed to be new, that exiſt under other denominations in the original work. The changes he has made among the ſynonyms, not being always marked, and proving often erroneous, oblige us on that head ſtill to conſult the edition of 1696." On the other hand, Dillenius made ſome uſeful corrections. He diſtinguiſhed and figured the *Hieracium*, afterwards called *alpinum* by Linnæus, which Ray had miſtaken for *H. villoſum quintum* of Cluſius, *villoſum* of Linnæus; a very different ſpecies, ſince obſerved in Scotland. He added much to the graſſes, but rather varieties than ſpecies, which may alſo be ſaid of the mints; but in moſſes, lichens, marine plants, and fungi, he greatly enriched this edition. This book was the chief guide of thoſe who ſtudied Britiſh plants, till Mr. Hudſon's *Flora* appeared in 1762, and its ſelling price has conſiderably encreaſed even ſince that time.

From Dillenius's firſt arrival in England, he had reſided in London, frequently viſiting Eltham in Kent, where Dr. James Sherard, brother of the above William, had a houſe and garden. Hence originated his moſt ſplendid work, the *Hortus Elthamenſis*, publiſhed in 1732, in two volumes folio, with 324 plates, drawn and engraved by his own hand, as were thoſe of his other publications. In theſe plates, 417 ſpecies of plants are delineated with great fidelity. The plates, though not beautiful as engravings, have an air of truth, and a degree of luminous preciſion, which none but a botaniſt can give. They contain almoſt a complete illuſtration of the genus *Meſembryanthemum*, as far as it was then known. Several new genera are here firſt eſtabliſhed, and many obſcure or rare ſpecies elucidated. The letter preſs abounds in ample deſcriptions, elaborate criticiſms, and intelligent remarks, delivered in good language. Some copies were coloured by the author, and are probably very correct, though, as works of art, inferior to what we are accuſtomed to ſee at preſent.

Before the publication of the *Hortus Elthamenſis*, its author was ſettled in the new botanical profeſſorſhip at Oxford, founded by his learned and munificent patron William Sherard, who died in Auguſt 1728. The aim of this gentleman was the continuation of Bauhin's *Pinax*, upon which he had beſtowed great labour and attention, and he left by will 3000*l.* to endow the profeſſorſhip in queſtion for the purpoſe of purſuing his ſcheme, having previouſly built, adjoining to the Oxford garden, a muſeum, to which he bequeathed his library, herbarium, and manuſcripts. He ſtipulated that Dillenius ſhould be the firſt profeſſor, and limited the appointment in future to Doctors of Phyſic, graduates of Oxford, not in holy orders, from among whom the profeſſor is choſen by the London College of Phyſicians. Dillenius ſpent the remainder of his life in the ſtudy of botany, but the *Pinax* never appeared. Botanical publications multiplied ſo faſt, and required ſuch ample pecuniary reſources to obtain them all, that they were quite out of his reach. This is perhaps the leſs to be regretted, as he was not ſupremely accurate in ſynonymy. Indeed the end in view is become rather obſolete ſince the prevalence of the Linnæan ſyſtem of arrangement and nomenclature. All botanical works now ſpeak one language, and for the moſt part wear one form and aſpect, ſo that a general index to them is, in a great meaſure, ſuperfluous. It is, indeed, much to be lamented that the Sherardian and Dillenian *Pinax*, as far as it went, has not been publiſhed, as it probably would prove nearly a complete index to all the botanical knowledge previous to the eſtabliſhment of the preſent clear and ſimple plan of nomenclature. Linnæus viſited Dillenius at Oxford in 1736, and though the latter was previouſly rather unfavourably diſpoſed towards his reformations and innovations, as tending to create difficulty and confuſion in the firſt inſtance, he ſoon forgot all ſuch prejudices, and theſe two great men became mutually attached, as honeſt liberal cultivators of ſo liberal and pleaſing a ſcience ought to be. Dillenius wiſhed to fix Linnæus at Oxford, as his coadjutor in the *Pinax*, and if ſir Hans Sloane had been equally diſcerning and equally liberal, the illuſtrious Swede might have been naturalized amongſt us. Here, however, it is worthy of remark, as we have alluded above to the miſchiefs of literary rivalſhip and enmity, that partiality among philoſophers may ſometimes be no leſs miſchievous.

miſchievous. The errors of Dillenius reſpecting the fructification of moſſes, of which we ſhall ſpeak hereafter, were too implicitly adopted by Linnæus, againſt his own judgment and obſervation; and hence a totally erroneous uſe of terms has prevailed in his works, and thoſe of his followers, to the preſent day. In his *Flora Lapponica* he often cites Dillenius, eſpecially concerning willows, for information reſpecting ſynonyms, that is erroneous; but his own remarks being ſubjoined, we are guarded againſt any errors that might enſue from ſuch high authority. The *Critica Botanica* of Linnæus was dedicated to the Sherardian Profeſſor, as being, from his peculiar occupation and duty, more than any other perſon aware of the evils ariſing from confuſion in botanical nomenclature, and the praiſe and reſpect, habitual in dedications, have rarely been ſo ſincerely beſtowed, or ſo juſtly deſerved. Linnæus remarked, in a letter to Haller, May 1, 1737, that "Dillenius was the only perſon then in England who either cared about, or underſtood the genera of plants;" a degree of ſcientific commendation which, in any age or country, can be extended to very few perſons. Nor did he to whom it was then applied, long continue in the ſame degree to deſerve it. We learn from the correſpondence of Dillenius with Haller, that his whole attention was now abſorbed by the family of Moſſes, under which were included not only the natural order of plants, properly ſo called, but the tribes at preſent denominated *Hepaticæ*, and *Lichenes*, as well as *Byſſi*, *Confervæ*, *Ulvæ*, *Tremellæ*, and others. *Fuci* and *Fungi* were, indeed, the only Cryptogamic families not illuſtrated in the great work upon which the chief reputation of Dillenius now ſecurely reſts, and which appeared in 1741, in one volume quarto, under the title of *Hiſtoria Muſcorum*. It conſiſts of 576 pages, with 85 plates, each containing numerous figures, drawn and engraved by the author. The propoſals promiſed but 464 pages, and 80 plates. The index is one of the moſt ample and complete that any book can boaſt. Of this work 250 copies only were printed; and though the ſubſcription price was no more than one guinea for thoſe printed on ordinary royal paper, and a guinea and half for fine Dutch royal, the book ſold very heavily. Eight copies went to Holland. It found its way alſo into ſome fine Engliſh libraries, and we have known it ſtand, fairly lettered and untouched, on the ſhelves of collectors, as a *hiſtory of the muſcovites*. Some botaniſts, however, acquired and uſed it. Linnæus truſted implicitly to it, and thence adopted ſpecies into his works, as his own ſubſcription copy, on fine paper, evinces. From its being frequently quoted, and the ſubject more ſtudied of late, the price of the *Hiſtoria Muſcorum* is now increaſed more than ten-fold. The plates, with an index or ſynopſis only, were reprinted by Millan in 1763; and even this edition is now advanced in price. The plan of the original one is as complete as poſſible, both with reſpect to the botanical characters and deſcriptions, the ſynonyms and hiſtory, as well as the uſes and qualities of the plants of which it treats. The ſpecific characters, both in Latin and Engliſh, which were intended to ſerve as names, are more ſcientific than thoſe of moſt works of that day, and the varieties under each are carefully inveſtigated. The plates repreſent every ſpecies, often of various ages, and under different forms and appearances, frequently with ſeparate leaves, or other parts. Nothing can be more expreſſive or characteriſtic than theſe figures, except, perhaps, with regard to the cruſtaceous and imbricated Lichens, which are leſs happily repreſented than the reſt. What is chiefly to be regretted, reſpecting the moſſes, is the want of a higher magnifying power, whence the ſtructure of the fringe of the capſule, and innumerable nice marks of diſcrimination in the leaves, or other organs, now familiar to the moſt ſuperficial ſtudent, paſſed unnoticed by Dillenius. On this head, the *Stirpes Cryptogamicæ* of Hedwig have made botaniſts faſtidious; and if that work had been as wide in extent, as excellent in execution, the performance of Dillenius would ſoon have become obſolete, however ſuperior, as beyond all compariſon it is, in botanical learning, and correctneſs of ſtyle. One thing we cannot help regretting, the illiberality with which Dillenius too often ſpeaks of his fellow-labourer in this tribe Micheli, who publiſhed 13 years before him, and had been dead about four years when the work of Dillenius appeared. We are diſguſted with inſinuations, that Micheli delineated or deſcribed more than was to be ſeen in nature; a practice of which that faithful and amiable writer was as incapable, as of the illiberality of gratuitouſly charging another with it. Happily, every one of his obſervations, as far as we can recollect, has been verified by ſubſequent botaniſts, eſpecially the ſeeds of Lichens, *t.* 52, &c. Theſe eminent men fell into one common error, concerning the parts of fructification of moſſes, taking for the anther what is now proved to be the capſule, in which miſtake Dillenius was, as we have already hinted, implicitly followed by Linnæus, and, indeed, by Haller and others, till the Hedwigian ſchool aroſe. Yet Dillenius has eſcaped much of the diſgrace by uſing the word *capſula* for what he believed to be an *anthera*, and Linnæus, from correcting this error, as he thought, has been ſuppoſed the author of the above falſe theory. The part in queſtion is properly called a capſule, but Dillenius miſapplied that term, as he believed it an anther, of which few of his readers are aware. Dr. Pulteney has obſerved, that the *Hiſtoria Muſcorum* was the firſt book printed in England in which any of the Linnæan ſpecific characters were exhibited. The learned Swede communicated ſeveral things to this work, and ſtill continued to correſpond with its author, whoſe laſt letter to him is dated Feb. 10, 1746. In this he aſks for moſſes, and accounts for his not being able to furniſh certain exotic ſeeds which Linnæus had required of him. In an earlier letter he complains of the low and watery ſituation of his Oxford garden, where the heavy morning dews and fogs, in autumn, were extremely unfavourable to the ripening of ſeeds. There appear, in his letters, ſcarcely any traces of the coolneſs or riſing diſpleaſure between theſe old friends, which the letters of Dillenius to Haller ſhew to have exiſted, on his part at leaſt. In a letter to Linnæus, ſo early as April 30, 1741, he complains of growing old, and not enjoying good health. He is ſaid to have been of a ſhort ſtature and corpulent habit, and it is probable he led a ſedentary life. He died of an apoplexy, April 2, 1747, in the 60th year of his age. His place of interment is not recorded, nor does it appear that any monument has been erected to his memory. A portrait of him exiſts in the picture-gallery at Oxford, of which a print has been publiſhed in the *Annals of Botany*, by Dr. Sims and Mr. Konig. The countenance is expreſſive of an eaſy placid diſpoſition, and ſuch is ſaid to have been the character of Dillenius. The imperfections of temper, to ſome indications of which we have alluded above, ſeem not to have been habitual nor permanent. He lived on eaſy terms with thoſe around him, and was reſpected as a man of probity. He was never married, nor have we found mention of any of his relations, except one whom he very eſſentially aided in pecuniary difficulties, to his own great loſs. His drawings, among which are very numerous and valuable repreſentations of Engliſh *Fungi*, his books, manuſcripts, and eſpecially his collection of dried ſpecimens referring to his *Hiſtoria Muſcorum*, were bought of his executor, by his ſucceſſor in the Profeſſorſhip, the late Dr. Humphrey Sibthorp, and are

now in the Sherardian library at Oxford. They have been frequently ſtudied by ſucceeding botaniſts, as may be found recorded in the works of Lightfoot, Dickſon, Turner, and the writer of this article: the preſent amiable Profeſſor, Dr. George Williams, being happy at all times to render them uſeful, and to forward the views of the truly excellent founder. Kippis in Biogr. Brit. Letters of Dillenius to Haller and Linnæus. Dill. Plantæ circa Giſſam. Hort. Eith. and Hiſt. Muſc. Haller Bibl. Bot.

DILLEUGHING. See Tin.

DILLINGEN, in *Geography*, a ſmall town of Germany, in the circle of Swabia, biſhopric of Augſburg, with an univerſity founded by biſhop Otto in 1552, and ſeveral monaſteries and convents of Nuns. It is ſituated on the Danube; 24 miles N.E. of Burgau, 12 N.W. of Augſburg, and as many of Donawerth. Lat. 48° 30'.

DILLON, Wentworth, earl of Roſcommon, in *Biography*, a nobleman diſtinguiſhed for his poetical talents, was born in Ireland about the year 1633. His mother was ſiſter of the great earl of Strafford, and at the ſeat of this nobleman, in Yorkſhire, he was inſtructed in the rudiments of a learned education. Thence he was removed to the univerſity of Caen in Normandy, where he ſtudied under the learned Bochart. He next ſpent ſome time in foreign travel, and became an accompliſhed man, as well as a profound ſcholar. His return to England was ſoon after the reſtoration, when he was made captain of the band of penſioners. At the diſſolute court of Charles II., he became diſſolute, and addicted himſelf to the faſhionable vices and manners of thoſe with whom he lived, and among whom, from his office, he was obliged to aſſociate. At the gaming-table he loſt much of his property, and in diſputes, the conſequences of play, he frequently hazarded his life. On account of a quarrel with the lord privy ſeal, about part of his eſtate, he found it neceſſary to reſign his poſt, and return to Ireland, where he was appointed captain of the guards. His paſſion for gaming ſtill continued, which involved him in ſimilar difficulties to thoſe he had experienced in England. Once, as he returned to his lodgings from a gaming-table, he was attacked in the dark by three ruffians, who had been employed to aſſaſſinate him. The earl, ever courageous, defended himſelf with ſo much reſolution, that he diſpatched one of the aggreſſors, diſarmed another, and obliged the third to ſecure his ſafety by flight. After a few years reſidence in Ireland, he returned to London, and was made, almoſt immediately, maſter of the horſe to the ducheſs of York, and married, about the ſame time, the daughter of the earl of Burlington. Notwithſtanding his diſſolute habits, he was the friend, and, in ſome meaſure, the patron of literature. He now formed the plan of a ſociety for refining the Engliſh language, and fixing its ſtandard: in this he was aided by Mr. Dryden; but lord Roſcommon did not live to bring it to maturity. He never took any lead in politics, but was inclined to high monarchical principles. When James II. aſcended the throne of theſe realms, he formed the reſolution of taking up his reſidence in Rome, but a ſudden fit of the gout, which prevented him from ſetting out on his journey, together with the unſkilfulneſs of his medical attendants, proved fatal. He died in the year 1684, and was buried in Weſtminſter abbey. This nobleman was author of ſeveral poetical pieces, which poſſeſs conſiderable merit. Of theſe the chief is, "An Eſſay on Tranſlated Verſe," a didactic piece, explaining the rules by which tranſlations ſhould be made. He publiſhed, likewiſe, in blank verſe, a tranſlation of Horace's Art of Poetry; a paraphraſe on the 148th pſalm; a tranſlation of the ſixth eclogue of Virgil, of ſome of the odes of Horace, and many ſmaller pieces. In ſpeaking of the powers of this nobleman, Dr. Johnſon ſays, "He is elegant, but not great; he never labours after exquiſite beauties; but ſeldom falls into groſs faults. His verſification is ſmooth, but rarely vigorous, and his rhymes are remarkably exact. He improved taſte, if he did not enlarge knowledge, and he may be numbered among the benefactors to Engliſh literature." Biog. Brit.

DILLSBERG, in *Geography*, a town of Germany, in the circle of the Lower Rhine, and palatinate of the Rhine; 6 miles E. of Heidelberg.

DILLWYNIA, in *Botany*, ſo named by Dr. Smith in honour of Mr. Lewis Weſton Dillwyn, F.R.S., F.L.S., author of an eminently valuable work on Britiſh *Conferva*. Sm. in Sims' and Konig's Annals of Botany, v. 1. 510. Claſs and order, *Decandria Monogynia*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, ſect. 4. Juſſ.

Gen. Ch. *Cal.* Perianth bell-ſhaped, two-lipped, without appendages; angular at the baſe: upper lip of 2 oblique, divaricated ſegments: lower of 3 direct, nearly equal ones. *Cor.* papilionaceous, of 5 petals; ſtandard broad, almoſt kidney-ſhaped, with a linear claw of its own length; wings obovate, ſhorter than the ſtandard, each with an incurved tooth on its upper edge near the baſe; keel ſhorter than the wings, of 2 petals, each with a tooth at the upper edge. *Stam.* Filaments 10, ſeparate, awl-ſhaped, aſcending, the lowermoſt gradually longer, all incloſed in the keel; anthers roundiſh, 2-lobed. *Piſt.* Germen ſuperior, oblong; ſtyle ſhort and thick, bent upwards; ſtigma obtuſe, downy. *Peric.* Legume ovate, inflated, of one cell. *Seeds* 2, kidney-ſhaped, ſmooth, each with a white gland-like appendage.

Eſſ. Ch. Calyx five-cleft, two-lipped. Corolla papilionaceous. Style recurved, ſhorter than the germen. Stigma obtuſe, downy. Legume inflated, of one cell, with two ſeeds.

Sp. 1. D. *ericifolia*. Sm. Exot. Bot. v. 1. 47. t. 25. "Leaves linear, twiſted, rough with minute points. Flowers nearly terminal." Stem ſhrubby, 4 or 5 feet high, much branched, ſpreading; the branches cluſtered, ſlender, rigid, leafy, clothed when young with ſhort, denſe, prominent pubeſcence. *Leaves* ſcattered, numerous, ſpreading, on ſhort ſtalks, linear, narrow, acute, entire, revolute, rough, with ſmall points, twiſted ſo that their convex under ſide is turned uppermoſt; the other ſide is marked with a longitudinal furrow. *Stipulas* minute, gland-like, one on each ſide of the footſtalk at its baſe. *Flower-ſtalks* cluſtered about the ſummits of the branches, rarely lateral. *Bracteas* numerous, concave, at the baſe of the flower-ſtalks, with a pair towards their middle. *Flowers* elegant, but inodorous. *Calyx* fringed at the edge with white denſe woolline's, otherwiſe ſmooth, and often reddiſh. *Petals* of a golden hue, not changed by drying; the ſtandard marked with a crimſon radiating central ſpot. *Legume* ſomewhat hairy, crowned by the thick baſe of the ſtyle.—This was one of the firſt plants whoſe ſeeds or dried ſpecimens were brought to England from New South Wales, and it flowered in the London nurſeries about the year 1793. It is eaſily propagated by ſeed, and only requires in winter the ſhelter of a greenhouſe, with regular but moderate ſupplies of water, and a turfy ſoil with ſome loam. 2. D. *floribunda*. Sm. Exot. Bot. t. 26. "Leaves linear, ſomewhat twiſted, rough with tubercles. Flowers lateral, axillary." A rather larger ſhrub than the laſt, brought from the ſame country. *Leaves* leſs ſpreading and more crowded, as well as broader, and covered with coarſe callous tubercles. *Stipulas*, as far as we have diſcovered, wanting. *Flowers* copious, lateral, axillary, ſolitary, on ſhort bracteated ſtalks, their ſtandard ſcarcely ſo broad

broad in proportion to its length, but otherwiſe much like the former. *Legume* very hairy, crowned with the ſmooth ſtyle. 3. D. *glaberrima.* Sm. in Ann. of Bot. v. 1. 510. Labillard. Nov. Holl. v. 1. 109. t. 139. "Leaves linear, ſtraight, triangularly keeled, ſmooth. Flowers terminal, crowded." This is ſmaller and more ſlender than either of the foregoing, with perfectly ſmooth *leaves*. *Stipulas* awl-ſhaped, minute. *Flowers*, as far as we can learn from the dried ſpecimens, moſt like the firſt ſpecies. This plant, though found about Port Jackſon, New South Wales, has never yet been cultivated in England. 4. D. *myrtifolia.* Sm. in Tr. of Linn. Soc. v. 9. (D. obovata; Labillard. Nov. Holl. v. 1. 110. t. 140?) "Leaves decuſſated, obovate, ſlightly concave, obſcurely five-ribbed, ſmooth. Flowers axillary." Communicated to the author by Mr. Menzies, who gathered it at King George's Sound on the weſt coaſt of New Holland. It has not been ſeen alive in Europe. It ſeems a very buſhy ſhrub. The *branches* are ſmooth and angular. *Leaves* crowded, oppoſite, croſſing each other in pairs, obovate, ſtalked, entire, ſmooth, tipped with a pungent point, and marked with 5 ribs, 2 of which are leſs conſpicuous than the reſt. The upper ſide is much the paleſt; the under purpliſh. *Stipulas* minute, ovate, fringed. *Flowers* ſeemingly like thoſe of the ſecond ſpecies. If this be the *obovata* of M. Labillardiere, which ſeems probable, our name muſt give way to the right of priority. 5. D. *glycinifolia.* Sm. in Tr. of Linn. Soc. v. 9. "Leaves ovate or linear, revolute, reticulated. Flowers racemoſe." This alſo is known to us merely by ſpecimens gathered at King George's Sound by Mr. Menzies. Its habit is very unlike the reſt, and more reſembles ſome of thoſe ſimple-leaved plants now referred to *Glycine*; ſee Curt. Mag. v. 8. t. 263. The *ſtyle* is "ſo recurved as almoſt to form a circle, not ſtraight at the baſe and then ſuddenly hooked, as in the genuine *Dillwyniæ*." The *legume*, moreover, is unknown, and when diſcovered, may ſtamp the plant as a new genus. The *calyx* and *corolla* ſufficiently accord with that to which it is here referred. S.

DILUENTS, in *Medicine*, are thoſe liquors which increaſe the fluidity of the humours in the animal body.

It is well known that the ordinary fluidity of the blood is owing to water, which, in great proportion, is conſtantly preſent in it; and that the chief, and, perhaps, only means of increaſing its fluidity, will be by increaſing the proportion of water in it. The ſame may be ſaid, indeed, of the ſecreted and excreted fluids in general, ſo that water may be conſidered as the only proper general diluent.

Nature having appointed water to be univerſally the drink of the whole animal creation, it is, therefore, in man, the proper object of thirſt; and its firſt operation is to quench this appetite, and thereby remove a very uneaſy ſenſation, which is often, in febrile diſeaſes particularly, a conſiderable irritation of the whole ſyſtem. It does this not only by its coolneſs and ſimple fluidity, but alſo by its diluent power, in diſſolving the viſcid matter of the mouth and internal fauces.

As the greater part of mankind take drink along with their ſolid food, there can be little doubt that a certain portion of diluent drink, and particularly of water, taken into the ſtomach, favours the ſolution and digeſtion of the ſolid aliment, and alſo contributes to the more ſpeedy evacuation of the ſtomach. The quantity neceſſary for this is very different in different perſons, and muſt be ſuited to the feelings of every individual; but with this obſervation, that a larger proportion than neceſſary, by increaſing the diſtenſion of the ſtomach, contributes to take off what appetite might otherwiſe remain; and it is commonly proper, only, after the digeſtion is over, to throw in a quantity of water to finiſh that buſineſs more completely, and to promote the entire evacuation of the ſtomach. But this diluent is not only neceſſary for the aſſiſtance of digeſtion, but otherwiſe, alſo, to the ſtate of the ſtomach itſelf. As the mucous glands of this organ throw out a large quantity of a heavy viſcid fluid, which, remaining in the ſtomach, gives an uneaſy ſenſe of weight, and impairs the appetite; ſo in this morbid ſtate, a quantity of water, by diluting and favouring the abſorption and evacuation of this mucus, may often be the moſt certain remedy.

When water is carried into the inteſtines, it will, by mixing with the bile, diminiſh the acrimony of this fluid, and obviate irritations that might otherwiſe have thence ariſen. By diluting the contents of the inteſtines, it will certainly promote the more entire ſolution of theſe, and even, by its bulk, favour their progreſs: and the dilution may likewiſe favour the abſorption of the finer and nutritious parts by the lacteals. A large quantity of water, quickly taken, and paſſing into the inteſtines, may, by its bulk, increaſe their action, and thus prove laxative: in this way water has been known, in numerous inſtances, to prove a very uſeful remedy, by clearing out the whole of the contents, whether natural or morbid, which might be ſtagnant there. The common people, who commonly take every thing that has the name of a mineral water, in very large quantities, often thus obtain much benefit from waters of no ſenſible impregnation.

When any unuſual quantity of water enters the lacteals or other abſorbents, it muſt contribute to increaſe the fluidity of their contents, and to expedite their motions, and perhaps to keep up the free paſſage through the conglobate glands, which are liable to obſtructions. When water enters the blood-veſſels by the thoracic duct, it muſt, in proportion, increaſe the fluidity of the whole maſs of blood, and is certainly the means by which its fluidity is ordinarily preſerved. But, in healthy bodies, or ſuch as are without any obſtruction of the excretions, any unuſual diſtenſion of the veſſels cannot in this way be produced, or long ſubſiſt; for it is not to be doubted that ſuch increaſed quantity of water in the blood, will immediately paſs off by one or other of the excretions: and this effect of diluents is important in the treatment of diſeaſes.

From this detail of the effects of water, when taken freely into the body, it will readily appear that the abundant uſe of it, with very few exceptions, may be conſidered as a very general means of preſerving the health, and that it is an important agent in the cure of many diſeaſes.

In the firſt place, by removing the diſagreeable ſenſation of thirſt, which is common in febrile diſeaſes, dilution removes one of the irritations which tend to keep up the febrile ſtate. And, ſecondly, by the diſpoſition of diluents to paſs off by the excretions, they tend to diminiſh fevers by exciting a regular perſpiration. In many diſordered ſtates of the ſtomach and other organs of digeſtion, which attack the ſedentary and indolent, and thoſe of irregular habits of life, and are included under the term *bilious*, diluents, by aiding digeſtion, and the evacuation of the ſtomach and duodenum, are of great utility, and much of the effect of all mineral waters, on the hypochondriac and other invalids, who frequent watering places, is to be attributed to the ſimple dilution. By theſe means, and by its paſſage through the abſorbent, and glandular ſyſtems, water freely taken is ſignally beneficial in the cure of ſcrofulous obſtructions; and the pureſt waters, with the leaſt ſenſible impregnation, have been particularly extolled for their virtues againſt this diſeaſe. Thus Ilkley ſpa has been

celebrated by Dr. Moſſman; and at Rheims, the water, which was extremely pure, was ſo renowned for the cure of ſcrofula, that an hoſpital, for the reception of patients labouring under that malady, was erected there.

Diluents, in conſequence of their diſpoſition to paſs off by urine, eſpecially when perſpiration is not encouraged, are uſeful in allaying the pain of ſtrangury and ardor urinæ, by diluting the acrimonious ſalts of the urine, and thus diminiſhing the irritation which they would excite in paſſing the neck of the bladder and the urethra, when rendered acutely ſenſible by inflammation. It is, doubtleſs, to the quantity of diluents taken in, with demulcent medicines, rather than to any ſpecific effects of the latter, that this ſucceſsful operation is to be attributed. See Demulcent.

All aqueous liquors, that is, all liquors conſiſting chiefly of water, without the addition of other matters, that may either diminiſh the diluent qualities of it, or give it peculiar properties, are to be conſidered as diluents operating in the way above deſcribed, and poſſeſſing the properties of ſimple water. See Cullen, Materia Medica, vol. ii.

DILURO, in *Ancient Geography*, a river of Spain, according to Ptolemy, called by Pliny Iluro, and by Mela Eluro.

DIMA, or Dyma, in *Ancient Geography*, a town of Thrace.

DIMACHÆ, from δις, *double*, and μαχω, *I fight*, in *Antiquity*, a kind of horſemen, firſt inſtituted by Alexander. Their armour was lighter than that of the infantry, and at the ſame time heavier than that uſed by horſemen, ſo that they could act as horſe or foot as occaſion required.

DIMACHÆRUS, Διμαχαιρος, from δις, and μαχαιρα, *ſword*, a gladiator who fought with two ſwords.

DIMALUM, in *Ancient Geography*, a town of Illyria, according to Polybius, called Dimallum by Livy.

DIMBACH, in *Geography*, a town of Germany, in the archduchy of Auſtria; 4 miles N. of Grein.

DIMCHURCH, or Dinchurch, a village of England, in the county of Kent, ſituated by the ſide of a ſtrong dyke, called "Dimchurch wall," between Romney and Hythe, to prevent the encroachments of the ſea, with a carriage road on the ſummit, wide enough in general for carriages to paſs each other; $4\frac{1}{2}$ miles N.N.E. of New Romney, and $4\frac{1}{2}$ S.S.W. of Hythe.

DIMENSION, the extenſion of a body, conſidered as meaſurable.

Hence, as we conceive a body extended, and meaſurable in length, breadth, and depth, we conceive a trine dimenſion, *viz.* length, breadth, and thickneſs. The firſt called a line, the ſecond a ſurface, the third a ſolid.

Dimension is particularly uſed with regard to the powers of the roots, or values of the unknown quantities of equations, which are called the dimenſions of thoſe roots. See Equation and Root.

Thus in a ſimple equation, the unknown quantity is only of one dimenſion, as $x = a + b$. In a quadratic equation it is of two dimenſions, as $x^2 = a^2 + b^2$. In a cubic, of three, as $x^3 = a^3 - b^3$, &c.

DIMETER. See Iambic.

DIMETIENT, in *Geometry*, is ſometimes uſed for diameter.

DIMIKUR, in *Geography*, a town of Bohemia, in the circle of Konigingratz; 10 miles W. of Biezow.

DIMINISHED Interval, in *Muſic*. See Interval.

Diminished *ſecond* is a ſemitone major, leſſened by a ſemitone minor. See Interval and Second.

Diminished *third*, by ſome called defective third, is properly a third minor leſſened by a ſemitone minor. But among practical muſicians it commonly ſignifies an interval equal to two ſemitones major. And this they confound with the former; but there is a difference between them, equal to the difference between a tone-major and minor, that is, a comma. The firſt mentioned of theſe diminiſhed thirds will be expreſſed by $\frac{144}{125} = \frac{4}{5} : \frac{25}{24}$, and is equal to the tone-major and enharmonic dieſis; for $\frac{144}{125} = \frac{9}{8} \times \frac{128}{125}$. The ſecond diminiſhed third will be expreſſed by $\frac{256}{225} = \frac{16}{15} \times \frac{16}{15}$, which is a comma leſs than the former. See the table in the article Interval.

Diminished *fourth*. See the table in the article Interval.

The diminiſhed fourth often occurs in practice, as from C to G ♮ deſcending; and ſometimes, though more rarely, from G ♮ to C aſcending.

Diminished *fifth*, is leſs than the true fifth by a ſemitone minor, and is therefore equal to two leſſer thirds.

Practitioners often confound the diminiſhed fifth with the ſemi-diapente, or falſe fifth, which is a comma leſs. See Interval.

Diminished *ſixth*. This interval, according to Ozanam, contains two tones and three ſemitones major; or a fourth and diminiſhed third; or a diminiſhed fourth and third minor. Thus from C ♮ to A ♭ is a diminiſhed ſixth.

But as there are two diminiſhed thirds, ſo there may be as many diminiſhed ſixths; theſe being the complements of the former to the octave. One of theſe diminiſhed ſixths will be expreſſed by $\frac{1024}{675} = \frac{4}{3} \times \frac{256}{225}$, and this is a ſemitone major more than the ſemi-diapente; the other diminiſhed ſixth will be $\frac{676}{375} = \frac{4}{3} \times \frac{144}{125}$, which is a ſemitone minor leſs than the flat ſixth. Practitioners confound theſe two; and, in effect, in temperate ſcales they coincide, as do all other intervals differing only by a comma. See Temperament.

Diminished *ſeventh* is of two kinds, differing by a comma. See the table in the article Interval.

That diminiſhed ſeventh, which is the complement of the ſuperfluous ſecond to the octave, is the only one in uſe. It is a ſemitone major more than the ſixth minor, as from C ♮ to B ♭.

Diminished *octave*, is a ſemi-tone minor, leſs than the octave, as from C to *c* ♭. It occurs ſometimes in the baſſes of inſtrumental pieces of muſic. See Interval.

DIMINUE', *Fr.* is a term uſed in muſic for an extreme flat 7th, produced by a ſharp to the loweſt note, or a flat to the higheſt; as $\frac{f\ ♮}{G\ ♯}$ or $\frac{B\ ♭}{C\ ♯}$.

DIMINUITO, *Ital.* an interval in muſic not accurate in its extent, that is, from being too flat, or too ſharp, out of tune.

DIMINUTION, in *Architecture*, a contraction of the upper part of a column, whereby its diameter is made leſs than that of the lower part.

To attain thoſe two important points in architecture, ſtrength, and the appearance of ſtrength, all architects have made their columns leſſer above than below, which is called their diminution. Some have likewiſe made them a little bigger towards the middle than at the bottom, which is called their ſwelling. The Gothic architects, indeed, obſerve neither diminution nor ſwelling; their columns are perfectly cylindrical; for which reaſon they are properly called pillars, in contradiſtinction to columns.

The diminution generally commences from one third of the height of the column. Some make it begin from the very baſis, and hold tapering to the capital; but that has not ſo good an effect. Vitruvius would have the diminution of columns differ according to their height, and not according to their diameter: thus, a column of fifteen feet high, he diminiſhes a ſixth part of its diameter; and another of fifty

feet only an eighth part; but we do not find this rule obſerved in the antique. The difference of orders, M. Perrault obſerves, does not infer a difference of diminution, there being ſmall and great diminutions in different works of the ſame order; excepting, however, the Tuſcan, which Vitruvius diminiſhes by a fourth part, though Vignola only makes it a fifth, and the Trajan column a ninth. The diminutions are very differently adjuſted in the different antique buildings, as well as by the different modern authors. For the method of diminiſhing a column, ſee COLUMN.

DIMINUTION, in *Heraldry*, a term uſed by Latin writers for what we more uſually call differences, and the French briſures. See DIFFERENCE.

DIMINUTION, in *Law*, is where the plaintiff or defendant in a writ of error alleges to the court, that part of the record remains in the inferior court not certified, and therefore prays that it may be certified by certiorari. Diminution cannot be alleged of what is fully certified, but of ſomething that is wanting, as the want of an original, or a warrant of attorney.

DIMINUTION, in the *Old Muſic*, is changing, in a canon, ſemibreves to minims. It likewiſe meant variations, diviſions, breaking crotchets into quavers, quavers into ſemiquavers, &c.

DIMINUTION, in *Rhetoric*, the augmenting and exaggerating what you have to ſay, by an expreſſion that ſeems to weaken and diminiſh it.

As for inſtance, when a man ſays, with a certain tone, This woman is not ugly; meaning, ſhe is very handſome.

Some authors take diminution in a ſtricter ſenſe, *viz.* for ſaying leſs than a man really means; as, You are not, indeed, to be commended; where a greater reproach is ſecretly meant.

DIMINUTIONE, *Ital.* in *Muſic*, is one of the names given to figurative counterpoint, to diſtinguiſh muſic in parts of note againſt note, or plain counterpoint from florid. See DIMINUITO.

DIMINUTIVE. in *Grammar*, a word formed from ſome other, to ſoften or diminiſh the force and effect thereof; or to ſignify a thing that is little in its kind.

Thus cellule is a diminutive of cell, globule of globe; hillock of hill, &c.

The Italians abound in diminutives, every author being at liberty to make as many as he pleaſes. The French are much more reſerved in that reſpect, though their old authors were every whit as licentious as the Italians, witneſs Belleau, &c.

In Engliſh we have very few; not that, as ſome have ſaid of the French, our language is hard, and incapable of the ſofteſt expreſſions, but becauſe we lay all our tenderneſs in our ſentiments; or rather, our language is tender, like a perſon of diſcretion, who always ſpeaks ſenſe, even in ſpeaking of his paſſion.

In Latin, Italian, Engliſh, and moſt other tongues, diminutives are formed from primitives, by the addition of a few letters or ſyllables: in French, the caſe is frequently otherwiſe, the diminutive being ſometimes ſhorter than the primitive, ſometimes of the ſame length.

They have a pleaſing effect in that celebrated addreſs of Adrian to his departing ſoul, which begins,

> " Animula, vagula, blandula
> Hoſpes comeſque corporis, &c."

Some grammarians call *at leaſt* a diminutive conjunction, as ſerving to leſſen or diminiſh the force of what went before.

DIMISSORY LETTERS, *Literæ Dimiſſoriæ*, in the *Canon Law*, a letter given by a biſhop to a candidate for holy orders, having a title in his dioceſe, directed to ſome other biſhop, and giving leave for the bearer to be ordained by him.

When a perſon produces letters of ordination, or tonſure, conferred by any other than his own dioceſan, he muſt at the ſame time produce the letters dimiſſory, given by his own biſhop, on pain of nullity.

Letters dimiſſory cannot be given by the chapter, ſede vacante; this being deemed an act of voluntary juriſdiction, which ought to be reſerved to the ſucceſſor.

DIMITRIA, in *Geography*, a fort of Ruſſian Tartary, on the Don, in the government of Caucaſus; 12 miles N. of Ekaterinograd.

DIMITROW, a town of Poland, in the palatinate of Braclaw; 50 miles S. S. W. of Braclaw.

DIMITY is a kind of cotton cloth originally imported from India, and now manufactured in great quantities in various parts of Britain, eſpecially in Lancaſhire. Dr. Johnſon calls it dimitty, and deſcribes it as a kind of fuſtian. The diſtinction between fuſtian and dimity, in the ſenſe in which theſe words are generally underſtood, ſeems to be this; that the word fuſtian is uſed to expreſs a common tweeled cotton cloth of a ſtout fabric, upon which no ornament is woven in the loom; but which is moſt frequently dyed after being woven. Dimity is alſo a ſtout cotton cloth of a ſimilar fabric; but is ornamented in the loom, either with ſtripes or fanciful figures, and when woven is ſeldom dyed, but commonly bleached of a pure white. The ſtriped dimities are the moſt common, as they require leſs labour in weaving than the others, and the mounting of the looms being more ſimple, and conſequently leſs expenſive, they can be ſold at much lower rates. For the plans of mounting both kinds, as generally practiſed by weavers, ſee the article DRAUGHT and *Cording*.

DIMIZA, in *Ancient Geography*, a town of Aſia, in Media Minor.

DIMLU, in *Geography*, a ſtrong city of Arabia, in the diſtrict of Hodsjerie, a part of the Imam's dominions, ſeated upon a mountain, and called by Abulfeda the king's treaſury; 20 miles E. S. E. of Taas.

DIMNAH, in *Ancient Geography*, a town of Zebulun, given to the Levites of Merari's family.

DIMNE, in *Geography*, a town of Arabia, in the country of Yemen; 12 miles S. S. E of Dsjebi.

DIMNESS *of Sight*, in *Farriery*, a diſorder in horſes, proceeding from blood-ſhotten eyes. If the ball of the eye be ſound, the cure is effected by keeping the horſe warm, with a hood of linen cloth fitted to his head, and anointing the eye-lids twice a day with a compoſition of ſugar-candy, honey, and white roſe-water. In two or three days the eyes will be well, after which the creature ſhould be blooded.

In this diſorder the bladders on any part of the eye ought by no means to be clipped or meddled with. See SIGHT.

DIMOCARPUS, in *Botany*, a name given by Loureiro to the Chineſe fruits Litchi and Longan. See SCYTALIA.

DIMŒRITÆ, in *Eccleſiaſtical Hiſtory*, a name given to the Apollinariſts, who at firſt held, that the Word only aſſumed a human body, without taking a reaſonable ſoul like ours; but being at length convinced by formal texts of Scripture, they allowed, that he did aſſume a ſoul, but without underſtanding; the Word ſupplying the want of that faculty. From this way of ſeparating the underſtanding from the ſoul, they became denominated dimœritæ, *q. d.* dividers, ſeparaters, of δια and μοιραω, *I divide*.

DIMON, GREATER, in *Geography*, one of the Feroe iſlands, lying half a Daniſh mile S. S. E. from Skuoe, and

$\frac{2}{3}$ of a mile S. S. W. from Sandoe. Its length, from S. E. to N. W., is ſcarcely half a mile, and its breadth about one-eighth of a mile. The coaſt is almoſt everywhere high and ſteep, and is acceſſible only in two places, where only one perſon can aſcend at a time; ſo that no iſland can be better fortified by nature. It is, indeed, impregnable; for it is impoſſible to ſtarve the inhabitants, as it abounds with good fiſh and ſea-fowls, and no ſhip can remain near it on account of the force of the currents. The fowls are ſo numerous, that at certain periods they almoſt darken the air, and ſtun the ears with their piercing cries. The whole population of the iſland conſiſts of one family; and in ſummer, the only time when the clergyman can viſit the church, it is neceſſary to hoiſt him up into the iſland by means of a rope. On the ſummit, however, the iſland is pretty level; but on account of the ſteepneſs of the coaſt, no boats can be kept here, and, therefore, the inhabitants live in a ſtate of ſeclufion from other people, and can never quit their priſon, except when ſome of the inhabitants of the other iſlands come to them with a boat.

Dimon, *Leſſer*, another of the Feroe iſlands, which lies at the diſtance of $\frac{3}{4}$ of a Daniſh mile from the greater Dimon, and about the ſame from the Suderoe. It is a ſmall uninhabited iſland, nearly of a circular form, $\frac{1}{6}$th of a mile in diameter. The ſurrounding coaſt is very ſteep, and is acceſſible only in three places. In form it reſembles a hay-ſtack, and, when viſible, might ſerve as a land-mark to navigators. It abounds with ſea-fowl, and contains a great number of wild ſheep. The black wild ſheep of this iſland are ſuppoſed to be a peculiar ſpecies; they are ſmall in ſize, have ſhort-curled wool, and do not readily mix with the others introduced into this iſland; their fleſh, which has a dark appearance, in taſte approaches to that of other wild animals. They ſhelter themſelves from the ſeverity of the weather in ſome natural caverns found in the iſland; and when the inhabitants of Suderoe come hither for a few days to catch ſea-fowl, they take up their abode in caverns of the ſame kind.

DIMONA, in *Ancient Geography*, a town of Lower Mœſia, ſeated on the bank of the Danube.

Dimona, a town of Judea, in the ſouthern part of the tribe of Judah, Joſhua, xv. 22.

DIMORPHA, in *Botany*, (from δις, *double*, and μορφη, *form*, alluding to the differences of ſtructure in the two genera of Aublet, which are by Schreber united into one under this name.) Schreb. Gen. 493. Willd. Sp. Pl. v. 3. 971. Mart. Mill. Dict. v. 2. (Parivoa; Aubl. Guian. v. 2. 756. t. 303, 304. Juſſ. 350. Eperua; Aubl. Guian. v. 1. 369. t. 142. Juſſ. 349. Panzera; Willd. Sp. Pl. v. 2. 540.) Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Leguminoſæ*, ſect. 3. Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, rounded at the baſe, divided into three or four deep ſegments, obtuſe. *Cor.* Petal one, very large, ventricoſe, rolled in at the ſides, finely crenate, inſerted into the calyx under the ſtamens, and placed at the lowermoſt ſide. *Stam.* Filaments diadelphous, (the ſimple one being at the opening between the edges of the petal, and the nine united ones lying againſt the middle of the petal,) all aſcending, longer than the corolla; anthers oblong, quadrangular, incumbent. *Piſt.* Germen ſtalked, compreſſed, ſhort; ſtyle longer than the ſtamens; ſtigma ſimple. *Peric.* Legume large, oblique, compreſſed, of one cell. *Seeds* ſolitary, or very few.

Obs. The petal is ſingle as in *Amorpha*, but it occupies the place of the keel, (not of the ſtandard;) the latter, as well as the wings, are wanting. In the *Parivoa* of Aublet the legume is obovate, and ſingle-ſeeded; in *Eperua* the filaments are thickened and villoſe at their baſe, (in his figure five only have anthers,) and the legume is ſcymitar-ſhaped, with three or four ſeeds. Schreb.

Eſſ. Ch. Calyx in three or four deep ſegments. Keel of one ample inflated petal. Wings and ſtandard wanting. Legume compreſſed, with few ſeeds.

It is very probable that Juſſieu and Willdenow may be right in keeping theſe two genera of Aublet diſtinct, but we have none of us ſufficient materials to determine the point, Aublet's figures, made from dried ſpecimens, and thoſe ſpecimens themſelves, (in this caſe imperfect,) being our only guides, except his original French deſcriptions, of which the Latin is a tranſlation. The only ſpecies known are,

1. D. *grandiflora*. Willd. Sp. Pl. v. 2 971. (Parivoa grandiflora; Aubl. t. 303.) "Leaves abruptly pinnated. Legume ſmooth." A lofty tree found about the ſhores of creeks and rivers in Guiana, flowering in September. The *leaves* conſiſt of three or four pair of ovate, pointed, ſtalked, ſhining leaflets, ſometimes $3\frac{1}{2}$ inches long. *Flowers* large, purpliſh, in terminal cluſters. *Legume* thick, woody, containing one large ſeed. 2. D. *tomentoſa*. Willd. (P. tomentoſa; Aubl. t. 304.) "Leaves ternate or pinnate. Legume downy." Native of the ſame country, in moiſt meadows, and about rivers. This tree is about 25 feet high. *Leaves* of three or five leaflets. *Flowers* in terminal ſpikes, purpliſh, and agreeing in ſtructure with thoſe of the firſt ſpecies, but the *legume* is downy. 3. D. *falcata*. (Eperua falcata; Aubl. t. 142. Panzera falcata; Willd. Sp. Pl. v. 2. 540.) Leaves abruptly pinnated. Legume ſmooth, with three or four ſeeds. Found in the foreſts of Guiana, near rivers, flowering in September. The *trunk* is 50 or 60 feet high. The wood oily, laſting long in a moiſt ſituation, and preferred by the negroes for the handles of their hatchets. *Leaves* reſembling thoſe of the firſt ſpecies, but their leaflets are more elliptical. *Flowers* red, in cluſters, on very long, axillary, compound, pendulous ſtalks. *Legume* ſeven inches long, ſcymitar-ſhaped, containing three or four flat ſeeds, of an irregular form.

DIMORPHOTHECA, a name given by Vaillant to a genus of plants, which Linnæus makes the ſame with the calendula.

DINA, in *Ancient Geography*, a lake of the Peloponneſus, in Arcadia. Pauſanias.

DINABURG, in *Geography*, a town of Ruſſia, in the government of Polotſk, ſeated on the Dwina; 80 miles N. W. of Polotſk, and 256 S. S. W. of Peterſburg. N. lat. 56° 5′. E. long. 61° 46′.

DINAGEPOUR, a town of Hindooſtan, in the country of Bengal; 85 miles N. of Moorſhedabad, and 180 E. of Patna.

DINAITES, in *Scripture Hiſtory*, a people who oppoſed the rebuilding of the temple. Ezra, iv. 9.

DINAN, a town of France, in the department of the Côtes du Nord, chief place of a diſtrict, ſituated on the river Rance, 18 miles S. of St. Malo, 36 N. W. of Rennes, and 270 N. W. of Paris. W. long. 1° 59′. N. lat. 48° 27′ 16″. It contains a population of 4170 individuals, and is divided into two parts, eaſt and weſt, each of which is a ſeparate canton. The eaſt compriſes ſix communes and 11,906 inhabitants; the weſt 13 communes, and 12,642 inhabitants. Both together have a territorial extent of $217\frac{1}{2}$ kiliometres.

Dinan is one of the nine quarters of the maritime diſtrict of Breſt, and has in its naval conſcription the leſſer places of Pleudihem, Plouer, Pleuſtuit, Saint Egouat, Saint Briac, and Saint Jacut. But it is chiefly celebrated for its mineral waters, on which account it is much frequented even by foreigners. The water has been carefully analyſed by Mr. Monnet

Monnet in 1769. It contains carbonate of iron, muriate of ſoda or potaſh, and carbonate of earth, (carbonate terreux.) Its taſte is ferruginous. On iſſuing from the ſource it is perfectly pellucid, but if left expoſed to the air it grows muddy, and leaves at the bottom of the veſſel in which it is contained an ochreous ſediment. The water then loſes its metallic taſte, and becomes inſipid, like common water. It ought, therefore, to be drank at the ſpring, and taken cold, as it is altered by heat. Its effects are aperitive, deterſive, aſtringent, and corroborative. The uſe of this water is particularly recommended in female diſeaſes ariſing from deficient or ſuperabundant menſtrual diſcharges.

As chief place of a diſtrict, Dinan has a ſub-prefect, a court of juſtice, and a regiſter office. The whole diſtrict contains 10 cantons, 92 communes, and 96.327 inhabitants, upon a territorial extent of 1460 kiliometres. The ſoil is good, and produces abundance of corn, hemp, and flax. Theſe articles, together with cattle, fiſh, honey, wax, linen cloth, iron, and ſome pottery, conſtitute the principal trade of the diſtrict of Dinan.

DINANT, a ſmall town of France, in the department of Sambre and Meuſe, chief place of a diſtrict, ſituated on the right ſhore of the Meuſe, between the river and a ſteep rock, which renders it very narrow, 18 miles S. of Namur, 45 S. E. of Mons, 48 S. W. of Liege. Lat. 50° 15′. It has a population of 2964 individuals. The canton contains 36 communes and 10,051 inhabitants, upon a territorial extent of 245 kiliometres.

As chief place of a diſtrict, Dinant has a ſub-prefect, a court of juſtice, and a regiſter-office. The ſoil of the diſtrict is tolerably fertile. There are ſome iron mines, rich quarries of white, black, and red marble, copper founderies, forges, tan-yards and breweries. Leather, copper utenſils, bar-iron, wrought iron, and beer, conſtitute the principal articles of trade.

The diſtrict of Dinant compriſes five cantons, 137 communes, and 37,321 inhabitants, upon a territorial extent of 1177½ kiliometres.

Dinant, a bay of France, on the W. coaſt of the department of Finiſterre, in the Engliſh channel, between Breſt road and the bay of Douarnenez. N. lat. 48° 13′. W. long. 14° 43′.

DINAPORE, a village of Hindooſtan, in the diſtrict of Patna, lies about 14 coſs W. of Bankipore, one of the ſuburbs of Patna, in which the Eaſt India company's civil ſervants reſide. At Dinapore there is a military cantonment built by the company on the ſame elegant and magnificent ſcale with thoſe at Berhampoor and Calcutta. It is ſo extenſive that every officer enjoys nearly three times the accommodation afforded by any of the barracks in England. The private ſoldiers are alſo provided with large and well-aired lodgings; but the troops belonging to the native battalions are quartered in ſmall tents, a little ſuperior to thoſe of the natives. For ſeveral miles around the adjoining villages of Bankipore and Dinapore, the fields aſſume the appearance of a rich and well-dreſſed garden. The ſurface of the ground in this flat part of the province of Bahar does not riſe more than 30 feet above the level of the Ganges; and in many places its level is ſtill more inconſiderable. The water therefore is not more than two or three fathoms from the ſurface; and the method of raiſing it is very ſimple. Two long bamboos are raiſed upon a frame about 10 or 12 feet, which are wrought like levers by a weight attached to one end, as the moving power which raiſes the leathern bags to the mouth of the well. The moſt common crops are cotton, dohl, and the caſtor-oil plant, which latter riſes to the height of a large ſhrub, and ſhelters below its broad leaves the dohl and cotton ſhrub. Barley alone, or mixed with a kind of ſmall pea, is alſo a very common produce in this vicinity. Almoſt every common article of food is here very cheap: fowls from ſix to ten a rupee, and ducks at nearly the ſame price. Wheaten bread is much cheaper than in Britain; though it is more expenſive than any other farinaceous food, and therefore not generally uſed by the natives. Tennant's Indian Recreations, vol. ii.

DINAR, a mountain of Perſia.

DINARITUM, in *Ancient Geography*, a promontory of the iſle of Cyprus, now *Capo St. Andrea*; placed by M. D'Anville at the moſt eaſterly point of the iſland, near the iſles called *Clides*.

DINAS-MAWDDWY, or Dinasmouthy, in *Geography*, a townſhip and market town in the pariſh of Llany-Mowddû, or Mallwyd, in the hundred of Tallybont, Merionethſhire, Wales. It is ſeated on the river Dyfi, at the junction of three vallies, near a remarkable and romantic precipice called Craig-y-Dinas. Excepting the bold ſcenery of the neighbourhood, this place does not preſent any objects, or events, of curioſity or intereſt. It has a well ſupplied market on Fridays, and three annual fairs. Here is a good bridge over the river: the church is more than a mile from the town. "That this was a place of more conſequence than its preſent ſtate indicates cannot be denied; indeed the annals of Wales (*vide* Warrington) notice it as having been the ſeat of a chieftain; and its vicinity the ſcene of many a feat of valour and barbarity." (Evans's Tour through North Wales.) Mr. Evans infers that this town derived its name of Dinas from being a fortified palace of a prince; "and, as uſual, the diſtrict around was endowed with ſeveral privileges and exemptions, which continued under the title of ancient uſages, till reſtricted by the ſtatutes of Henry VIII.; when the laws of England were generouſly extended to the conquered country." This place is the capital of an extenſive lordſhip belonging to the Mytton family. According to Pennant, it is governed by "a mayor, aldermen, recorder, and ſeveral burgeſſes," the former tries criminals, and the recorder, in the abſence of the lord, hears and determines cauſes of debt, &c. not exceeding forty ſhillings. See Pennant's Tour in Wales, vol. ii.; and Evans's Tour through North Wales.

DINAW, a town of Poland, in the palatinate of Lemberg; 60 miles W.S.W. of Lemberg.

DINCKEL, a river of Germany, which runs into the Vechl, about ſeven miles N. from Nianhuys, in the county of Bentheim.—Alſo, a river of Germany, which runs into the Emmer, near Wobbel, in the county of Lippe.

DINDARI, in *Ancient Geography*, a people of Illyria, in Dalmatia.

DINDIGUL, in *Geography*, a town of India, in the Myſore country, capital of a diſtrict or circar, to which it gives name; 51 miles S. W. of Tritchinopoly, and 70 S. E. of Coimbore. N. lat. 10° 23′. E. long. 78° 6′.

DINDYMIS, in *Ancient Geography*, one of the names of Cyzica, ſituated in Aſia Minor, at the foot of mount Didymos, on the borders of the Propontide.

DINDYMOS, a mountain of Aſia Minor, in the peninſula of which Cyzica occupies the iſthmus. The mother of the gods had a temple in this mountain; it is thought to have been conſecrated by the Argonauts.

DINESTONS, in *Geography*, a town of America, in the ſtate of Pennſylvania; 25 miles E. of Pillſburg.

DING, in *Commerce*, a name which the Siameſe give in general to all ſorts of weights.

DINGAS, or *Bombay-barks*, in *Navigation*, are veſſels uſed at Bombay and places adjacent, which are ſometimes navigated

navigated by rowing with paddles. They have one maſt, one-third the length from the ſtern, which rakes much forward. On the maſt is hoiſted a ſail bent to a long yard, reſembling a ſettee-ſail: the laſh is made faſt to the head of the ſtern, and the ſheet to the keel of the maſt. Theſe veſſels never tack, but wear, in doing which they peck the yard againſt the maſt to ſhift the ſail; at the ſame time they paſs the ſheet before the maſt. Their rigging conſiſts of a pair of haliards, a bow-line, and brace. Their keels are very much hollowed upwards, to avoid wholly grounding on ſand-banks.

DINGE', in *Geography*, a town of France, in the department of the Ille and Vilaine and diſtrict of Dol; five leagues N. of Rennes.

DINGELFING, a ſmall town of Bavaria, ſituated on the river Iſer, in Lower Bavaria, between Landſhut and Straubing.

DINGELSTADT, a town of Germany, in the circle of the Lower Rhine, and county of Eichsfeld, on the Unſtrutt; 33 miles N. W. of Erfurt.

DINGLA, in *Ornithology*, the name given by Forſkal to the Larus *Cinerarius*.

DINGLE, in *Geography*, a market and poſt-town of the county of Kerry, Ireland: the Iriſh called it *Daingean-ni-Cuſhy; i e.* the faſtneſs or caſtle of Huſſey. In the reign of James I. a charter was granted to it under the name of *Dingle Cuſhy*, and it was ſince called *Dingle i-Couch*, though the addition is now ſeldom made. It is ſituated on a harbour towards the north ſide of Caſtlemain bay, which is but a quarter of a mile broad at the entrance, but grows wider, and in which veſſels are protected from every wind. Ships of a hundred tons may come up to the town. Before queen Elizabeth's reign, ſeveral Spaniſh merchants reſided at Dingle, who traded with the natives for fiſh and other kinds of proviſions. Several of the houſes were built in the Spaniſh faſhion, with ranges of ſtone balcony windows. Dingle, beſides its export of butter and other articles of proviſions, has a manufacture of coarſe linen, which takes its name from the town, and is much uſed for ſheeting. It was formerly a borough town, but has loſt its privilege of returning members to parliament by the union. It is 164 Iriſh miles S. W. from Dublin. Latitude 52° 8′ N.; longitude 10° 7′ W. from Greenwich. Smith's Kerry.

DINGMANS, a town of America, in the ſtate of Pennſylvania; 75 miles N. of Philadelphia.

DINGWALL, anciently written *Dingaval*, is the name of a pariſh in Roſs-ſhire, Scotland, ſeated near the weſtern ſhore of the Frith of Cromarty. This diſtrict conſiſts of an extenſive valley, and the ſides of ſeveral hills, the greater part of which is well cultivated. Oats, barley, peaſe, beans, and wheat, are the chief produce. About 100 acres are appropriated to ſown graſs, 200 to paſture, and 900 to plantations. In this pariſh is Dingwall, an ancient royal borough, which was created ſuch by king Alexander II. in 1226. Its charter of that date was confirmed by James IV. and its inhabitants empowered to elect a provoſt, two bailiffs, dean of guild, treaſurer, and ten counſellors. It joins with Kirkwall, Wick, Dornock, and Tain, in returning one member to parliament. Here was formerly a ſeat, or family manſion of the earls of Roſs, and parts of an ancient caſtellated building, with moat, &c. ſtill remain. Into the latter, the water was admitted at high tides, and the whole was adapted to protect the poſſeſſor in times of warfare. From foundations of houſes that have been diſcovered at ſome diſtance from the preſent town, and other ſimilar evidence, it is juſtly inferred that the ancient borough exceeded the preſent in extent. It is, however, certain, that modern improvements have rendered the preſent place more comfortable and convenient for human habitation, trade, and ſocial intercourſe. Near the church is an obeliſk, which riſes from a baſe of ſix ſquare feet, to the height of 57 feet. It was erected to diſtinguiſh the burial place of the Cromarty family. The population of the pariſh, in 1791, was 1379. Sinclair's Statiſtical Account of Scotland.

DINHABAH, in *Ancient Geography*, a city of Edom. Gen. xxxvi 32.

DINIA, Digne, a town of Gallia Narbonnenſis, and the capital of the Bodiontici, who lived near it. Its name is ſaid to be of Celtic original, derived from *din*, water, and *ia*, hot; ſo called from the thermal waters, at the diſtance of a quarter of a league from it. See Digne.

DINIÆ, a place of Aſia Minor, in Phrygia.

DININ, in *Geography*, a river of the county of Kilkenny, Ireland, which riſes in the mountainous diſtrict of Carlow weſt of the Barrow, and having received another ſtream from Caſtlecomer, joins the Nore a few miles above Kilkenny.

DINKELSBÜHL, or Dunkelspühl, in Latin *Tricollis*, *Zeacollis*, or *Zeapolis*, an ancient town of Germany, on the river Wernitz, ſeated on three hills, was formerly a free imperial city, which, in the diet of the empire, held the ſixteenth place on the bench of the imperial towns in Swabia; but at the peace of Luneville it was given to the king of Bavaria, as part of the indemnities to which he was entitled for his loſſes on the weſtern ſhore of the Rhine. The inhabitants and the magiſtrates are half Lutherans and half Roman Catholics.

DINKELSCHERBEN, a ſmall town of Germany, in the circle of Swabia, formerly belonging to the biſhopric of Augſburg.

DINKIRA, a country of Africa, a little inland of the Gold coaſt, W. of Inta or Aſſiento, ſix days' journey from Axim, and five from Elmina. On the eaſt it has Aſſiento, or, as ſome ſay, the intermediate country of Cabaſterra, on the weſt Adom, and on the north unknown regions extending to Barbary. This kingdom was formerly confined within narrow limits, and thinly inhabited; but the natural valour of the inhabitants rendered them formidable to all their neighbours, except thoſe of Achem and Aſſiento, who always maintained their ſuperiority by their numbers. When the roads are free and open, the Dinkineſe merchants, and the Acheneſe, frequent the markets of Axim, Elmina, Commendo, and Cape Coaſt; but when they are ſhut up, they direct their commercial attention to the more diſtant parts of the coaſt, and there occaſion a great afflux of wealth at the inferior factories. The gold of Dinkira is naturally fine, but artfully mixed with the Fetiche gold. As to the Acheneſe, they carry on a great trade with the natives, both of the coaſt and of the interior countries. Such is their eſtabliſhed reputation for honeſty and fair dealing, that the merchants of Commendo and Simpa give their gold the name of "alkanney chienka," on account of its purity and genuine qualities. They are fierce, bold, and warlike, ſo that they are no leſs dreaded than eſteemed by their neighbours. In travelling through the adjacent countries, they are hoſpitably entertained without expence. Their arms are darts, ſcymitars, and bucklers: and their language is a kind of compound of thoſe of the neighbouring countries with which they keep up an intercourſe, blended with many Portugueſe words borrowed by their anceſtors during their commerce with that nation.

DINNAGE. See Dunnage.

DINNER, the great meal, or that taken about the middle of the day.

The word is formed from the French *diſner*, which Du-Cange derives from the barbarous Latin *diſnare*. Henry Stephens

Stephens derives it from the Greek δινεω; and will have it wrote *dipner*. Menage deduces it from the Italian *definare*, to dine; and that from the Latin *definere*, to leave off work.

The grand Tartar, emperor of China, after he has dined, makes publication by his heralds, that he gives leave for all the other kings and potentates of the earth to go to dinner; as if they waited for his leave.

In the general, it is agreed to be the moſt ſalutary to make a ſpare ſupper, and to eat the more plentifully at dinner, eſpecially for tender, valetudinary people. This is the ſentiment of the Schola Salernitana.

"Ex magna cœna ſtomacho fit maxima pœna:
Ut ſis nocte levis, ſit tibi cœna brevis."

Yet Bernardinus Paternus, an eminent Italian phyſician, maintains the contrary, in a treatiſe expreſsly on the ſubject.

The Romans, we are aſſured, never minded dinner; but deferred their good cheer to the evening, which they made their grand meal.

DINO, in *Biography*, a celebrated Italian juriſt, was born about the middle of the 13th century. He ſtudied law at Bologna, and, in 1279, was invited to take the chair in that faculty at Piſtoia. Five years afterwards, he was appointed profeſſor of Bologna, with a handſome ſtipend. In 1296, he refuſed an invitation to Naples ſent by the king himſelf, and in the following year he removed to Rome, where Boniface VIII. employed him in compiling the ſixth book of decretals publiſhed in 1298. As a recompence for this labour, he hoped for the office of cardinal, and to enable him to hold it, he ſeparated from his wife, who entered into a convent, and enrolled himſelf in the clerical order: he did not ſucceed according to his expectations, and was obliged to reſume the profeſſorſhip. He died in 1303, leaving behind him ſeveral works of great authority. His commentary on the rules of law was ſo highly eſteemed, that it was recommended to be committed to memory. He wrote treatiſes on "The Pandects;" and "De Actionibus," and his authority was ſo great at Verona, that in difficult points it was decreed, that the opinion of Dino ſhould be deciſive. Moreri.

DINOCRATES, a famous architect of Macedonia, who flouriſhed about 330 years B. C. Having formed a variety of ſingular conceptions in the exerciſe of his profeſſion, he wiſhed to recommend himſelf to Alexander the Great, whilſt this conqueror was atchieving his military exploits. Accordingly he joined his army, and obtaining acceſs to Alexander, he propoſed to him a ſcheme for laying out mount Athos into the form of a man, having in his left hand the walls of a great city, and all the rivers of the mountain flowing through his right hand into the ſea. (See Athos.) Alexander, though ſeemingly pleaſed with the grand deſign, deferred the execution of it. Nevertheleſs, he took Dinocrates with him into Egypt, and employed him in marking out and building the city of Alexandria. He was alſo engaged by the Epheſians to ſuperintend the re-building of the temple of Diana. (See Diana.) The laſt great deſign which hiſtory aſcribes to him was that of erecting a temple to Arſinoe, queen of Ptolemy Philadelphus, at Alexandria, having a dome above it, on which was to be incloſed a magnet, in order to keep ſuſpended in the air an iron ſtatue of that queen. Ptolemy approved the deſign, and gave orders for its execution; but both the king and the architect died before the project could be accompliſhed.

DINOGETIA, in *Ancient Geography*, a town of Lower Mœſia, called *Dirigathia*, *Demigutia*, and *Dinogeſſia*.

DINOSTRATES, in *Biography*, a famous mathematician of the Platonic ſchool, the brother of Menechmus, and diſciple of Plato. Purſuing the ſteps of his brother, who amplified the theory of the conic ſections, Dinoſtrates is ſaid to have made many geometrical diſcoveries; but he is particularly diſtinguiſhed as the inventor of the *quadratrix*, which ſee. Montucla, however, obſerves (Hiſt. Mathem. v. i. p. 181.) that there is ſome reaſon for aſcribing the original invention of this curve to Hippias of Elæa, an ingenious philoſopher and geometer, contemporary with Socrates.

DINSLAKEN, in *Geography*, a town of Germany, in the circle of Weſtphalia, and duchy of Cleves; 23 miles S.E. of Cleves.

DINUS, in *Ancient Geography*, a port of Aſia Minor, in Lycia.

DINUS, in *Medicine*, according to ſome, is the name of a diſeaſe, called more uſually vertigo.

DINWIDDIE, in *Geography*, a county of America, in Virginia, S. of Appamatox river, which divides it from Cheſterfield. It is about 30 miles long, and 20 broad, and its chief town is Peterſburg. It contains 4987 free inhabitants, and 6866 ſlaves.

DIO, in *Biography*, a celebrated Stoic, who lived in the time of Nero, was a native of Pruſa, in Bithynia, and denominated, on account of his eloquence, Chryſoſtom. Under Nero and Veſpaſian he maintained the profeſſion of a Sophiſt: and frequently inveighed, in a declamatory and luxuriant ſtyle, againſt the moſt illuſtrious poets and philoſophers of antiquity; which obliged him to leave Rome, and withdraw to Egypt. He then aſſumed the character of a Stoic philoſopher; embelliſhing, however, his philoſophical diſcourſes, that treated of moral topics, with the graces of eloquence. As his character correſponded to his principles of virtue, he was a bold cenſor of vice, and ſpared no individual on account of his rank. By his freedom of ſpeech he offended Domitian, and being obliged to become a voluntary exile in Thrace, he lived in great poverty, and ſupported himſelf by private labour. After the death of this emperor, he returned to Rome, and for ſome time remained concealed; but when he found the ſoldiers inclined to ſedition, he brought to their recollection Dio the orator and philoſopher, by haranguing them in a ſtrain of manly eloquence, which ſoon ſubdued the tumult. He was admitted into the confidence of Nerva and Trajan, and diſtinguiſhed by the former with tokens of favour. He lived to old age, but the time of his death cannot be aſcertained. His "Orations" are ſtill extant, from which we may infer that he was a man of ſound judgment and lively fancy, and that he blended in his ſtyle the qualities of animation and ſweetneſs. Brucker's Hiſt. Phil. by Enfield, vol. ii.

DIOCÆSAREA, in *Ancient Geography*, a town of Aſia, placed by Pliny and Ptolemy in a country of Cappadocia. —Alſo, a town of Aſia Minor ſituated on the river Calycadnus in the weſtern part of Cilicia. Under the Philips, it was ſignalized by the title of metropolis. See Sephoris.

DIOCALLIA, in *Botany*, a name by which Apuleius and ſome other authors have called the common ſweet chamomile.

DIOCESE, or Diocess, the circuit, or extent, of the juriſdiction of a biſhop. See Bishop.

The word is formed from the Greek διοικησις, *government*, *adminiſtration*, formed of διοικεω, which the ancient gloſſaries render *adminiſtro*, *moderor*, *ordino*: hence διοικησις της πολεως, the *adminiſtration*, or *government of a city*.

Diocese is alſo uſed, in *Ancient Authors*, &c. for the province of a metropolitan. See Province and Metropolis.

Diocæſis, Διοικησις, was originally a civil government, or prefecture, compoſed of divers provinces.

The

The firſt diviſion of the empire into dioceſes is ordinarily aſcribed to Conſtantine, who diſtributed the whole Roman ſtate into four, *viz.* the dioceſe of Italy, the dioceſe of Illyriæ, that of the Eaſt, and that of Africa. And yet, long time before Conſtantine, Strabo, who wrote under Tiberius, takes notice, (lib. xiii. p. 432.) that the Romans had divided Aſia into dioceſes, and complains of the confuſion ſuch a diviſion occaſioned in geography; Aſia being no longer divided by people, but by dioceſes, each whereof had a tribunal, or court, where juſtice was adminiſtered. Conſtantine, then, was only the inſtitutor of thoſe large dioceſes, which comprehended ſeveral metropoles and governments; the former dioceſes only comprehending one juriſdiction, or diſtrict, or the country that had reſort to one judge, as appears from this paſſage in Strabo, and, before Strabo, from Cicero himſelf, (lib. iii. Epiſt. ad Famil. Ep. 9. and lib. xiii. Ep. 67.) who, when proconſul of Cilicia, often mentions the dioceſes that were annexed to his government: and alſo in his command of Capua, he calls himſelf the "episcopus" of the Campanian coaſt; which ſhews, that theſe names, which were afterwards appropriated in the Chriſtian church to characters and powers eccleſiaſtical, carried with them in their original uſe the notion of a real authority and juriſdiction. Thus, at firſt, a province included divers dioceſes, and afterwards a dioceſe came to compriſe divers provinces. In after-times the Roman empire became divided into thirteen dioceſes, or prefectures; though, including Rome, and the ſub-urbicary regions, there were fourteen. Theſe fourteen dioceſes comprehended a hundred and twenty provinces; each province had a pro-conſul, who reſided in the capital, or metropolis; and each dioceſe of the empire had a conſul, who reſided in the principal city of the diſtrict.

On this civil conſtitution the eccleſiaſtical one was afterwards regulated; each dioceſe had an eccleſiaſtical vicar, or primate, who judged finally of all the concerns of the church within his territory.

At preſent there is ſome farther alteration; for dioceſe does not now ſignify an aſſemblage of divers provinces, but is limited to a ſingle province, under a metropolitan, or even to the ſingle juriſdiction of a biſhop.

England, with regard to its eccleſiaſtical ſtate, is divided into two provinces, *viz.* Canterbury and York; the former province contains twenty-one dioceſes, and the latter three, beſides the biſhopric of the iſle of Man, which was annexed to the province of York by Henry VIII. Every dioceſe is divided into archdeaconries, of which there are ſixty in all; and each archdeaconry into rural deaneries; and every deanery into pariſhes.

The bounds of dioceſes are to be determined by witneſſes and records, but more particularly by the adminiſtration of divine offices. To which purpoſe there are two rules in the canon law; in one caſe, upon a diſpute between two biſhops on this head, the direction is, that they proceed in the buſineſs by ancient books and writings, and alſo by witneſſes, reputation, and other ſufficient proof; in the other caſe, where the queſtion was, by whom a church built upon the confines of two dioceſes ſhould be conſecrated, the rule laid down is, that it ſhould be conſecrated by the biſhop of that city, who, before it was founded, baptized the inhabitants, and adminiſtered to them other divine offices. The juriſdiction of the *city* is not included in the name of *dioceſe*, according to the canon law; and, therefore, in citations in general viſitations, directed to the clergy, it is ordered to cite the clergy of the *city* and *dioceſe*. A biſhop may perform divine offices, and uſe his epiſcopal habit, in the dioceſe of another, without leave, but may not perform there any act of juriſdiction, without permiſſion. A clergyman dwelling in one dioceſe, and beneficed in another, may, in different reſpects, be puniſhed in both; that is, the biſhop, in whoſe dioceſe he dwells, may proſecute him; but the ſentence, ſo far as it affects his benefice, muſt be carried into execution by the other biſhop. Gibſon, 133, 134.

Gul. Brito affirms dioceſe to be properly the territory and extent of a baptiſmal, or parochial church; whence divers authors uſe the word to ſignify a ſimple pariſh.

It is obſerved by lord King (Conſt. Diſcipl. &c. of the Primitive Church, p. 15.) that the ancient dioceſes are never ſaid to contain churches in the plural, but only a church in the ſingular. (See CHURCH.) As for the word dioceſe, by which the biſhop's flock is now uſually expreſſed, he ſays that he does not remember to have found it uſed in this ſenſe by any of the ancients; but they frequently denominated the biſhop's cure by the term pariſh. Thus, in the ſynodical epiſtles of Irenæus to pope Victor, the biſhoprics of Aſia are twice called pariſhes; and in Euſebius's Eccleſiaſtical Hiſtory the word is ſo applied in ſeveral hundred places. Accordingly, we often read of the biſhops of the pariſh of Alexandria, of Epheſus, of Corinth, of Athens, and of Carthage; and alſo of the biſhops of ſeveral other churches. This ingenious and impartial writer alleges ſeveral conſiderations, in order to ſhew, that the biſhop's dioceſe did not exceed the bounds of a modern pariſh, and that it was, really as well as nominally, the ſame. All the people of a dioceſe met all together every Sunday, in one place, to celebrate divine ſervice; and, therefore, the biſhop's church could not have been larger than our pariſhes, or elſe, it would have been impoſſible that the members of it ſhould have been conſtantly aſſembled together in one place. Further, the biſhop had but one altar, or communion-table, in his whole dioceſe, at which his whole flock received the ſacrament from him. Beſides, the other ſacrament of baptiſm was generally adminiſtered by the biſhops alone within their reſpective dioceſes; and, therefore, it is not probable, nor, indeed, ſcarcely poſſible, that their dioceſes were extended beyond the bulk of ſingle congregations. Moreover, the church's charity was depoſited with the biſhop; conſequently, that dioceſe could not be very large, where the biſhop perſonally relieved and ſuccoured all the poor that reſided in it. Again, all the people of a dioceſe were preſent at church-cenſures: and no offenders were reſtored again to the peace of the church, without the knowledge and conſent of the whole dioceſe. When the biſhop of a church was dead, all the people of that church met together in one place to chooſe a new biſhop. At the ordinations of the clergy, the whole body of the people were preſent. Public letters from one church to another were read before the whole dioceſe: and the whole dioceſe of the biſhop met together to manage church-affairs. From all theſe conſiderations, ſupported by citations from ancient writers, the author infers that a dioceſe, in the primitive ages of Chriſtianity, could not be larger than a ſingle congregation. This reaſoning is further confirmed by an inquiry into the real ſize of thoſe biſhoprics concerning which we have any notice on ancient records, whence it appears that the largeſt of them were not greater than our particular congregations. Accordingly, Ignatius gives ſuch an account of the biſhoprics of Smyrna, Epheſus, Magneſia, Philadelphia, and Trallium, as plainly proves that they were ſo many ſingle congregations. Upon the whole it is concluded, that the greateſt biſhoprics in the world, even in the third century, were no more than ſo many ſingle congregations. The four largeſt dioceſes, which ſubſiſted in thoſe days, were Antioch, Rome, Carthage, and Alexandria; the

the three former of which, during three centuries after Chriſt, never branched themſelves into ſeparate congregations; though the latter did, on account of local circumſtances, which rendered it inconvenient for all the members of this dioceſe to aſſemble, at the ſtated times of worſhip, in one and the ſame place. This ſeparation, however, was not introduced till the third century, and was peculiar to the biſhopric of Alexandria.

DIOCESE, *Aſiatic*. See ASIATIC *Dioceſe*.

DIOCLEA, in *Ancient Geography*, a town of Illyria, in Dalmatia, called by Ptolemy Doclea, the native place of Diocleſian. This town is now ruined; it was not far from Narona, now Narenza.

DIOCLEIA, Διοκλεια, in *Antiquity*, a ſolemnity kept in the ſpring at Megara, in memory of the Athenian hero Diocles, who died in the defence of the youth he loved. Pott. Arcæol. Græc. lib. ii. cap. 20.

DIOCLES, in *Biography*, a mathematician who flouriſhed about the fourth century; he invented the curve line denominated the CISSOID of Diocles, and for this his name is chiefly celebrated. It is reckoned by ſir Iſaac Newton among the defective hyperbolas, and is uſed for finding two mean proportionals between two other given lines. Moreri.

DIOCLESIAN, or DIOCLETIAN, in *Biography*, a Roman emperor, was born A.D. 245, at Diocea, or Doclea, in Dalmatia, from which town he derived his firſt name, which was probably Docles, afterwards lengthened to the Grecian harmony of Diocles, which was alſo the name of his mother; and, at length, after his acceſſion to the empire, to the Roman majeſty of Diocletianus or Diocleſianus. He likewiſe aſſumed the patrician name of Valerius. The parents of Diocleſian had been ſlaves in the houſe of Anulinus, a Roman ſenator; but it is probable that his father obtained the freedom of the family, and that he ſoon acquired an office of ſcribe, or regiſter, which was commonly exerciſed by perſons of his condition. Victor the Younger (Epit. p. 542.) reports, that he was himſelf, in his youth, ſlave to the ſenator Anulinus, who gave him his liberty. At an early age he embraced the profeſſion of arms, in which he muſt have excelled, as he is reckoned among the good generals formed under the diſcipline of Probus, and as he raiſed himſelf to the firſt military employments. At the commencement of his career, and whilſt he occupied ſome inferior poſt, it is ſaid that a Druid woman, in whoſe houſe he lodged, upbraided him with covetouſneſs; to whom he jocoſely replied, "I ſhall be more generous when I am emperor." "You are joking," replied the Druideſs; "but I tell you, in good earneſt, that you will attain the empire after you have killed a boar." This circumſtance is ſaid to have occurred in the city of Tongres, in the preſent biſhopric of Liege. In recompence of his ſervices under Probus, he was promoted to the government of Mœſia, and having diſtinguiſhed himſelf in the expedition of Carus againſt the Perſians, he was advanced by that prince to the conſulſhip. At the time of Numerian's death, he held the honourable and important office of commander of the guards of the palace, or, as this office was called, "count of the domeſtics."

On the 17th of September, A.D. 284, he was elevated to the imperial throne by the unanimous voice of the army. As ſoon as he was proclaimed, he aſcended the tribunal, and, after having harangued the ſoldiers, and ſolemnly declared, upon oath, that he had not been acceſſary or privy to the death of Numerian, he cauſed Aper to be ſeized, reproached him in bitter terms with the murder of his prince and ſon-in-law; and then deſcending from the tribunal, plunged his ſword in his breaſt; ſaying, "You ſhall have the honour, Aper, to fall by an illuſtrious hand." Thus, it is ſaid, he fulfilled the prediction of the Druideſs, the word *Aper* ſignifying a *boar*; and therefore, on ſeeing Aper falling, he cried out, "I have, at length, killed the fatal boar!" The epocha of Diocleſian's proclamation at Chalcedon forms a new era, for an account of which ſee *Diocleſian* EPOCHA.

Diocleſian made his public entry into Nicomedia on the 27th of September of this year, 284. In the year 285, he commanded the troops that had lately returned from the Perſian war in a conteſt with the infamous Carinus, brother of Numerian, who endeavoured to ſupport his legal title to the empire. On this occaſion the troops under his command ſuffered a defeat, and Diocleſian deſpaired both of the purple and of life. But the advantage which Carinus had obtained by the valour of his ſoldiers, he quickly loſt by the infidelity of his officers. A tribune, whoſe wife he had ſeduced, ſeized the opportunity of revenge, and, by a ſingle blow, extinguiſhed civil diſcord in the blood of the adulterer. After the advantage thus gained, his conduct was ſingularly mild and honourable. He not only pardoned all who had borne arms againſt him, whom he juſtly thought not blameable for having ſerved a prince whoſe title was ſo legitimate as that of Carinus; but he alſo continued in their poſts and dignities thoſe who had been promoted by his enemy. Motives of policy might, indeed, on this occaſion, aſſiſt the humanity of Diocleſian. The diſcerning judgment of Aurelian, of Probus, and of Carus, had filled the ſeveral departments of the ſtate and army with officers of approved merit, whoſe removal would have injured the public ſervice, without promoting the intereſt of the ſucceſſor. Such a conduct, however, diſplayed to the Roman world the faireſt proſpect of the new reign; and the emperor affected to confirm this favourable prepoſſeſſion, by declaring that, among all the virtues of his predeceſſors, he was the moſt ambitious of imitating the humane philoſophy of Marcus Antoninus. This is the account of Aurelius Victor; but Eutropius aſſerts that he was betrayed by his own army, and killed by Diocleſian.

When Diocleſian found himſelf, by the death of his rival, ſole maſter of the empire, he marched to Rome, and, being acknowledged there, he ſpent the winter at Nicomedia. In the mean while he viſited Germany, where he gained ſeveral advantages over the Alemanni, who had made an irruption into Gaul. In the ſame year his generals fought with ſucceſs againſt the inhabitants of Britain, who had attempted to ſhake off the yoke. On account of theſe victories he aſſumed the appellations of Germanicus and Britannicus, which we find on medals. From Germany he returned through Illyricum into the eaſt; for he was at Sirmium on the firſt day of the following year, and at Nicomedia on the 21ſt of January. In the courſe of this year, *viz.*, April 1, 286, he took Maximian, ſtyled on the ancient coins M. Aurelius Valerius Maximianus, for his colleague and partner in the empire. (See MAXIMIAN.) On Maximian he beſtowed at firſt the title of Cæſar, and afterwards that of Auguſtus. The motive that induced him to make this appointment ſeems to have been an apprehenſion that the numerous enemies with whom he had to contend, would be too powerful for him without the aſſiſtance of a perſon of Maximian's military talents and bold enterprizing ſpirit; for Diocleſian himſelf was leſs a warrior than a ſtateſman, nor does he ſeem to have poſſeſſed the daring and generous ſpirit of a hero, who courts danger and fame, diſdains artifice, and boldly challenges the allegiance of his equals. Maximian he had long known; he was well acquainted with his ruling diſpoſition and general character; his fidelity and attachment he had long experienced; and he was ſufficiently aſſured that he would ſerve the purpoſes for which he was appointed, and,

and, at the ſame time, aſſume no independent authority and command. Of his vices alſo Diocleſian was well apprized, and he knew how to render them uſeful. Inſenſible to pity, and fearleſs of conſequences, he was the ready inſtrument of every act of cruelty which the policy of that artful prince might at once ſuggeſt and diſdain. As ſoon as a bloody ſacrifice had been offered to prudence or revenge, Diocleſian, by his ſeaſonable interceſſion, ſaved the remaining few, whom he had never deſigned to puniſh, cenſured the ſeverity of his ſtern colleague, and enjoyed the compariſon of a golden and an iron age, which are univerſally applied to their oppoſite maxims of government. Notwithſtanding the difference of their characters, the two emperors maintained, on the throne, that friendſhip which they had contracted in a private ſtation. The haughty turbulent ſpirit of Maximian, ſo fatal afterwards to himſelf and the public peace, was accuſtomed to reſpect the genius of Diocleſian, and confeſſed the aſcendant of reaſon over brutal violence. From a motive either of pride or ſuperſtition, the two emperors aſſumed the titles, the one of Jovius, the other of Herculius: though Crevier ſays, that theſe were names afterwards conferred on the two Cæſars, Galerius and Conſtantius.

Diocleſian, after having aſſociated Maximian, prepared to march againſt the Perſians, and charged his colleague with the war in the weſt, who juſtified the choice that had been made by the ſignal ſucceſs of his arms. Diocleſian himſelf, though no great warrior, was not inactive. By the terror of his name he induced the king of Perſia to ſue for peace; and his panegyriſts mention the victories which he gained over the Alemanni in Rhætia, and over the Sarmatians, whence he was called Sarmaticus, the Juthongi, the Quadi, the Carpians, and the Goths, in Pannonia and the neighbouring countries. After theſe exploits of the two emperors, for which they obtained a triumph, they had an interview at Milan, A.D. 290. In order to repair thither, they croſſed, in the midſt of winter, one of them the Julian Alps in his way from Pannonia, and the other the Cottian Alps, which are thoſe neareſt Gaul. What was the motive of this interview hiſtory has not recorded: but if it merely ſerved to exhibit the cordial union that ſubſiſted between them, it muſt greatly contribute to maintain peace and tranquillity in the empire. However, new dangers preſented themſelves, and therefore the two emperors determined to ſtrengthen their power and intereſt, by conferring on two generals of approved merit, with the inferior title of *Cæſars*, an equal ſhare of the ſovereign authority. This event took place, A.D. 292. Galerius, ſurnamed Armentarius, from his original profeſſion of a herdſman, and Conſtantius, who from his pale complexion had acquired the denomination of Chlorus, were the two perſons inveſted with the ſecond honours of the imperial purple. The two emperors, in order the better to cement the union between them and their Cæſars, obliged them to repudiate their wives, and ally themſelves to the imperial families. Accordingly, Conſtantius married Theodora, daughter-in-law to Maximian; and Galerius eſpouſed Valeria, the daughter of Diocleſian. Theſe four princes diſtributed among themſelves the wide extent of the Roman empire. The defence of Gaul, Spain, and Britain, was entruſted to Conſtantius; Galerius was ſtationed on the banks of the Danube, as the ſafeguard of the Illyrian provinces; Italy and Africa were conſidered as the department of Maximian; and for his peculiar portion, Diocleſian reſerved Thrace, Egypt, and the rich countries of Aſia. Every one was ſovereign within his own juriſdiction, but their united authority extended over the whole monarchy; and each of them was prepared to aſſiſt his colleagues with his counſels or preſence. After the adoption of the two Cæſars, the emperors themſelves, retiring to a leſs laborious ſcene of action, devolved on their adopted ſons the defence of the Danube and of the Rhine. The vigilant Galerius was never reduced to the neceſſity of vanquiſhing an army of barbarians on the Roman territory. The brave and active Conſtantius delivered Gaul from a very furious inroad of the Alemanni; and his victories of Langres and Vindoniſſa appear to have been actions of conſiderable danger and merit. In the diſpoſal of the captive barbarians, Diocleſian and his aſſociates imitated the conduct of Probus, and diſtributed them among the provincials, and thoſe diſtricts were aſſigned them, which had been depopulated by the calamities of war. They were uſefully employed as ſhepherds and huſbandmen, but were denied the exerciſe of arms, except when it was found expedient to enrol them in the military ſervice. While the Cæſars were exerciſing their valour on the banks of the Rhine and Danube, the emperors were called to the ſouthern confines of the Roman world. From the Nile to mount Atlas, Africa was in arms. A confederacy of five Mooriſh nations, called Quinque-gentiani, iſſued from their deſerts to invade the peaceful provinces. Julian had aſſumed the purple at Carthage. Achilleus at Alexandria; and the Blemmyes, ſcattered between the iſland of Meroe and the Red ſea, continued their incurſions into Upper Egypt. Although we have no particular detail of the exploits of Maximian in weſtern Africa, we know in general that he vanquiſhed the fierceſt barbarians of Mauritania. Diocleſian undertook the ſiege of Alexandria, occupied by Achilleus, and having proſecuted it for eight months, the city ſubmitted, but experienced the full extent of his ſeverity. Many thouſands of the citizens periſhed in a promiſcuous ſlaughter. The fate of Buſiris and Coptos was ſtill more melancholy than that of Alexandria. Whilſt Diocleſian vigorouſly chaſtiſed the paſt crimes of the Egyptians, he provided for their future welfare by many wiſe regulations, which were confirmed and enforced under the ſucceeding reigns. He alſo by an edict ſuppreſſed all books of alchemy which the Arabs, by the conqueſt of Egypt, had been the means of diffuſing over the globe. The reduction of Egypt was immediately followed by the Perſian war. It commenced A.D. 296; at which time Diocleſian fixed his ſtation in the city of Antioch, from whence he prepared and directed the military operations. Galerius had the charge of the Roman legions; but after two battles of various and doubtful ſucceſs, he was totally defeated in a third engagement, the diſaſter of which was attributed to his own raſhneſs in preſuming, with an inconſiderable body of troops, to attack the innumerable hoſt of the Perſians. When he returned to Antioch, Diocleſian received him, not with the uſual expreſſions of friendſhip, but with the indignation of an offended ſovereign. The haughtieſt of men, clothed in his purple, but humbled by the ſenſe of his misfortune and diſgrace, was obliged to follow the emperor's chariot above a mile on foot, and to exhibit, before the whole court, the ſpectacle of his diſgrace. Diocleſian, however, having indulged his reſentment, and aſſerted the majeſty of ſupreme power, allowed Galerius, at his earneſt entreaty, to retrieve his own honour, as well as that of the Roman name. A ſtrong force was provided for him, and at the head of a choſen army of 25,000 men, he again paſſed the Euphrates, and by his circumſpection and valour obtained a complete victory over the Perſian army. In the general confuſion and carnage, Narſes, the wounded monarch, fled towards the deſerts of Media, and left behind him an immenſe booty to the conqueror. Several of his wives, his ſiſters, and children, were in the number of the captives, who were honourably protected from violence and rapine, con-

veyed to a place of ſafety, and treated with every mark of tenderneſs and reſpect that was due from a generous army to their age, their ſex, and their royal dignity. The emperor Diocleſian, who had aſſembled in Syria a ſtrong army of obſervation, and was anxiouſly waiting the event, as ſoon as he received intelligence of the victory, advanced towards the frontier, in order, by his preſence and counſels, to moderate the pride of Galerius. The interview of the Roman princes at Niſibis was accompanied with every expreſſion of reſpect on one ſide, and of eſteem on the other. Here they ſoon afterwards gave audiences to the ambaſſador of the great king. In the conference that enſued, Galerius manifeſted the fierceneſs of his paſſion, as well as his deference to the ſuperior wiſdom and authority of Diocleſian. The ambition of the former graſped at the conqueſt of the eaſt, and had propoſed to reduce Perſia into the ſtate of a province. The prudence of the latter, who adhered to the moderate policy of Auguſtus and the Antonines, embraced the favourable opportunity of terminating a ſucceſsful war by an honourable and advantageous peace. Accordingly, after the adjuſtment of ſome previous circumſtances, a ſolemn peace was concluded and ratified between the two nations.

The conditions of this peace were, that Narſes ſhould cede to the Romans five provinces beyond the Tigris, *viz.* Intilene, Zabdicene, Arzanene, Sophene, and Carduene, which by their ſituation formed a very uſeful barrier, and whoſe natural ſtrength was ſoon improved by art and military ſkill;—that the Aboras, or as Xenophon calls it, the Araxes, ſhould be the boundary between the two monarchies: and not the Tigris, as ſome authors have ſtated in conſequence of an error of the geographer Ptolemy, who removed the poſition of Singara from the Aboras to the Tigris; by this article of the treaty Meſopotamia, which had been the object of many wars, was ceded to the empire, and the Perſians renounced all pretenſions to that great province:—that the limits of Armenia ſhould be extended to the fortreſs of Sintha or Zintha, on the confines of Media:—that the king of Iberia ſhould receive his crown from the Roman emperors, and be no longer dependent on the kings of Perſia:—and that Niſibis ſhould be a common emporium or mart of commerce between the two empires; but to this latter article Narſes objected, whilſt he complied with all the reſt. The wives and children of the Perſian king were reſtored to him; but the other priſoners were retained by Diocleſian to grace his ſubſequent triumph. This peace was very advantageous to the Romans, and laſted 40 years, from the year 297, when the war terminated, to the year 337, when Conſtantine, provoked by Sapor, who wanted to withdraw the five provinces ceded to Diocleſian, would have made war againſt the Perſians, if he had not been prevented by death. Galerius's victory over Narſes, though glorious to the Roman empire, was fatal to Diocleſian. It ſwelled the pride of the conqueror, who aſſumed the pompous titles of Perſicus, Armeniacus, Adiabenicus, and Mediacus: and diſdaining a mortal origin, ſtyled himſelf the ſon of Mars. Although he was treated with high diſtinction by his adoptive father and emperor, he became weary of holding only the ſecond rank. "Always Cæſar," ſaid he, "How long will it be till I ſhall be nothing but Cæſar?" At length, gaining an aſcendant over Diocleſian, he prevailed on him to perſecute the Chriſtians, and reduced him to the neceſſity of abdicating the empire. During the five years that elapſed between the peace concluded with the Perſians, and the perſecution ordered againſt the Chriſtians, Diocleſian employed his time chiefly in providing for the internal welfare of the empire, and in ſecuring its frontiers by caſtles built upon the Rhine, the Danube, and the Euphrates. Ammianus Marcellinus particularly mentions Cercuſium, or Circeſium, in Meſopotamia, a frontier town, at the confluence of the Aboras and the Euphrates, which he ſtrongly fortified, and thus rendered an important poſt. It was alſo, during this ſame interval of tranquillity, that Diocleſian erected his magnificent and expenſive buildings at Nicomedia, and that baths were conſtructed by Maximian at Carthage. In the year 302, a great ſcarcity prevailed in moſt provinces of the empire; and Procopius ſays, that Diocleſian ordered two millions of buſhels of corn to be yearly diſtributed among the inhabitants of Antioch, and a ſimilar diſtribution was made in the city of Alexandria. Galerius paſſed the winter of this year with Diocleſian in the palace of Nicomedia; and the fate of Chriſtianity became the object of their ſecret conſultations. Galerius had been brought up in hatred of the Chriſtian name by his mother, a woman extremely ſuperſtitious, who, offering frequent ſacrifices in her village to the pretended deities of the mountains, had taken great offence at the Chriſtians, becauſe they refuſed to partake of the repaſts which ſhe gave at the ſame time, and becauſe they faſted and prayed whilſt ſhe celebrated feaſts of joy with the inhabitants of the place. Galerius, no leſs ſuperſtitious than his mother, and full of the prejudices which he had imbibed from her inſtruction, embraced the firſt favourable opportunity of converſing with the emperor, and diſpoſing him to concur in meaſures of perſecution. A circumſtance is ſaid to have occurred which promoted the views of Galerius. As the emperor was offering ſacrifices in order to aſcertain the will of the gods, by inſpecting the entrails of animals, concerning the events of futurity, the Chriſtians diſturbed the prieſts in the performance of their office; and as theſe miniſters of ſuperſtition and deluſion were unable to give the emperor the ſatisfaction which he deſired, they alleged the interference of profane perſons, as they called Chriſtians, and charged upon them the failure of their ſucceſs. The emperor was incenſed; and puniſhed both the officers of the palace and army, who would not join in his ſacrifices. Galerius took the advantage of this circumſtance; and in his converſation with Diocleſian uſed a variety of arguments to induce him to commence and afterwards to extend the horrid work of perſecution. The emperor himſelf was rather inclined to meaſures of lenity, and though he readily conſented to exclude the Chriſtians from holding any employments in the houſehold or the army, he urged in the ſtrongeſt terms the danger, as well as cruelty, of ſhedding the blood of thoſe deluded fanatics, as he ſeemed to regard them. At length, however, Galerius prevailed; a council was ſummoned, conſiſting of the principal perſons in the civil and military departments of the ſtate: violent meaſures were recommended; and Diocleſian yielded and acquieſced. On the 23d of February, A.D. 303, the perſecution commenced by the demolition of the church of Nicomedia; and on the next day the general edict was publiſhed; and it was enacted, that the churches of the Chriſtians, in all the provinces of the empire, ſhould be demoliſhed to their foundations; and the puniſhment of death was denounced againſt all who ſhould preſume to hold any ſecret aſſemblies for the purpoſe of religious worſhip. Their ſacred books were commanded to be publicly burnt; the property of the church was confiſcated: and in order to induce individuals, who were found to be obſtinate in their attachment to their Chriſtian profeſſion, to abandon it, and to prevent others from rejecting the religion of nature, of Rome, and of their anceſtors, violent meaſures of various kinds were purſued. Perſons of a liberal birth were declared incapable of holding any honours or employments; ſlaves were for ever deprived

of

of the hopes of freedom, and the whole body of the people were put out of the protection of the law. The judges were authoriſed to hear and to determine every action that was brought againſt the Chriſtians; but the Chriſtians were not permitted to complain of any injury which they themſelves had ſuffered, and thus they were expoſed to the ſeverity, whilſt they were excluded from the benefits of public juſtice. This edict was ſcarcely exhibited to public view, in the moſt conſpicuous place of Nicomedia, before it was torn down by the hands of a Chriſtian, who is ſaid, at the ſame time, to have expreſſed, by the bittereſt invectives, his contempt as well as abhorrence of ſuch tyrannical governors. For this act of contumacy he was burnt, or rather roaſted by a ſlow fire; but his executioners were unable, by this refinement of cruelty, to ſubdue his patience, or to make him to alter the ſteady and inſulting ſmile which, in his dying agonies, he ſtill exhibited in his countenance. Within 15 days after the firſt edict was iſſued, the palace of Nicomedia, and even the bed-chamber of Dioclesian, were twice in flames; and though they were extinguiſhed without any material damage, the repetition of the fire was conſidered as a convincing proof, that it was not the effect of chance or negligence. Euſebius writes, that he could never learn how that accident had happened. Conſtantine, who was on the ſpot, aſcribes it to lightning: and Lactantius aſſures us, that Galerius cauſed the palace to be privately ſet on fire, that he might accuſe the Chriſtians, and by that calumny incenſe Dioclesian ſtill more againſt them. It did produce this effect; for Dioclesian, aſcribing it to the Chriſtians, reſolved to puniſh them with the utmoſt ſeverity: and Galerius, the more to exaſperate him againſt them, withdrew from Nicomedia the ſame day, pretending that he was afraid of being burnt alive by thoſe incendiaries. For a further account of this perſecution, which was extremely grievous, and which laſted ten years; ſee PERSECUTION.

The arduous work of reſcuing the diſtreſſed empire from tyrants and barbarians having been completely atchieved, and Dioclesian having entered into the twentieth year of his reign, A. D. 303, he celebrated that memorable era, as well as the ſucceſs of his arms, by the pomp of a Roman triumph. Maximian, the only equal partner of his power, was his only companion in the glory of that day. This triumph, which was dignified and ſplendid, was the laſt that Rome ever beheld; for ſoon after this period, the emperors ceaſed to vanquiſh, and Rome ceaſed to be a capital of the empire. Whilſt Maximian fixed his reſidence at Milan, Dioclesian employed his leiſure, and the wealth of the Eaſt, in embelliſhing Nicomedia, a city placed on the verge of Europe and Aſia, and almoſt at an equal diſtance between the Danube and the Euphrates; which, in proceſs of time, was inferior only to Rome, Alexandria, and Antioch, in extent or populouſneſs. As Dioclesian had framed a new ſyſtem of imperial government, which was afterwards completed by the family of Conſtantine, he adopted every meaſure that tended to debaſe Rome, and the Roman ſenate. Civil magiſtracies, and their modeſt titles of conſul, proconſul, cenſor, and tribune, were laid aſide, and imperial dignity and correſponding titles were aſſumed. Even the attributes, or at leaſt the titles of the divinity, were uſurped by Dioclesian and Maximian, who tranſmitted them to a ſucceſſion of Chriſtian emperors. Dioclesian introduced the ſtately magnificence of the Perſian court; he aſſumed the diadem, though deteſted by the Romans, as the odious enſign of royalty; and his ſumptuous robes, and thoſe of his ſucceſſors, were of ſilk and gold; and it is remarked with indignation, that even their ſhoes were ſtudded with the moſt precious gems. Acceſs to their ſacred perſons was every day rendered more difficult, by the inſtitution of new forms and ceremonies. The avenues of the palace were ſtrictly guarded; and the interior apartments were entruſted to the jealous vigilance of eunuchs, the increaſe of whoſe number and influence was the moſt infallible ſymptom of the progreſs of deſpotiſm. When a ſubject was at length introduced into the imperial preſence, he was obliged, whatever might be his rank, to fall proſtrate on the ground, and to adore, according to the Eaſtern faſhion, the divinity of his lord and maſter. The firſt principle of the new ſyſtem inſtituted by Dioclesian, was oſtentation, and the ſecond diviſion; for he divided the empire, the provinces, and every branch of the civil, as well as military adminiſtration; and this principle of diviſion, in the courſe of a few years, occaſioned the perpetual ſeparation of the eaſtern and weſtern empires under the ſyſtem introduced by Dioclesian. The number of miniſters, of magiſtrates, of officers, and of ſervants, who filled the different departments of ſtate, was multiplied beyond all former example; and of courſe his ſyſtem was accompanied with a more expenſive eſtabliſhment, and conſequently an increaſe of taxes, and the oppreſſion of the people. Dioclesian, after this ceremony of his triumph, left Italy, and commenced his progreſs towards the circuit of his Illyrian provinces. The fatigue of the journey, and the inclemency of the weather, occaſioned a diſorder, which, before he arrived at Nicomedia, towards the end of the ſummer, A.D. 304, became very ſerious and alarming. During the whole winter he was confined to his palace; and his danger occaſioned a very general alarm. The rumour of his death was circulated, and very generally believed; and it was thought that the event was kept concealed till the arrival of Galerius, leſt the ſoldiers ſhould, in the mean time, according to cuſtom, proclaim a new emperor. At length, however, on the 1ſt of March, A.D. 305, he once more appeared in public, but ſo pale and emaciated, that he could ſcarcely have been recognized by thoſe to whom his perſon was the moſt familiar. Galerius, who had already threatened Maximian with a civil war, if he did not reſign the empire, arrived about this time at Nicomedia; with a view of obliging Dioclesian likewiſe to ſurrender the ſovereignty, ſince he was no longer able to diſcharge the functions of the imperial dignity. Whilſt the emperor demurred, offering, however, to ſhare the empire with him and Conſtantius, Galerius told him plainly, that if he did not reſign willingly, he would force him to abdicate. It was at length agreed, that Dioclesian and Maximian ſhould renounce the ſovereignty; that Conſtantius and Galerius ſhould, at the ſame time, be veſted with it; and that, in order to preſerve the form of government introduced by Dioclesian, two new Cæſars ſhould be appointed. Theſe meaſures, on the part of the ambitious Galerius, haſtened the execution of the purpoſe, which Dioclesian had previouſly formed, even during the ſplendour of a Roman triumph. Accordingly the ceremony of his abdication was performed on the 1ſt of May, A.D. 305, in a ſpacious plain, about three miles from Nicomedia. The emperor aſcended a lofty throne, and in a ſpeech, full of reaſon and dignity, declared his intention, both to the people and the ſoldiery, who were aſſembled on this extraordinary occaſion. As ſoon as he had diveſted himſelf of the purple, and delivered it to Maximin, whom at the ſame time he declared Cæſar, together with Severus, he withdrew from the gazing multitude; and traverſing the city in a covered chariot, he proceeded without delay to the favourite retirement which he had choſen in his native country of Dalmatia. On the ſame day Maximian, as it had been previouſly concerted between the two emperors, made his reſignation of the imperial dignity at Milan, tranſferring

ferring the purple to Severus, and declaring Conſtantius and Galerius emperors, as Diocleſian had done, he retired to Lucania. Lactantius aſcribes the reſignation of Maximian and Diocleſian to the intrigues and menaces of Galerius, and to the apprehenſion of a civil war, which his ambition led them to entertain. Conſtantine, however, who was then at Nicomedia, and lodged in the ſame palace with Diocleſian, aſſures us that the emperor, thinking himſelf no longer able to govern, on account of the fits to which he was ſubject, reſigned of his own accord; and the panegyriſts, who wrote at that time, mention his reſignation as a ſhining inſtance of greatneſs, generoſity, and an utter contempt of all human grandeur; and aſſert that both he and Maximian had agreed long before, and even bound themſelves by a ſolemn oath in the capital, to reſign the ſovereignty. Diocleſian paſſed the laſt nine years of his life at a country ſeat in the neighbourhood of Salona, on the ſpot where the city of Spalatro was afterwards built. About ſix or ſeven miles from the city of Salona he conſtructed a magnificent palace, ſome remains of which are ſtill viſible; for an account of which ſee SALONA.

In this retirement Diocleſian employed his leiſure hours in building, planting, and gardening. His anſwer to Maximian is deſervedly celebrated. When he was earneſtly ſolicited by that reſtleſs old man to reſume the reins of government and the imperial purple, he rejected the temptation with a ſmile of pity, calmly obſerving, that if he could ſhew Maximian the pot-herbs which he had planted with his own hands at Salona, he ſhould no longer be urged to relinquiſh the enjoyment of happineſs for the purſuit of power. In his converſation with his friends, he often acknowledged, that, of all arts, the moſt difficult was that of reigning; and he expreſſed himſelf on that topic with a degree of warmth which could only be the reſult of experience. "How often, as he was accuſtomed to ſay, is it the intereſt of four or five miniſters to combine together, to deceive their ſovereign? Secluded from mankind by his exalted dignity, the truth is concealed from his knowledge: he can ſee only with their eyes, he hears nothing but their miſrepreſentations. He confers the moſt important offices upon vice and weakneſs, and diſgraces the moſt virtuous and deſerving among his ſubjects. By ſuch infamous acts, added Diocleſian, the beſt and wiſeſt princes are ſold to the venal corruption of their courtiers." (Hiſt. Auguſt. p. 223, 224.) Although Diocleſian had retired from the diſtracting anxieties of government, he could not in his privacy remain ignorant of the troubles that afflicted the empire after his abdication, nor could he be indifferent to their conſequences. His tenderneſs, or at leaſt his pride, was deeply wounded by the misfortunes of his wife, Priſſe, and daughter Valeria, who, under the reign of Conſtantine, were both condemned and publicly executed, and their bodies were afterwards thrown into the ſea; and the laſt moments of Diocleſian were embittered by ſome affronts, which Licinius and Conſtantine might have ſpared the father of ſo many emperors, and the firſt author of their own fortune. Before his death, which happened at Salona, in the ninth year after his abdication, the 21ſt of his reign, the 68th of his age, and the 313th year of Chriſt, he was ſeized with an agitation of body and of mind, which allowed him no reſt either day or night, but he rolled himſelf ſometimes on the ground, and ſpent his whole time in ſighs, groans, and tears. According to ſome authors, he either ſtarved or poiſoned himſelf. His memory was much reſpected, and a magnificent tomb was erected to him, which was ſtill covered with purple in the time of Conſtantius, the ſon of Conſtantine. He was ranked among the gods; a prerogative, ſays Eutropius, which never was beſtowed upon any other man who died in a private ſtation. This apotheoſis cannot be laid to the charge of Conſtantine, who then profeſſed himſelf a Chriſtian; but it muſt be imputed to Licinius and Maximin, who had offended Diocleſian whilſt he lived, and who, without any charge to themſelves, might honour him after he was dead.

The abilities of Diocleſian, ſays Gibbon, were uſeful rather than ſplendid; he poſſeſſed a vigorous mind, improved by the experience and ſtudy of mankind; dexterity and application in buſineſs, a judicious mixture of liberality and economy, of mildneſs and rigour; profound diſſimulation under the diſguiſe of military frankneſs; ſteadineſs to purſue his ends; flexibility to vary his means; and, above all, the great art of ſubmitting his own paſſions, as well as thoſe of others, to the intereſt of his ambition, and of colouring his ambition with the moſt ſpecious pretences of juſtice and public utility. Like Auguſtus, Diocleſian may be conſidered as the founder of a new empire. Like the adopted ſon of Cæſar, he was diſtinguiſhed as a ſtateſman rather than as a warrior; nor did either of thoſe princes employ force, whenever their purpoſe could be effected by policy. Libanius writes (Orat. xiv.) that Diocleſian ſhewed himſelf in many, but not in all things, an excellent prince; and the emperor Julian (Orat. i.) commends him for having done many things that proved very uſeful to the public. He enacted many excellent laws, ſeveral of which are inſerted in the code, and he was ſo far from encouraging informers, that he commanded them to be executed when they could not ſupport their charge. He encouraged and preferred perſons of merit and virtue, diſcountenanced vice, encouraged the worſhip of the gods, and was, till ſeduced by Galerius, rather a friend than an enemy to the Chriſtians, of whom he had, till the year 303, great numbers both in his court and in his army. He was attentive to make plenty reign in his capital, in the armies, and in the whole empire. Nevertheleſs, with ſo many qualities worthy of eſteem, he knew little of the art of rendering himſelf amiable; and though he gloried in imitating Marcus Aurelius, he was far from copying his goodneſs. Beſides the cruel perſecution which he ordered againſt the Chriſtians, his government tended to the oppreſſion of the people. All hiſtory reproaches him with pride, oſtentation, and arrogance. Even his prudence degenerated into artifice and cunning, and inſpired ſentiments of ſuſpicion and diſtruſt. His economy bordered on avarice, and, if we may believe Lactantius, was ſometimes enforced with cruelty. It has been obſerved by Aurelius Victor, that no connection with him juſtified confidence, and that thoſe whom he called his friends could not depend upon a ſincere affection on his part. He was greatly addicted to building: and embelliſhed the ſeveral cities of the empire, particularly Rome, Carthage, Milan, and Nicomedia, with many ſtately edifices. Lactantius much blames him for his rage of building. At Nicomedia he indulged this paſſion to an extravagant and injurious degree. Here, ſays our author, he built a baſilic, there a circus, in another place a mint, and elſewhere an arſenal. For his wife he built a palace, and another for his daughter. In order to make room for thoſe new edifices, a great part of the city was taken from its inhabitants, who were obliged to migrate with their wives and children, as if their country had been ſeized by enemies. When theſe buildings were finiſhed, to the ruin of the provinces; they were again executed upon another plan. Then they were again pulled down and altered, perhaps to be again deſtroyed. Such was the madneſs which he manifeſted in his vain ambition of making Nicomedia equal to Rome. At Rome his baths were an immenſe building, the vaſt circumference of which, if it cannot, without hyperbole, be compared with an ancient writer, (Ammian l. xvi.) to the extent of a province, is, at leaſt,

leaſt, greater than that of many cities. In this building, beſides baths, were walks, places for exerciſe, and others for ſtudy; rows of trees, porticoes, great halls, and libraries. Crevier's Rom. Emp. vol. ix. x. Anc. Univ. Hiſt. vol. xiv. Gibbon's Hiſt. vol. ii.

DIOCLETIANOPOLIS, in *Ancient Geography*, an epiſcopal town of Thrace.—Alſo, an epiſcopal town of Phrygia.

DIOCLIA, in an epiſcopal town of Aſia, in the Pacatian Phrygia.

DIOCTAHÆDRIA, in *Natural Hiſtory*, the name of a genus of ſpars. The word is derived from the Greek δις, *twice*, οκτω, *eight*, and ἑδρα, *a ſide*. The bodies of this genus are ſpars compoſed of twice eight planes, or two octangular pyramids joined baſe to baſe, without any intermediate column. Hill's Hiſt. of Foſſ. p. 211.

DIODATI, John, in *Biography*, a celebrated preacher at Geneva, was born at Lucca about the year 1589, of a noble family of the Catholic perſuaſion, but having, at an early age, embraced the Proteſtant faith, he went to Geneva, where he ſtudied with ſo much ſucceſs, as, at the age of nineteen, to be deemed qualified for the profeſſorſhip of Hebrew in that univerſity. He was ſoon advanced to the theological chair, and acquired a high reputation as a preacher. In 1619, he was deputed with M. Tronchin to repreſent the Genevan clergy in the ſynod of Dort. Here he acted his part ſo well, that he was appointed one of ſix miniſters to draw up the Belgic confeſſion of faith, which was intended to preſerve the profeſſors of the reformed religion in Holland within the pale of Calviniſm. He died at Geneva in 1652, much regretted by the country and communion for which he renounced his family expectations, and the religion of his anceſtors. He was an elaborate writer, but his principal work was a tranſlation of the whole Bible into the Italian language. He publiſhed alſo a complete French tranſlation of the Bible, and a tranſlation of "Father Paul's Hiſtory of the Council of Trent;" and various other works. Moreri.

DIODIA, in *Botany*, (from Διοδος, a paſſing from one place to another, in alluſion, as Linnæus informs us, to its growing by way-ſides.) Linn. Gen. 51. Schreb. 67. Willd. Sp. Pl. v. 1. 580. Juſſ. 197. Gærtn. t. 25. Claſs and order, *Tetrandria Monogynia*. Nat. Ord. *Stellatæ*, Linn. *Rubiaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of two or three ſomewhat ovate, undivided, permanent leaves. *Cor.* of one petal, funnel-ſhaped; tube long and ſlender; limb ſmall, in four deep, ſpreading, lanceolate ſegments. *Stam.* Filaments four, briſtle-ſhaped, erect; anthers verſatile. *Piſt.* Germen inferior, roundiſh, with four angles; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma cloven. *Peric.* Capſule ovate, with four angles, crowned with the enlarged calyx, of two cells and two valves. *Seeds* ſolitary, ovate-oblong, poliſhed, convex, and furrowed on the outſide, flat on the inner.

Eſſ. Ch. Calyx two or three-leaved. Corolla of one petal, funnel-ſhaped. Capſules of two cells. Seeds ſolitary.

D. *virginiana*. Linn. Sp. Pl. 151. Jacq. Ic. Rar. v. 1. t. 29, is the only ſpecies which was known to Linnæus, or of which any figure exiſts. It was found by Clayton in Virginia, growing in watery places, and has not yet been cultivated in the gardens of Britain. Jacquin had it at Vienna, growing in the open air, but more vigorouſly in the ſtove, flowering from June to October, and ripening ſeed. It has no pretenſions to be reckoned an ornamental plant. The *root* is perennial. *Stems* ſeveral, red, decumbent and rooting, clothed with numerous, oppoſite, lanceolate, entire *leaves*, each about two inches long, and in a cultivated ſtate, rough only at the edge. *Stipulas* connate, fringed. *Flowers* axillary, ſolitary, ſeſſile, white, ſmall, the upper ſurface of their petals rough, and the calyx, according to Jacquin, moſtly conſiſting of two larger leaves, and a ſmaller one. In a wild ſpecimen, gathered by the celebrated John Bartram in Maryland, we find the leaves very rough all over with rigid points, and the fruit clothed with prominent briſtles, with three leaves to the calyx. *Diodia ſimplex*, *proſtrata*, *ſcandens* and *ſarmentoſa*, are four Weſt Indian ſpecies, ſmaller than the foregoing in their leaves and bloſſoms, of which the three laſt are ſomewhat woody. They were all gathered by Dr. Swartz, and are deſcribed in his *Flora Indiæ Occidentalis*, v. 1. D. *verticillata*. Vahl. Symb. v. 2. 28, gathered at Santa Crux by a Mr. Pflug, ſeems to differ from the original *Diodia* chiefly in having an upright ſtem. Theſe are all the ſpecies known. The habit of the genus is ſimilar to that of the far more numerous one *Spermacoce*.

DIODON. in *Ichthyology*, a genus of Branchioſtegous fiſhes, diſtinguiſhed by having the jaws bony, extended, and undivided; aperture of the gills linear; body covered on all ſides with long ſpines, which are ſtrong, and moveable, varied with white and black, hollow within, and covered with the common ſkin; no ventral fins. There are only five ſpecies of this remarkable genus at preſent known, unleſs ſome of the ſuppoſed varieties of the ſpecies Hyſtrix ought truly to be regarded as diſtinct ſpecies, as we are inclined to ſuſpect. They are inhabitants chiefly of the American ſeas.

Species.

Hystrix. Spherical; ſpines triangular. Gmel. *Le Guara*, Bloch. *Porcupine fiſh*.

The porcupine fiſh, or, as ſometimes called, the ſea porcupine, is a ſpecies of large ſize, growing to the length of two feet. The uſual ſhape is ſpherical, but it poſſeſſes the power of inflating or contracting itſelf at pleaſure, by means of an internal ſkin, or membrane, ſituated beneath the exterior, or ſpiny covering; the colour is a pale, or whitiſh grey, the back of a deeper caſt, and blueiſh, and the whole body is marked at the baſe of each ſpine by a round black ſpot, and the fins alſo are ſpotted. This fiſh, according to father Dutertre, affords an amuſing ſpectacle when taken with the hook and line baited with a piece of crab, or other ſimilar ſubſtance; after having played round the bait for ſome time, it makes various efforts to ſeize it, and at length faſtens upon it with a ſudden ſpring; but finding itſelf ſecured, it exhibits every mark of anger, inflating its body, and elevating its ſpines to the higheſt poſſible degree, and at intervals ruſhing with unavailing impetuoſity upon the pliable line, or beating about, as if endeavouring to wound in all directions. Till having at laſt tired itſelf by ineffectual ſtruggles, it ſuddenly expels the air from its body, and becomes entirely flaccid; but, on being drawn to the ſhore, it once more revives, redoubles its rage, and again inflates its body, and in this ſtate it is allowed to remain, with length of line ſufficient to admit it to expend its ſtrength in rolling about the ſhore, as it is impoſſible to touch it without danger till after its death. This ſpecies is a native of the Indian and American ſeas, and is conſidered as a coarſe and worthleſs fiſh, though ſometimes eaten by the inhabitants of the Weſt Indian iſlands. The ſkin of this fiſh is occaſionally taken off entire, and being dried in an inflated, or diſtended ſtate, ſerves the purpoſe of a lantern, being ſuſpended by the tail, and having the lighted candle placed in the inſide of the mouth. One of the ſuppoſed varieties of the ſea porcupine is of a ſomewhat rounded form, with ſhort triangular ſpines; another is roundiſh, with the ſpines triangular at the baſe; and a third conic oblong, with the ſpines long, and a little rounded.

Atinga. Oblong; ſpines on the body round. Bloch. &c.

A ſpecies much reſembling the former, but of a more lengthened form; its general colour is grey, deeper on the back, and tinged with a caſt of pink beneath. The whole body is marked, as well as the fins, with numerous round black ſpots, as in the former ſpecies. In its manners of life, it reſembles the porcupine fiſh, but grows to ſcarcely more than half its length. The ſpecies is conſidered as poiſonous, unleſs cleaned with the greateſt care, and, according to Piſo, if the leaſt quantity of the gall ſhould happen to fall on, and mix with the fleſh, it produces the moſt violent ſymptoms; the tongue becomes immoveable, the limbs ſtiffen, and a cold ſweat enſues, followed by certain death, unleſs the poiſon be expelled by immediate medical aid. This fiſh is a native of the American ſeas round the Cape of Good Hope.

Orbicularis. Body round and covered with ſhort ſpines. Bloch. *L'orbe Hériſſon. Diodon Atinga var β*, Linn.

This ſpecies inhabits the ſea of Jamaica, the Cape of Good Hope, and the Molucca iſles; grows to the length of nine or ten inches, and feeds on ſhells and cruſtaceous animals. In point of ſhape this ſpecies is almoſt ſpherical; the ſpines ſtrong, and ſhort, with the baſes broad, and ſomewhat reticulating the ſkin; the colour is rufous above, beneath paler. This, like the former, is eſteemed poiſonous.

Plumieri. Elongated, blueiſh, with white ſpots, and contracted neck. *Diodon Plumieri*, Cepede.

Reſembles the oblong diodon, but is longer in proportion, and has a conſiderable contraction behind the head; the general colour is blueiſh, with numerous ſmall round white ſpots. This ſpecies is a native of the American ſeas in warm latitudes, where it was diſcovered by father Plumier.

Liturosus. Browniſh, beneath whitiſh, and marked on the upper part with black patches. Shaw. *Dindon tacheté*, Cepede.

This is a native of the Indian ſeas, and is deſcribed by Commerſon. Its ſhape is rather globular, the colour brown above, beneath whitiſh, with a large lunate black ſpot on the nape, the horns of which point towards the eyes. On each ſide the body a ſomewhat oval patch, ſituated above the pectoral fin, and two others placed tranſverſely, the firſt beneath the eye, the ſecond between the eye and pectoral fin: throat marked by a duſky cloud, and on the back a round ſpot encircling the dorſal fin; ſpines white with brown tips, and conſiderably longer on the back than towards the abdomen. All the fins are greeniſh.

The diodon mola of Gmelin is referred to the tetrodon genus. See Tetrodon *Mola*.

DIODORI Insula, in *Ancient Geography*, an iſland of Ethiopia, in the Arabic gulf, near Egypt, according to Pliny and Ptolemy.

DIODORIDA, a town of Aſia, in Meſopotamia.

DIODORUS, in *Biography*, a diſciple of the Megaric ſchool, was a native of Caria, and a great adept in that kind of verbal combat which prevailed among perſons of his ſect. It is ſaid that a queſtion was propoſed to him in the preſence of Ptolemy Soter, by Stilpo, one of his fraternity, which he required *time* to anſwer; and on this account he was ridiculed by Ptolemy, and denominated *Chronus*. Mortified at this defeat, he wrote a book on the queſtion, and, nevertheleſs, died of vexation. He is the reputed author of the famous argument or ſophiſm againſt motion: if any body be moved, it is moved either in the place where it is, or in a place where it is not, for nothing can act or ſuffer where it is not; and, therefore, there is no ſuch thing as motion. Diodorus was ſuitably recompenſed for the invention of this ſophiſm. Having diſlocated his ſhoulder, the ſurgeon, who was ſent for, kept him for ſome time in torture, whilſt he proved, from his own mode of reaſoning, that the bone could not have *moved* out of its place. He has been improperly reckoned among the atomic philoſophers. Brucker's Hiſt. Phil. by Enf. vol. i.

Diodorus, a Peripatetic philoſopher, with whom the uninterrupted ſucceſſion of the Peripatetic ſchool terminated.

Diodorus, named *Siculus*, an ancient hiſtorian, who flouriſhed in the times of Julius and Auguſtus Cæſar, was a native of Agyrium in Sicily. He devoted himſelf to the compoſition of hiſtory, and ſpent thirty years in his ſtudies and enquiries, travelling to the very places in Europe and Aſia, which had been the theatre of important tranſactions, and inveſtigating the facts with the greateſt care and attention. A ſmall part of his labours has come down to our times. His great work was entitled Βιβλιοθηκη ἱστορικη, or "The Hiſtoric Library," in forty books on Univerſal Hiſtory, of which only fifteen and ſome fragments remain. This hiſtory was divided into the periods before the Trojan war, and from that to the death of Alexander, and thence to the commencement of Cæſar's wars in Gaul. His ſtyle is commended by Photius, as being that kind of middle diction which is ſuitable to hiſtory; but others have not thought ſo favourably of it. He has been charged with chronological errors, fable, and trivial narrative; but the fabulous hiſtory of the early ages has been alleged as an apology. Upon the whole, his hiſtory is valuable, and we have to regret the loſs of his laſt books. The beſt editions of this work are thoſe by Stephanus, Par. 1559; of Rhodomannus, Hanau, 1604; and of Weſſelingius, in two vols. fol. Amſterd. 1746.

Diodorus, deſcended from a good family, was probably born at Antioch, in which city he long reſided, and was ordained biſhop of Tarſus, in Cilicia, about the year 378. He died in 394, or ſooner. Whilſt he was preſbyter, he had the direction of a ſchool in or near Antioch, where he inſtructed young perſons in the knowledge of the Scriptures, and the principles of religion. The moſt eminent of his diſciples were Maximus, biſhop of Sileucia, in Iſauria, Theodore, biſhop of Mopſueſtia, in Cilicia, and John Chryſoſtom, biſhop of Conſtantinople, the latter of whom calls him, in one of his orations, his father. He was a firm adherent to the orthodox cauſe under the perſecutions of the Arians, and conducted himſelf with ſo much prudence, that he ſeems to have enjoyed a peaceable epiſcopate till his death. In the firſt council of Conſtantinople he was held in ſuch reſpect, as to be appointed one of the biſhops, to whoſe ſuperintendance the eaſtern churches were entruſted. His works were numerous, and conſiſted of apologies for the Chriſtian religion, controverſial treatiſes againſt the Manichers, &c. and principally commentaries on almoſt all the books of the Old Teſtament, and ſome of the New, which were deſtroyed, as ſome ſay, by the Arians, and, according to others, by the Athanaſians. Some fragments ſtill remain, which are found in the Catena Patrum Græcorum. The loſs of his writings is the more to be deplored, as they diſplayed great learning, the mode of interpreting Scripture by adhering to the literal ſenſe, and an acquaintance with Origen's Hexapla. Diodorus is much commended by Theodoret, Baſil, and other fathers of the church. Suidas has given a catalogue of his works, extracted from the fragments of Theodore. Cave's H. L. vol. i. ad Sæc. Arian. Lardner's Cred. vol. iii.

DIODURUM, in *Ancient Geography*, a place of Gaul, ſituated, according to the Itinerary of Antonine, between Durocaſſes (Dreux) and Lutetia, and ſuppoſed by D'Anville to be Jouare, near Pontchartrain.

DIOECESIS, Διοικησις, among the Romans, a prefecture of

of ſeveral provinces joined together, under the ſame governor, called præfectus. See PREFECT and DIOCESE.

DIOECIA, in *Botany*, (from δις, *double*, and οικια, *a houſe*,) the 22d claſs of the ſexual, or artificial ſyſtem of Linnæus, containing ſuch plants as have barren, or male, flowers on one individual, and fertile, or female, ones on another of the ſame ſpecies. Such flowers are termed dioecious; (ſee DIOICI, FLORES.) This claſs is ſtrictly natural and invariable only when the two kinds of flowers differ in other parts of their ſtructure, beſides their eſſential difference in the organs of impregnation, as in the Hop, *Humulus Lupulus*, becauſe ſuch flowers can never vary ſo as to become united. A ſimilar difference of ſtructure, however, in the acceſſory parts of the bloſſoms, is much more prevalent in the claſs *Monoecia*, whoſe barren and fertile flowers grow on the ſame plant, like the Oak, the Haſel, the Walnut, &c., than in the *Dioecia*. See Sm. Introd. to Botany, 470.

The Orders of this claſs are reckoned but eight in the work laſt cited, though Linnæus makes them much more numerous. They are diſtinguiſhed by the number or connection of the ſtamens, and are called, 1. *Monandria*, 2. *Diandria*, (of which *Salix*, the Willow, is an example,) 3. *Triandria*, 4. *Tetrandria*, 5. *Pentandria*, (containing the Hop, Hemp, Piſtacia-nut, and ſome others,) 6. *Hexandria*, 7. *Polyandria*, (compriſing all dioecious plants with eight or more ſtamens,) and 8. *Monadelphia*, in which the filaments are united; of this laſt the Fir, Yew, and Juniper, are inſtances. S.

DIOGENES, in *Biography*, a famous philoſopher of the Cynic ſect, was born in the 3d year of the 91ſt Olympiad, B. C. 414, at Sinope, a city of Pontus. His father was a banker, who, being convicted of debaſing the public coin, was obliged to leave his country. This circumſtance occaſioned the removal of his ſon to Athens, where he offered himſelf as a pupil to Antiſthenes, who, being in a peeviſh humour, refuſed to admit him. As he ſtill perſiſted in his application, the ſurly philoſopher lifted up his ſtaff to repulſe him, upon which young Diogenes ſaid; "Beat me if you pleaſe; I will be your ſcholar." Antiſthenes, at length, received him; and he became his intimate companion and friend. Having thus choſen his maſter, he adopted his principles, and reſembled him in character: determining to diſtinguiſh himſelf by a contempt of riches and honours, and by his indignation againſt luxury. He wore a coarſe cloak; carried a wallet and a ſtaff; made the porticoe, and other public places, his habitation; and depended upon caſual contributions for his daily bread. Diſappointed in obtaining a cell as ſoon as he expected, he is ſaid to have taken up his abode in a tub, or large open veſſel, in the "Metroum." This tub, which was probably not a ſettled reſidence, but a temporary expreſſion of indignation and contempt, is celebrated by Juvenal, (Sat. xiv. v. 308.)

"—— Dolia nudi, &c."
"Safe in his tub, the naked Cynic lives
Fearleſs of fire: break up his houſe; next day
Brings him a new one, or repairs the old."

This tub is ridiculed by Lucian (De Scrib. Hiſt.) and mentioned by Seneca (Ep. 90.); but no notice is taken of this circumſtance by other ancient writers who have mentioned this philoſopher; not even by Epictetus, who (Ap. Arr. l. iii. Diſſ. 24.) relates ſeveral particulars of his life. Whether this piece of hiſtory be true or not, there is no doubt of his having practiſed the moſt hardy ſelf-controul, and the moſt rigid abſtinence, and of his having depended upon charity for his ſcanty ſupport. In conformity to the principles which he had adopted, and the character he ſuſtained, he reprehended the Athenians, and eſpecially thoſe of the higher ranks, with great freedom and ſternneſs. His reproofs, however, though very pungent, manifeſted ſo much ingenuity, as to excite even the admiration of thoſe againſt whom they were directed. He uniformly inculcated patience of labour and pain, frugality, temperance, and an entire contempt of pleaſure. But though his rigid diſcipline procured for him from ſome reſpect and admiration, it ſubjected him to contempt and indignity from others. But to one and the other he appeared equally indifferent, and preſerved on all occaſions a perfect ſelf-command.

Diogenes, in his old age, is ſaid to have ſailed to the iſland of Ægina; and having met with pirates, he was carried into Crete, and expoſed to public ſale. Being aſked what he could do? he replied, "I can govern men, and therefore ſell me to one who wants a maſter:" Xeniades, a wealthy Corinthian, being ſtruck by this ſingular reply, purchaſed him; upon which Diogenes told him, "I ſhall be more uſeful to you as your phyſician, than as your ſlave." Upon their arrival at Corinth, Xeniades gave him his liberty, and committed to his direction the education of his children, and the management of his domeſtic concerns. Xeniades had ſo much reaſon to be ſatisfied with his judgment and fidelity, that he uſed to ſay, the gods had ſent a good genius to his houſe. He accuſtomed his pupils to the diſcipline of the Cynic ſect, and took greater pains to inure them to habits of ſelf-command, than to inſtruct them in the elements of ſcience. However, he was not negligent in teaching them leſſons of moral wiſdom, which he inculcated by ſententious maxims: and he allowed them the moderate uſe of athletic exerciſes and hunting. The young men, pleaſed with their preceptor, treated him with reſpect, and recommended him to their parents. During his reſidence at Corinth, he frequently attended the aſſemblies of the people at the Craneum, a place in its vicinity, and at the Iſthmian games. Here he appeared under the character of a cenſor, ſeverely laſhing the follies of the times, and inculcating rigid leſſons of ſobriety and virtue. At one of theſe aſſemblies the conference between Alexander the Great and Diogenes is ſaid to have happened. Plutarch relates the ſtory thus: Alexander received the congratulations of all ranks on his being appointed, after the death of his father, to the command of the Grecian army in their projected expedition againſt the Perſians. Diogenes was abſent on this occaſion, and Alexander expreſſed his ſurpriſe at this circumſtance. Wiſhing to gratify his curioſity by the ſight of ſuch a philoſopher as Diogenes, he viſited the Craneum, where he found the philoſopher ſitting in his tub in the ſun. The king came up to him in the crowd, and ſaid, "I am Alexander the Great;" to which Diogenes replied, in a ſurly tone, "and I am Diogenes the Cynic." Alexander, requeſting to know if he could render him any ſervice, received for anſwer, "Yes," ſays he, "do not ſtand between me and the ſun." Alexander, ſurpriſed at the magnanimity of this reply, ſaid to his friends, "If I were not Alexander, I would be Diogenes." There are ſeveral circumſtances in this narrative, which ſuggeſt ſome doubts as to its truth; but it is not improbable that Diogenes, who, at the beginning of the 111th Olympiad, when Alexander held the general aſſembly of the Greeks, was upwards of 70 years old, might often appear in the public walks of Corinth, and that Alexander, indulging a curioſity to ſee a man of his ſingular character, might put himſelf in his way: nor is it unlikely, that the ſurly Cynic might manifeſt his contempt for kings, by treating him with ſome kind of rudeneſs, ſimilar to what has been above related.

As far as we can depend on the repreſentations of the ancients,

cients, Diogenes was a philoſopher of a penetrating genius, not unacquainted with learning, and deeply verſed in the knowledge of mankind. He alſo poſſeſſed an elevated mind, ſuperior to the viciſſitudes of fortune, patient of ſuffering, and incapable of fear. Contented with a little, he deſpiſed the luxuries of the age. Earneſtly deſirous of correcting and improving the public manners, he cenſured réigning follies and vices with a ſteady confidence, ſometimes degenerating into ſeverity. His freedom gave great offence to multitudes; and, of courſe, he ſuffered much obloquy, and was made the ſubject of ludicrous and diſgraceful calumny. But we can hardly believe that a perſon, who has been extolled by ſome of the moſt eminent philoſophers for his ſobriety and virtue, and repreſented as one endowed with divine wiſdom, ſhould have been capable of committing the groſſeſt indecencies, ſome of which have been charged upon him. The ſtory of his intercourſe with Lais, the celebrated courtezan, is inconſiſtent with chronology; and as it chiefly depends on the teſtimony of Athenæus, we ought to recollect, that this writer has amaſſed a variety of tales to the diſcredit of philoſophy. From the charge of philoſophical pride, however, the moſt partial advocates of Diogenes cannot acquit him: hence, he was led to treat other philoſophers, and even magiſtrates and princes, with contempt; and he reproved vice, wherever he found it, with bitterneſs, and even with ſcurrility. True wiſdom cannot juſtify this conduct, nor did it require his taking the cloak and wallet of a mendicant. The time and manner of his death are not ſatisfactorily aſcertained. It is moſt probable that he died at Corinth of mere decay, in the 90th year of his age, in the 1ſt year of the 114th olympiad, B. C. 324. He was buried honourably by the Athenians at the public expence; a column of Parian marble, terminated by the figure of a dog, was placed over his tomb; and his friends erected many brazen ſtatues to his memory.

The philoſophy of Diogenes, which was practical, conſiſts of the following heads:—"Virtue of mind, as well as ſtrength of body, is to be acquired chiefly by exerciſe and habit. Nothing can be accompliſhed without labour, and every thing with it. Even the contempt of pleaſure may, by habit, become pleaſant. All things belong to wiſe men, to whom the gods are friends. The ranks of ſociety originate from the vices and follies of mankind, and are, therefore, to be deſpiſed. Laws are neceſſary in civilized ſtates; but the happieſt condition of human life is that which approaches the neareſt to a ſtate of nature, in which all are equal, and virtue is the only ground of diſtinction. The end of philoſophy is to ſubdue the paſſions, and prepare men for every condition of life."

The following maxims or apothegms of Diogenes, ſelected from a variety of others, may be gratifying to the reader:—"I trample under foot the pride of Plato," ſaid Diogenes, treading upon his robe. "Yes," ſaid Plato, "with greater pride of your own." To a friend, who adviſed him to indulge himſelf in his old age, he ſaid, "Would you have me quit the race when I have almoſt reached the goal." Plato, having defined man a two-legged animal without wings, Diogenes plucked off the feathers from a cock, and turning him into the academy, exclaimed, "See Plato's man." In reply to one who aſked him at what time he ought to dine, he ſaid, "If you are a rich man, when you will; if you are poor, when you can." "How happy," ſaid one, "is Calliſthenes in living with Alexander." "No," ſaid Diogenes, "he is not happy; for he muſt dine and ſup when Alexander pleaſes." Plato, diſcourſing concerning ideas, ſpoke of the abſtract idea of a table and a cup. Diogenes ſaid, "I ſee the table and the cup, but not the idea of the table and the cup." Plato replied, "No wonder, for you have eyes but no intellect." His anſwer to an invitation from Craterus to come and dine with him was, "I had rather lick ſalt at Athens, than ſit down to the richeſt feaſt with Craterus." Being aſked what countryman he was, he replied, "A citizen of the world." To one that reviled him he ſaid, "No one will believe you when you ſpeak ill of me, any more than they would believe me if I were to ſpeak well of you." Hearing one of his friends lamenting that he ſhould not die in his own country, he ſaid, "Be not uneaſy, from every place there is a paſſage to the regions below." "Would you be revenged upon your enemy," ſaid Diogenes, "be virtuous, that he may have nothing to ſay againſt you." Laertius, l. vi. § 20, &c. Arrian Epict. l. iii. Diſſ. 21. Brucker's Hiſt. Phil. by Enf. vol. i.

Diogenes (not the Cynic), the ancient Greek writer on muſic, attacked by the αμουσος, Philodemus, whoſe abuſe of muſic has been recovered from the cinders of Herculaneum.

Diogenes, ſurnamed the Babylonian, from his birth-place, Seleucia, near Babylon, flouriſhed in the ſecond century, B C. He was the diſciple of Chryſippus, and the ſucceſſor of Zeno of Tarſus, where he taught the principles of his ſect with unwearied diligence, and a high reputation. He was the author of ſeveral works on divination, the laws, learning, &c. which have been referred to with reſpect by Cicero and others. He is ſaid to have lived to the age of 88 years, and philoſophized to the laſt. That he was highly eſteemed by his contemporaries is evident from his being appointed in conjunction with Carneades, the head of the academics, and Critolaus, the chief of the peripatetic ſchool, to the embaſſy to Rome. As a proof how well his practice conformed to his principles, we are told, that when he was once diſcourſing againſt anger, an inſolent young man, with the hope of expoſing him to the ridicule of his audience, ſpat upon him, and otherwiſe contumeliouſly treated him, upon which the philoſopher obſerved with meekneſs, "I am not angry, but I am doubtful whether I ought to be ſo." Bayle. Brucker by Enfield.

Diogenes Laertius, ſo named from the ſuppoſed place of his birth, Laerta, or Laertes, in Cilicia, was a Greek biographical writer; who is ſuppoſed to have flouriſhed according to Voſſius about the time of the Antonines, or ſomewhat later. Others, however, have thought it more probable that he lived under Severus and his ſucceſſors, and that his book of the "Lives," &c. was written about the year 210, in which opinion Dr. Lardner acquieſces. As an author the principal work of Diogenes is entitled "The Lives, Opinions, and Apothegms, of celebrated Philoſophers," in ten books, which has been regarded by ſome as a very valuable repoſitory of materials, for the hiſtory of philoſophy; but the character given of it by Brucker is, that the author "has collected from the ancients with little judgment, patched together contradictory accounts, relied upon doubtful authorities, admitted as facts, many tales which were produced in the ſchools of the ſophiſts, and has been inattentive to methodical arrangement." The work appears, upon the whole, to have been the production of a credulous and feeble mind. He alſo compoſed a book of epigrams, to which he refers. Little of his hiſtory is known, but he is ſuppoſed to have been inclined to the Epicurean philoſophy. His Life of Epimenides contains a paſſage which ſerves to illuſtrate the inſcription on the altar at Athens, To the unknown God, mentioned Acts, xxvii. 16—23. See Altar. The beſt edition of his "Lives, &c. is that of Meibomius, Amſt. 1692, 2 vols. 4to. with the obſervations of Menage. Brucker's Hiſt. Philos. by Enfield.

DIOGENES APOLLONIATES, a native of Crete, and a philoſopher of the Ionic ſect, flouriſhed about the 17th Olympiad, or 500 years B. C. Having ſtudied under Anaximenes, he ſucceeded Anaxagoras at Athens, where he taught philoſophy and eloquence for ſome time with great reputation. Either his doctrines were unpopular, or his ſucceſs created jealouſy, and he was obliged to leave the city at the peril of his life; and from this period nothing more is recorded of him. Little is known of the peculiarity of his ſentiments, but he appears to have held, that the air poſſeſſed a divine intelligence, and is the firſt principle in nature: that the number of worlds is infinite, and that they were formed by an exertion of the powers of rarefaction and condenſation; and that the centre of the earth, which is globular, is in the centre of the whole. Moreri. Brucker by Enfield.

DIOGENIS PROMONTORIUM, in *Ancient Geography*, a montory of Ethiopia, upon the Arabic gulf. Ptol.

DIOGNETUS, in *Biography*, a philoſopher, who flouriſhed in the reign of the emperor Marcus Aurelius, and who was one of the preceptors of that prince, by whom he was inſtructed in philoſophy, and other branches of important knowledge. He is mentioned with great reſpect by Juſtin, in whoſe works, publiſhed by Henry Stephens in 1592, an epiſtle to Diognetus is inſerted. By Lardner, and other judicious critics, the claim of this epiſtle to authenticity has been doubted. Diognetus was highly reſpected by his contemporaries, as well as greatly beloved by his pupil, Marcus Aurelius. Lardner.

DIOICI, FLORES, dioecious flowers, in *Botany*, have ſtamens in one individual, and piſtils in another, on ſeparate plants of the ſame ſpecies. Sometimes this is accompanied with no difference in the other parts of ſuch flowers, as the calyx or corolla, and therefore the organs of impregnation are liable to meet in the ſame flower in other plants of the ſame natural genus, as happens in *Lychnis*, *Valeriana*, *Urtica*, *Rumex*, &c. They ſtill more frequently meet in flowers of the ſame ſpecies, that are partly monoecious or dioecious, witneſs many exotic trees, and numerous graſſes, referred by Linnæus on that account to his 23d claſs, *Polygamia*, as well as our Engliſh Maple, Sycamore and Aſh. Hence, ſuch plants have been removed in the *Flora Britannica* to the united claſſes, and no genera left in *Polygamia* that have not a difference of ſtructure in the acceſſory parts of their flowers. This has been approved by all ſcientific botaniſts who have ſubſequently conſidered the matter. When flowers are perfectly monoecious or dioecious, and ſuch diſtinctions are accompanied by a difference in their acceſſory parts, as in *Zannichellia*, *Carex*, *Valiſneria*, and ſome others, eſpecially when there is moreover a difference of inflorescence, as in *Quercus*, *Corylus*, *Humulus*, &c. nothing can be more natural, conſtant, or convenient, than ſuch a character. It is far otherwiſe when the male and female flowers are ſo much alike, that there are rudiments of each part in the contrary flower. Thus, *Rhodiola* is merely a *Sedum*, with ineffectual ſtamens on one plant, and abortive piſtols on another. See DICLINIA. S.

DIOKO-WAR, or DIACOVAR, in *Geography*, a town of Sclavonia; 16 miles S. W. of Eſzek.

DIOMEDÆ, INSULÆ, in *Ancient Geography*, iſlands of the Adriatic ſea, according to Strabo, Ptolemy, and Pliny. They are now the iſlands of "Tremiti." One of theſe iſlands was called *Teutria*, and the other *Diomedea* and *Trimetus*. They had to the ſouth that part of Italy in which was ſituated mount Garganus.

DIOMEDEA, in *Ornithology*, a genus of the aquatic or marine kind, the albatroſs of Engliſh navigators. Theſe birds have the bill ſtraight, with the upper mandible hooked at the point, and the lower truncated; the noſtrils oval, wide, prominent, and lateral; tongue very ſmall; and feet three-toed, all placed forward.

Species.

EXULANS. White, back and wings lineated with white; bill pale yellow, legs fleſh colour; quill-feathers black; tail rounded and lead colour. Gmel.—*Diomedea exulans*, Linn.—*Plautus albatrus*, Klein.—*Tchaiki*, Pallas.—*Man of war bird*, Grew.—*Wandering albatroſs*, Arct. Zool.

This ſort of albatroſs is larger than the ſwan, meaſuring from three to four feet in length; and its general expanſion between the wings, when opened and ſtretched out, about ten feet. Many voyagers ſpeak of them as far exceeding even theſe dimenſions. One expanding to the breadth of eleven feet ſeven inches, is mentioned in Parkinſon's voyage, another of twelve feet in the Bankſian MS. One in the Leverian collection is ſaid to have meaſured thirteen feet; and if we may credit Ives, an albatroſs of this kind was ſhot off the Cape of Good Hope, which expanded ſeventeen feet and a half. The bill of this bird is of a dirty yellow; the crown of the head pale cinereous brown, and the legs fleſh colour. The young birds are ſaid to be brown, becoming gradually whiter as they advance towards maturity.

Albatroſſes are very abundant in many parts without the tropics, both to the north and ſouthward, and are in particular found in every temperate ſouthern latitude as far as the polar regions have been yet explored. Forſter tells us, they are never ſeen in the torrid zone. They are ſeen in vaſt flocks in Kamtſchatka, and the adjacent iſlands, about the end of June, and their arrival is a ſure preſage of the ſhoals of fiſh approaching. They are voracious birds, and often ſwallow a fiſh of four or five pounds weight; but as they cannot take the whole of it into their ſtomach at once, they are often caught with the tail hanging out of their mouth, and in this ſituation are knocked down themſelves by the natives. When caught, they defend themſelves ſtoutly with the bill; their cry is harſh and diſagreeable, and reſembles the braying of the aſs, or rather, according to Clayton, that of a trumpet, ſuch as the children buy at fairs. They are known to breed in Patagonia and the Falkland iſlands, and part of New Zealand bears the name of Albatroſs Point from this circumſtance. The neſt is made on the ground with earth, its ſhape is round, ſtands about a foot in height, and is indented at the top. The egg is larger than that of a gooſe, of a white colour, with a few dull ſpots at the broadeſt end; theſe eggs are eſteemed good for eating, but poſſeſs this remarkable peculiarity, that the white never becomes hard by boiling.

While the female is ſitting, the male is conſtantly on the wing, and ſupplies her with food; and during this time they are ſo tame, as to ſuffer themſelves to be puſhed off the neſt while their eggs are taken out. But their chief deſtruction ariſes from the perſecution of the New Zealand falcon, which the moment the female gets off the neſt, darts upon it, and flies away with the eggs. The albatroſs itſelf has its enemies likewiſe, particularly a ſort of gull of a dark colour, like the ſkua. This wily antagoniſt, aware of his inferiority of ſtrength, endeavours to attack the albatroſs underneath, and to prevent which, the latter is obliged to ſettle on the water. Theſe birds are often taken by the natives of Kamtſchatka, by means of a hook baited with a fiſh: they are caught chiefly for the ſake of their inteſtines, a particular part of which is blown up as a bladder, and ſerves as floats to buoy up their nets in fiſhing. Of the bones they make tobacco pipes, needle caſes, and other uſeful things; the fleſh is not in much requeſt, being hard and unſavoury. Hawkeſworth,

however, mentions that they were eaten by our voyagers: as ſoon as caught, they were ſkinned, and ſoaked in ſalt water till next morning; then parboiled, and the liquor being thrown away, ſtewed with freſh water till tender, and being ſerved up with ſavoury ſauce, they were much commended. The albatroſs feeds chiefly on marine animals.

Two varieties of the ſpecies *exulans* are deſcribed in the Gmelinian Syſtema, one of which is brown, with the upper part blackiſh; the bill red, with the tip blackiſh, down cinereous, and whitiſh towards the head. The other is white; the region of the ſhoulders, wings, and tail, blackiſh brown; head, and upper part of the neck, deep ſtraw colour; and the upper mandible white or reddiſh, the lower red, with a white keel.

Spadicea. Deep cheſnut, front, orbits, chin, throat, lower quill-feathers, abdomen and legs white; bill ochraceous white. *Diomedea ſpadicea*, Gmel. *Chocolate albatroſs*, Cook's Voyage.

This is ſmaller than the foregoing, meaſuring little more than three feet in length. The plumage is, in general, of a fine deep chocolate, paleſt beneath; the tail is ſhort and rounded, and the legs blueiſh white, with white claws. This varies in having more or leſs white about the head, and inhabits the South ſeas. A kind of albatroſs, entirely of a grey brown colour, with the bill and legs pale, is found in China, and has been conſidered as a variety of this ſpecies: its length is two inches and a half.

Chlororhynchos. White; bill black; keel of the upper mandible and baſe of the lower yellow; body above black blue, beneath white. Gmel. *Yellow noſed albatroſs*. Lath.

Length about three feet and breadth ſeven, the bill black, with the upper ridge and tip yellow, and the baſe of the under mandible is alſo yellow. The head is grey, and between the bill and eyes is an obſcure black ſpot, and another over the eye. The hind part of the neck is duſky, the lower part white; back, ſcapulars, and wings duſky blue black; rump and under part of the body white; the tail duſky; the legs pale yellowiſh white, with the fore part and webs duſky. This ſpecies is met with in the ſouthern hemiſphere from 30 to 60 degrees round the pole. This bird is obſerved to fly about five or ſix feet above the ſurface of the water.

Fuliginosa. Brown; head, bill, tail, quill-feathers and claws, ſooty brown; area of the eyes white. Gmel. *Sooty or brown albatroſs*, Forſter. *Albatroſs with a white eyebrow*, Cook's Voyage.

Inhabits the ſeas within the Antartic circle, is about the ſize of a gooſe, and meaſures about three feet in length. The bill is black; the irides pale yellow; at each angle of the eye a nictitating membrane. The general colour of the plumage is brown; the head and tail inclining to black or ſoot colour; for a ſmall ſpace above, behind and beneath the eye, the feathers are white, but not on the fore part of it; the quills and tail are dark brown, nearly black; the ſhafts of both white, and the latter pointed; legs pale browniſh lead colour; claws black.

Obſerved throughout the ſouthern ocean within the Antartic circle.

DIOMEDES, in *Biography*, was ſon of Tydeus, king of Etolia, and afterwards king of Argos himſelf. He led his ſubjects to Troy in numbers ſufficient to man eighty ſhips; hence he became one of the principal commanders at the Trojan war, and Homer has made him one of the moſt diſtinguiſhed heroes of his Iliad. After the deſtruction of Troy he returned to Argos, where he is ſaid to have found his wife connected with an adulterer, and plotting with him againſt the life of her huſband. He therefore embarked again, and after much travelling, ſettled with the companions of his fortunes at Daunia, on the Adriatic coaſt of Italy, where he married the daughter of the king, and founded the city of Argyrippa, afterwards called Arpi. Gen. Biog.

Diomedes, in *Geography*, the name of an iſland near the promontory of Siberia, on the N. E. point of the continent.

DIOMEDIA, in *Ancient Geography*, a town of Italy, in the Daunian diſtrict, mentioned by Virgil.

DIOMEDIS Insula, an iſland of Italy, at the bottom of the gulf which lies to the eaſt of Aquileia. It is now called *Belforte*.

Diomedis *Stabulum*, a town of Thrace, which belonged to king Diomedes, called by Mela "Diomedis Turris."

Diomedis *Avis*, in *Ornithology*, the name of a bird of the web-footed kind, with a ſlender beak, hooked at the end, and with its hinder toe not connected by the membrane that joins the reſt. It is of the ſize of a common hen, but its neck and legs are much longer; its colour is a duſky, and ſomewhat greyiſh brown, and under the belly there is more or leſs white; its beak is of a fine red, or in ſome of a yellowiſh colour, with a black end. It is found in the Inſula Diomedea, now called Tremiti, in the Adriatic ſea, and is ſaid to be peculiar to that place. See Shear-*Water*.

DION, in *Biography*, an illuſtrious inhabitant of Syracuſe, who, deriving an ample inheritance from his father, Hipparinus, became a diſciple of Plato, invited by Dionyſius the Elder to his court at Syracuſe. The philoſopher was highly pleaſed with his ſcholar, and ſpeaks in high terms of his attention and proficiency. Being a philoſopher in practice, as well as ſpeculation, Dion eſcaped the diſſoluteneſs of the licentious capital, attached himſelf to the cauſe of liberty, and took part with his preceptor in the perſecutions which he underwent from the tyrant. He was nearly connected with Dionyſius by having married his daughter, and by his ſiſter's being one of his wives; and he was alſo much eſteemed by him, ſo as to be employed in ſeveral important embaſſies. At the acceſſion of Dionyſius the Younger, B. C. 366, he maintained conſiderable influence by virtue of his character and his wealth. At his requeſt, Plato was again invited to the Syracuſan court; and, in order to counteract his authority, the courtiers obtained the recal of Philiſtus, a man notorious for his adherence to arbitrary principles. This faction determined to ſupplant the credit of Dion and his favourite philoſopher; and availed themſelves of a real or ſuppoſititious letter, to fix upon him the charge of treaſon. Dion, precluded from ſelf-defence, was tranſported to Italy; and from thence proceeded to Greece, where he was received with great honour. At Athens he attended the academy, and the Lacedæmonians conferred upon him the freedom of their ſtate. At length Dionyſius became jealous of his popularity, ſtopped his remittance, confiſcated his eſtates, and compelled his wife, who had been left at Syracuſe as an hoſtage, to marry another perſon. Dion, juſtly incenſed at this uſage, determined to expel Dionyſius. Plato reſiſted his intention; but, encouraged by other friends, he aſſembled a body of troops, and, with a ſmall force, ſailed for Sicily, and landed at Minoa, a town belonging to the Carthaginians. Availing himſelf of the abſence of Dionyſius upon an expedition to Italy, he advanced to the capital, and was received at the gates of the city, amidſt the acclamations of the people. At length Dionyſius arrived; but, after ſeveral conflicts and ineffectual propoſals of accommodation, he was obliged to make his eſcape to Italy. Dion, poſſeſſing to a great degree the auſterity and reſerve of a philoſopher, was ſupplanted

planted in the popular eſteem by Heraclides, a Syracuſan exile, and obliged to make his retreat to Leontium. The inhabitants of Syracuſe were ſoon after reduced to diſtreſs by an armament ſent againſt them by Dionyſius; and a deputation was ſent to Dion, imploring his aſſiſtance. The philoſopher, burying in oblivion the ſlight he had received, and anxious only for the welfare of the ſtate, determined to make an attempt for its deliverance. Accordingly, he marched at the head of a body of troops, who declared their readineſs to follow him to death or victory, and found the city in the laſt extremity of deſolation and terror. Having pardoned the machinations of Heraclides and his adherents, who ſurrendered themſelves into his hands, he gained poſſeſſion of the citadel, and entered it in preſence of the applauding citizens. At the gate he was met by his ſiſter, leading his ſon and his wife Arete. The two former were embraced by him, while the latter ſtood by unnoticed, and diſſolved in tears. At length his tenderneſs was awakened, and, embracing her, he ſent her with his ſon to his houſe. Having eſtabliſhed the Syracuſans in poſſeſſion of their citadel, he diſmiſſed his guards, and retired to the condition of a private citizen. As ſoon as public tranquillity was reſtored, inteſtine factions revived. Heraclides was among the foremoſt of the malcontents, and Dion was perſuaded to aſſaſſinate him. This fatal deed robbed him of all mental peace, and his imagination was henceforth haunted with avenging furies. Having loſt his ſon by a premature and voluntary death, an Athenian, who was his intimate friend, formed a conſpiracy againſt his life. Burſting into his houſe, the traitor ſeized his perſon, and, whilſt Dion ſtruggled, his murderers, being unprovided with weapons, could not diſpatch him, till they were ſupplied through a window with a dagger. The death of Dion happened about the year 354 B. C. in the 55th year of his age. His ſiſter and wife, and a poſthumous infant of which his wife was delivered, were ſoon after put to death. The Syracuſans afterwards cheriſhed his memory as their deliverer, and honoured him with a public monument. Plut. Vit. Dion. Rollin's Anc. Hiſt. vol. iv.

Dion Cassius Cocceianus, was a native of Nice, in Bithynia, and the ſon of Apronianus, who was prefect of Bithynia at the acceſſion of Adrian. Dion was a ſenator of Rome in the reign of Commodus, and entruſted with ſeveral governments and poſts of dignity under the ſucceeding emperors. He was twice conſul; the ſecond time as colleague to the emperor Alexander Severus, A. D. 229. His rigorous diſcipline, when he commanded the Pannonian legions, excited a tumult and a combination againſt him, which endangered his life. But he retired from Rome, and paſſed the greater period of his conſulſhip in Campania. He afterwards returned to his native country, and finiſhed his days in tranquillity. Twenty-two years of his life were devoted to the compoſition of a Roman hiſtory in the Greek language, comprehending, in eight books, the whole period from the origin of the Roman ſtate to his own times. Ten years were employed in collecting materials, and twelve more in digeſting and arranging them. To this work, as he informs us, he was impelled by a viſion, which occurred to him the night after he had received the emperor Severus's thanks for a treatiſe which he had compoſed on the preſages that had announced the elevation of that prince. This circumſtance leads us to conclude, that he was not only ſuperſtitious, but inclined to adulation; and, indeed, his hiſtory is evidently partial to Cæſar and his party, whilſt it abuſes Cicero, Brutus, Seneca, and other patriots. His ſtyle, however, is clear and eaſy, and he has interſperſed a variety of judicious reflections. Of the 80 books, the firſt 54 and and part of the 55th are loſt. The 25 following are extant, but the latter ſix in an abridged ſtate; the laſt 20 are alſo loſt, except a few fragments. We have, however, an epitome of his work from the time of Pompey to the end of it in the reign of Severus, which was made by John Xiphilinus, nephew to the patriarch of Conſtantinople. Dion's hiſtory, notwithſtanding its defects, is juſtly admired, and Xiphilinus's epitome is well eſteemed. In ſome places we find fragments of Dion himſelf; and the epitome often repreſents Dion in his own words. Dion's hiſtory is ſuppoſed to have been publiſhed ſoon after the year 230. In Dion's hiſtory we have a ſhort and defective account of the ſiege and capture of Jeruſalem, which affords a teſtimony to the ruin of the temple and city, and the conqueſt of Judæa under Titus and Veſpaſian. We have, likewiſe, in the hiſtory of Domitian, an atteſtation to the progreſs of Chriſtianity, and the ſufferings of its profeſſors. It appears that it had got footing in the imperial family. Clement ſuffered death on account of it; and Domitella his wife was baniſhed to a remote and inſalubrious iſland, whither perſons were wont to be ſent for ſtate crimes, or other like offences. Another paſſage in Dion's hiſtory confirms the ſuppoſition of the ſeverity of Domitian's perſecution, though it was not long, and leads us to conclude, that the perſecution did not ceaſe till after the beginning of Nerva's reign. We have alſo an account of the ſhower by which Marcus Antoninus and his army were ſaved in Germany. The beſt editions of Dion Caſſius are thoſe of Leunclavius, Hanau, fol. 1606, and of Reimarus, Hamburgh, 2 vols. fol. 1750. Crevier's Hiſt. Emp. vol. viii. Lardner's Works, vol. viii.

Dion, or *Dium*, in *Ancient Geography*, a promontory placed by Ptolemy in the northern part of the iſle of Crete. —Alſo, a town of Greece, in Eubœa.—Alſo, a town of the Decapolis, between Pella and Gadara. Ptol.—Alſo, a town placed by Strabo and Herodotus in Epirus.—Alſo, a town of Greece, in Macedonia, ſituated north of mount Olympus, and near it, where the games were celebrated.—Alſo, a town of Italy.—Alſo, a town of Aſia, in Piſidia.—Alſo, a town of Thrace, near mount Athos.—Alſo, a town of Aſia, in Cœloſyria. Steph. Byz. ſays that it was near Pella, and built by Alexander. Ptolemy diſtinguiſhes Pella from Dion.

DIONÆA, in *Botany*, (a name of Venus, from her mother Dione. "*Sacra Dionæ matri, Diviſque ferebam*," ſays her ſon Æneas, Virg. Æn. 3. 19. In its botanical application, of which Solander and Ellis were the authors, it may be underſtood as alluding to the elegance and delicacy of the flowers which rival thoſe of Linnæus's favourite *Trientalis*.) Venus's Fly-trap. Ellis in Act. Nov. Upſal. v. 1. 98. t. 8. Ejuſd. Monogr. 38. t. 1. Linn. Mant. 2. 151. Schreb. 288. Willd. Sp. Pl. v. 2. 574. Mart. Mill. Dict. v. 2. Juſſ. 431. Claſs and order, *Decandria Monogynia*. Nat. Ord. *Gruinales*, Linn. "Uncertain," Juſſ. Undoubtedly a-kin to *Droſera*, and therefore to the *Capparides* of Juſſieu.

Gen. Ch. *Cal.* Perianth of five ovate-oblong, acute, ſpreading, permanent leaves. *Cor.* Petals five, equal, obovate, concave, longer than the calyx, with numerous pellucid ribs in their lower part. *Stam.* Filaments ten, equal, awl-ſhaped, ſpreading, ſhorter than the petals; anthers roundiſh, ſmall, their pollen three-lobed. *Piſt.* Germen ſuperior, roundiſh, depreſſed, furrowed; ſtyle thread-ſhaped, ſhorter than the filaments; ſtigma depreſſed, fringed. *Peric.* Capſule of one cell, furrowed. *Seeds* numerous, minute, nearly ovate, affixed to the "bottom of the capſule." Ellis.

Eſſ. Ch. Calyx of five leaves. Petals five, equal. Capſule ſuperior, furrowed, of one cell. Seeds numerous, affixed to the baſe of the capſule. Stigma fringed.

The

The only known ſpecies is D. *Muſcipula*, figured by Ellis in the places above cited, copied in Shaw's Nat. Miſc. t. 40. But Venten. Jardin de la Malmaiſon, t. 29. and Sims in Curt. Mag. v. 20. t. 785, are original figures. It grows in the ſwamps of North Carolina, lat. 35° north, and was ſent in a dried ſtate by John Bartram to Peter Collinſon, who, in 1765, ſent the ſame to Ellis. Solander communicated a ſpecimen to Linnæus, from which, and Ellis's paper, the characters in the ſecond *Mantiſſa* were drawn up. Mr. William Young ſent living plants to Kew in 1768, ſince which time others have frequently been brought to England, where they bloſſom one ſeaſon in a ſtove, by means of conſiderable heat and moiſture, but ſeldom ſurvive our winters. The great ſingularity of the plant conſiſts in its leaves, which are radical, numerous, ſpreading on the ground; obovate, each terminated by an orbicular appendage, half an inch or more in breadth when expanded, but compoſed of two hemiſpherical lobes, ſtrongly toothed at their outer edge, coloured and glandular within. On the inſide of each lobe ſtand about three highly irritable erect briſtles, which, when touched, cauſe the two lobes to fold together like a rat-trap, impriſoning inſects, no doubt that their putrifying bodies may adminiſter an air wholeſome to the plant, which theory, recent obſervations on *Sarracenia*, *Droſera*, and *Nepenthes* confirm. See Sm. Introd. to Botany, 195—198. The roots of the *Dionæa* are deſcribed as ſcaly and perennial. The flower-ſtalk is ſolitary, radical, a ſpan high, bearing a corymbus of very elegant ſnow-white flowers, ſomewhat reſembling, in general aſpect, thoſe of the *Parnaſſia*, the petals moreover being, like theirs, ſtriped with pellucid parallel veins. Our knowledge of the fruit is imperfect, but it ſeems very much to accord in general ſtructure with thoſe of *Parnaſſia* and *Droſera*, at leaſt ſo as to ſtamp them all of the ſame natural order, while other particulars approach theſe plants to *Saxifraga*, as hinted in Engl. Bot. v. 2. t. 82. The theory of botanical affinities is too much a ſcience of conjecture to juſtify dogmatical concluſions, and any univerſal ſyſtems founded upon it can as yet be but artificial and incomplete. Such attempts, however, conducted with due modeſty, are laudable, and muſt in the end lead to ſome truths. S.

DIONÆA, in *Gardening*, compriſes a plant of the low growing herbaceous perennial exotic kind; the Venus's Fly-trap, D. *muſcipula*.

It riſes in a ſimple ſtem to the height of about ſix inches, which ends in a ſpike of milk-white flowers. It has two lobes at the upper joint of the leaf, which conſtitute a ſort of trap, hence its name.

Method of Culture.—This is a plant which is increaſed by ſowing the ſeed obtained from its native ſituation in pots of light moiſt mould which ſhould be plunged in a moderate hot bed, and when the plants have acquired ſome growth, they ſhould be removed into ſeparate ſmall deep pots filled with bog earth, dew water, and ſhade, being given till they become well rooted.

The plants afterwards require to be placed in a frame or green-houſe, ſo as to be protected from the full ſun during the ſummer heat, and have a free air, with proper waterings; but in the beginning of autumn, placed in the green-houſe, ſo as to be guarded from the effects of froſt being very moderately watered at that period.

Theſe are plants which are of the ſenſitive kind, affording variety among others of the exotic green-houſe ſorts.

DIONE, in *Mythology*, a ſea nymph, the daughter of Ocean and Thetis, and the mother of Venus by Jupiter.

DIONE, in *Zoology*, a ſpecies of COLUBER.

DIONIA, in *Ancient Geography*, a town of the iſland of Cyprus.

DIONIS, PETER, in *Biography*, educated to the practice of ſurgery, in which he acquired conſiderable fame; became firſt known by being appointed reader of the lectures in anatomy and ſurgery in the royal gardens at Paris, inſtituted by Lewis XIV. This procured him, in 1680, the appointment of ſurgeon in ordinary to the queen, the dauphineſſes, and the royal children, which offices he held, with great credit, to the 16th of December, 1718, the time of his death. His firſt publication contained the hiſtory of a woman, who was ſuppoſed to have died in conſequence of a rupture of the uterus. She was only in the ſixth month of her pregnancy. On opening the body, there appeared, the author ſays, to be two uteri, one of which was ruptured. But as the woman was only in the ſixth month of her pregnancy, it is probable the fœtus had never reached the uterus, but was detained in one of the Fallopian tubes, which gave way, not bearing to be diſtended to ſuch a ſize as would contain a full-grown fœtus. We have two caſes of ruptured Fallopian tubes recorded; one by De Graaf, and the other by Cyprianus: but there are no caſes of ruptured uteri occurring at ſo early a period of pregnancy. This was publiſhed in 1683. In 1690 he publiſhed "Anatomie de l'homme, ſuivant la circulation du ſang, et les nouvelles decouvertes," 8vo.; an uſeful epitome, containing all that was then known on the ſubject. It was well received, and frequently reprinted. It was tranſlated, in 1718, into the Tartar language, by order of Cam-hi, the emperor of China, for the benefit of his ſubjects. His next work, which firſt appeared in 1707, was "Cours d' Operations de Chirurgie demontreé, au Jardin Royal de Paris," 8vo. This has been reprinted ſtill more frequently than the former work, and has been tranſlated into nearly all the modern languages. Heiſter gave an edition of it in Latin, with notes, and it ſtill retains a certain degree of credit. In 1709, he gave "Diſſertation ſur la mort ſubite, avec l' hiſtoire d'une fille cataleptique," 12mo.; and, in 1718, "Traite general des accouchmens," 8vo. This alſo has been tranſlated into moſt modern languages, though it contains little more than an abridgment of the practice of Mauriceau, and is now almoſt entirely unnoticed. Hall. Bib. Chir. Eloy. Dict. Hiſt.

DIONYSI PROMONTORIUM, or *Civitas*, in *Ancient Geography*, a promontory or town, ſituated in the ſouthern part of the iſland of Taprobana, according to ſeveral copies of Ptolemy.

DIONYSIA, an iſland of the Mediterranean ſea, over-againſt the coaſt of Etolia.—Alſo, an iſland of the ſame ſea, over-againſt the coaſt of Lycia, in Aſia Minor. Pliny ſays that it was ſometimes called *Caretha*.—Alſo, an epiſcopal town of Aſia, under the metropolis of Boſtra.—Alſo, a town of Greece, in Bœotia, ſaid to have been built by Bacchus.—Alſo, a town of Italy.

DIONYSIA, or *Dionyſiaca*, ſolemn feaſts, held among the ancients, in honour of Bacchus.

The word is formed from the Greek Διονυσια, of Διονυσος, *Bacchus*; and that of Διος, the genitive of Ζευς, *Jupiter*, and *Nyſa*, a city in Egypt, on the frontiers of Arabia, where Bacchus is ſaid to have been educated by the nymphs.

The Dionyſia are the ſame with what are otherwiſe called Orgia, and by the Romans Bacchanalia and Liberalia.

There are divers feſtivals under the denomination of Διονυσια, *Dionyſia*; but the chief were two; *viz.* 1. The ancient, αρχαιωτερα, probably the ſame with μεγαλα, or the greater Dionyſia; ſometimes alſo called, by way of eminence, Διονυσια, without any other addition, as being the moſt celebrated of all Bacchus's feſtivals at Athens, where it was held in the month of Elaphebolion. This feſtival was celebrated by the Athenians with extraordinary magnificence; tragedies and comedies

comedies were then exhibited in the theatre; and hymns in honour of Bacchus, accompanied with flutes, were chaunted by the chorus, in the Odeum. On this occaſion each of the 10 Athenian tribes appointed a choragus, whoſe office is particularly deſcribed under the article CHORAGUS. 2. The new, Νεωτερα, probably the ſame with μικρα, or the leſſer Dionyſia, held in autumn, as a ſort of preparation to the greater. Some will have this the ſame with Διονυσια ληναια, ſo called from ληνος, a *wine-preſs*, and place it in the month Lenæon.

Several days of the year were dedicated to the worſhip of Bacchus. The city, the harbour of Piræus, the country, and the neighbouring towns, alternately re-echoed with his name. The whole city has on this occaſion been in a ſtate of complete intoxication. Bacchanals and bacchanalian nymphs, crowned with ivy, fennel, and poplar, danced and howled through the ſtreets with convulſive agitations, and invoked Bacchus with barbarous acclamations. They have torn the raw entrails of the victims with their teeth and nails, ſqueezed ſerpents in their hands, interwove them in their hair, twiſted them round their bodies, and by ſuch extravagancies attracted the attention of the terrified multitude. Similar ſcenes were exhibited at a feſtival which was celebrated on the firſt appearance of ſpring. The city was then filled with ſtrangers, who repaired thither in crowds, to bring the tribute of the iſlands ſubjected to the Athenians, to ſee the new pieces preſented at the theatre, and to be preſent at the games and public ſhows; but, above all, at a proceſſion which repreſented the triumph of Bacchus. In this the ſame retinue is exhibited with which that god is ſaid to have been attended when he made the conqueſt of India: men, who perſonated ſatyrs, others who repreſented the god Pan; ſome dragging goats along to ſacrifice them; others mounted on aſſes in imitation of Silenus; others diſguiſed like women; others again carrying obſcene figures, ſuſpended on long poles, and ſinging the moſt licentious hymns: in fine, all ſorts of perſons, of both ſexes, moſt of them clad in the ſkins of fawns, concealed under maſks, crowned with ivy, either drunk or feigning to be ſo, mingling their uninterrupted ſhouts with the ſound of inſtruments; ſome agitating their bodies like madmen, and abandoning themſelves to all the convulſions of fury; others executing regular and military dances, but holding vaſes inſtead of bucklers, and throwing thyrſi, in the manner of darts, with which they ſometimes menaced and inſulted the ſpectators. In the midſt of theſe bands of furies, the choruſſes deputed by the different tribes advanced in the moſt perfect order; and a number of young women, of the moſt diſtinguiſhed families of the city, walked with downcaſt eyes, decked out in all their ornaments, and bearing on their heads the ſacred baſkets, which, beſides offerings of the choiceſt fruits, contained cakes of different forms, grains of ſalt, ivy leaves, and other myſterious ſymbols.

The roofs of the houſes, which were in the form of terraces, were covered with ſpectators, and eſpecially women, moſt of them with lamps and torches, to light the proceſſion, which almoſt always began its march at night, halting in the ſquares and public places, to make libations, and to offer up victims in honour of Bacchus. The day was conſecrated to different games. The company repaired early to the theatre, either to be preſent at the competitions in muſic and dancing between the choruſſes, or to ſee the new pieces, which the poets had prepared for the occaſion. The firſt of the nine archons preſided at theſe feſtivals; the ſecond at other ſolemnities; and both had ſubordinate officers to relieve them in their functions, and alſo guards to drive all perſons from the theatre, or other ſpectacles, who occaſioned any diſturbance. As long as theſe feſtivals continued, the leaſt violence done to a citizen was criminal, and no creditor was allowed to proſecute his debtor. All crimes and diſorders committed at this time were ſeverely puniſhed on the ſucceeding days. Anacharſis, vol. ii.

On occaſions of this kind, the Heathens worſhipped with divine honour thoſe parts of the body, which are the inſtruments of exciting and gratifying the moſt impure paſſions. The figures of them, as we have obſerved above, were carried about in ſome of their ſacred proceſſions, to which hymns were ſung, and religious veneration paid. Concerning the obſcenities in their ſacred rites and ceremonies, Arnobius, who had himſelf been a learned Pagan, treats largely. (Adverſ. Gent. l. v. p. 168, 169, &c. Ed. Varior. Lugd. Bat. 1651.) to which may be added what Clemens Alexandrinus relates concerning the ſacred cheſt or coffer of Bacchus, and its impure contents, which were propoſed to veneration. (Clem. Alex. Protrept. p 16. Ed. Potter.) See alſo what Auſtin ſays from Varro, which delicacy forbids us to tranſlate. "De turpitudine ſacrorum quæ Libero celebrantur. In Italiæ compitis quæ dicit (Varro) ſacra Liberi celebrata cum tantâ licentiâ turpitudinis, ut in ejus honorem pudenda virilia colerentur. Nam hoc turpe membrum, per Liberi dies feſtos cum honore magno plaſtellis impoſitum, priùs vere in compitis, et uſque in urbem poſtea vectabatur. In oppido autem Lavinio Libero totus menſis tribuebatur, cujus diebus omnis verbis flagitioſiſſimis uterentur, donec illud membrum per forum tranſvectum eſſet, atque in loco ſuo quieſcerit. Cui membro inhoneſto matrem familias honeſtiſſimam palàm coronam neceſſe erat imponere." Auguſtin. De Civ. Dei, l. vii. c. 21, p. 136. Ed. Bened.

DIONYSIACA, in *Antiquity*, was a deſignation given to plays and all manner of ſports acted on the ſtage; becauſe play-houſes were dedicated to Dionyſius, *i. e.* Bacchus and Venus, as being the deities of ſports and pleaſure. Potter, Archæol. Græc. lib. i. cap. viii. tom. i. p. 41.

DIONYSIADES INSULÆ, in *Ancient Geography*, iſlands mentioned by Diodorus Siculus, and placed by him in the vicinity of that of Candia, in the gulf *Didymus*.

DIONYSIAN, or VICTORIAN PERIOD. See CYCLE, and PERIOD.

DIONYSIANA, in *Ancient Geography*, a town of Africa, in the Bizacian territory.

DIONYSIAS, a town of Egypt, ſituated near the lake Mœris.

DIONYSIAS, in *Botany*, from Διονυσος, *Bacchus*, is not only an appellation of the Ivy, ſacred to him, but has been given to the *Hypericum Androſæmum*, or Tutſan, by ſome writers, who are generally conſidered, in that inſtance at leaſt, as incorrect.

DIONYSII PROMONTORIUM, in *Ancient Geography*, a mountain of Spain, on the ſea of Iberia, acccording to the Argonautics of Orpheus.

DIONYSIUS I. in *Biography*, king of Syracuſe, was raiſed to that high rank, from the ſtate of ſimple citizen. He was ſon-in-law to Hermocrates, who, having been baniſhed by an adverſe party, attempted to return by force of arms, and was killed in the action. Dionyſius was dangerouſly wounded, but he recovered, and was afterwards recalled. In time he procured himſelf to be nominated one of the generals, and under pretence of raiſing a force ſufficient to reſiſt the Carthaginians, obtained a decree for recalling all the exiles. He was ſoon called to take the chief command. His firſt act was to double the ſoldier's pay, and pretending that his life was in danger, he was allowed a body guard, which he took care to ſelect from thoſe moſt devoted to his ſervice. His courſe was now clear; and in the 25th year of his

age about 404 B. C. he aſſumed the title of king of Syracuſe. His reign was not without trouble: in an expedition againſt the Carthaginians, he was deſerted by his own cavalry, who fled back to the city, and made themſelves maſters of the citadel and of his treaſures. Apprized of their plans, he followed them with great celerity, got poſſeſſion of the citadel, and took a ſpeedy and ſevere revenge. He now made peace with the Carthaginians, and employed himſelf in fortifying the city, after which he made an expedition againſt ſome of the free ſtates of Sicily; and in time he became maſter of the whole iſland, and then ſet about expelling the Carthaginians from all their remaining poſſeſſions in Sicily. With this view he ſpared no expence; inviting all the beſt artificers from Greece and Italy, whom he treated with a liberality truly worthy of his high rank. He fitted out a great fleet and rendered himſelf very popular among his own ſubjects. War was now declared againſt the Carthaginians, and carried on for ſome years with various ſucceſs: during the conteſt, Polyxenus, who had married Theſta, the ſiſter of Dionyſius, declared againſt the king, and when he was beaten and obliged to retire, Dionyſius ſent for his ſiſter, inſiſting upon her diſcovering whither Polyxenus had fled. "Do you ſuppoſe me," ſaid Theſta with a noble mind, "ſo bad a wife as not to have accompanied my huſband had I been aware of his departure? If I had been acquainted with his deſign, I ſhould have never informed you of it, but ſhould have ſhared all hazards with him, and have thought myſelf more honoured in being called the wife of Polyxenus the exile, than ſiſter of Dionyſius the tyrant." The king forgave her freedom, and the Syracuſans ſo much honoured her conjugal fidelity, that after the abolition of the tyranny, they continued, during her life, to treat her with all the honours of her rank, and beſtowed a public funeral upon her at her deceaſe. The Carthaginians were at length ſo much reduced by defeats and ſickneſs, that they were glad to obtain permiſſion to quit the iſland. Dionyſius afterwards carried his arms into Italy, beſieged and took Rhegium, and ſold all his captives for ſlaves. His conduct towards Phyto, the commander, was worthy only of a cruel tyrant, a character which in many reſpects he deſerved, as well for his actions, as for the mode by which he attained the ſovereignty: the ſon of Phyto he cauſed to be thrown into the ſea, and the father he firſt treated with every indignity, and then put to death. Dionyſius was not leſs ambitious of being eſteemed learned, than he was of being poſſeſſed of the ſupreme power. He wiſhed to be regarded as a poet, an honour which no doubt was readily conferred upon him by ſervile flatterers, but Philoxenus ſpoke freely of the merit of the verſes of his royal maſter; and as a reward for his integrity, was committed to priſon. Dionyſius, however, liberated him the next day, and then inviting him to a ſplendid entertainment, read ſome other verſes, which he thought would not fail of the poet's approbation: in this however he was diſappointed. Philoxenus, when he had heard the lines, turned to the guards, and deſired them to carry him back to the priſon: the king, no doubt, mortified at the incivility which was offered him, had the moderation and good ſenſe to pardon it. Dionyſius next ſent his brother in his own name, and with his own productions, to contend at the Olympic games for the prize awarded to the beſt written poetry; the brother, it was admitted, did his part; but the verſes were received with the utmoſt ridicule: and Lyſias, the orator, pronounced an harangue, proving that it was diſhonourable for Greece to ſuffer an impious tyrant to ſhare in the ſolemnities of a ſacred entertainment. Dionyſius, however, made a ſecond attempt, and meeting with no better ſucceſs, he fell into a phrenetical melancholy. He vented his firſt rage on his own friends, and then attempted to divert his chagrin by a public war, which proved unſucceſsful, and he was obliged to conclude a peace on very unfavourable terms. Dionyſius, after the death of his firſt wife, married two others at once, *viz* Doris, a Locrian, and Ariſtomache, the ſiſter of Dion: he treated them with impartiality, and had children by both. His relation Dion reproved him with moderation, and, in order to improve his mind and temper, perſuaded him to invite Plato to his court; but the diſcourſes of the philoſopher were ill adapted to the irritated mind of the tyrant, and he was ſent back in diſgrace. It is even ſaid that he directed the owner of the veſſel to ſell Plato for a ſlave, obſerving that according to his doctrine, no injury could be done him, ſince a virtuous man muſt be happy in every ſtate: ſuch was the apology which he was willing to offer for the injuſtice that he was anxious to commit. As he advanced in years, he became the moſt ſuſpicious of tyrants: he confided in no one: the moſt intimate of his wives' relations, and their neareſt friends, were never permitted to enter the palace without being previouſly ſearched, and the king himſelf ſlept in a bed chamber ſurrounded by a deep ditch, with a drawbridge. It is recorded of Dionyſius that he obliged the ſervile courtier Damocles to partake of a ſplendid feaſt, while a naked ſword was ſuſpended by a ſingle hair over his head. In the year 366 B. C. a tragedy of his was acted, and to it was awarded the prize: this ſo elated the king, that he offered a ſolemn ſacrifice, feaſted all his ſubjects, and drank himſelf ſo much to exceſs, as to be the cauſe of his death, which happened in the thirty-eighth year of his reign. Univer. Hiſt.

Dionysius II. ſon of the preceding, ſucceeded peaceably to his authority, but he was ſoon plunged into the debaucheries of a court, and it required all the influence of his uncle Dion, aided by the leſſons of Plato, to recal him to ſobriety. He then ſeemed to imbibe the true principles of philoſophy, and to enter ſo much into their ſpirit, as to conſider the cares of government a curſe rather than a bleſſing. The courtiers gained an aſcendancy over the young king, and ſucceeded in driving from his preſence Dion and Plato. The latter was exhorted to return, to which he conſented, and Dionyſius received him in the moſt honourable manner: their friendſhip did not long continue, and Plato again left the court, upon which Dionyſius abandoned himſelf to every ſpecies of exceſs and tyranny. While Dionyſius was abſent in Italy, Dion landed in Sicily, took poſſeſſion of Syracuſe, from which the king was unable to expel him till after the aſſaſſination of Dion, and Sicily itſelf had been the prey of different factions and tyrants. In the year 350 B. C. he re-aſcended the throne, but his paſt misfortunes did not produce any real effect on the mind of the monarch: the evils which he had ſuffered in his own perſon from the violence of party, exaſperated his temper, and rendered him more a tyrant. At length driven to retirement by Timoleon, he went to Corinth, where he kept low company, and indulged in groſs debauchery. He took upon himſelf to direct the performances of the theatre, and diſplayed ſome ſkill in muſic. Some writers have aſſerted that he was obliged, for a maintenance, to open a ſchool at Corinth; but this is not mentioned by Plutarch, and is probably not entitled to credit. Neither the time nor the place of his death is known. In his fallen ſtate he was liable to the reproaches and ſarcaſms of the witty: to one who aſked what he had gained by the wiſdom of Plato, he replied, "The ability to bear as I do this change of fortune." Plutarch. Univer. Hiſt.

Dionysius of Halicarnaſſus, an hiſtorian and critic, ſon of Alexander, was a native of Halicarnaſſus, in Caria.

Caria. He came to Rome B. C. 30, and paſſed more than twenty years in that capital. Here he employed himſelf in ſtudying the Latin language, in converſing with men of learning, and in carefully peruſing the ancient Roman hiſtorians. From their works he compiled his "Roman Antiquities," in which the hiſtory of the city was brought down to the firſt Punic war. This work originally conſiſted of twenty books, of which eleven only have come down to us. Dionyſius wrote alſo on rhetorical and critical ſubjects, and his "Compariſons of ſome Ancient Hiſtorians" and "Treatiſe on the Structure of Language," are well known to the moderns. The ſtyle of this writer is flat and languid, but he is regarded as an accurate hiſtorian, and judicious in his narratives. Moreri.

Dionysius, called the *Areopagite*, from his being a member of the court of Areopagus, at Athens, was probably born in that city, and was converted to Chriſtianity by St. Paul's preaching. (See Acts, xvii. 34.) His literary acquirements at Athens and at Heliopolis, in Syria, are ſaid to have been conſiderable, and we may infer from the ſtation which he occupied that his character was reſpectable. Tradition reports that he was the firſt biſhop of Athens, appointed to that office by the apoſtle Paul; and that he was one of the early Chriſtians, who ſuffered martyrdom, probably under Domitian. Several works have been aſcribed to Dionyſius, which were printed at Cologne in the year 1536, and which have been frequently reprinted with various commentaries. The moſt complete editions are thoſe of Antwerp, in 1634, and of Paris, in 1644, both in two volumes folio. It is now, however, the general opinion of learned men, that they are ſpurious, though they differ in opinion concerning the time when they were written. The opinion moſt generally received is, that they were written in the latter part of the fifth, or the beginning of the ſixth century. James Baſnage aſſerts, that the author of theſe works mentions no books of the Old Teſtament but thoſe of the Jewiſh canon; and it it is plain that one of thoſe books is the Song of Songs. Daillé ſays, that he omits no ſacred book, either of the Old or New Teſtament; however "the beloved diſciple" alone is expreſsly mentioned. It is manifeſt, that the author received the Revelation; and it is probable, that he thought St. John's Goſpel to be the laſt written book of the New Teſtament, it being mentioned laſt, and next after the book of Revelation. Fab. Bib. Gr. T. v. Cave's H. L. vol. i. Lardner's Works, vol. ii. iii. and v.

Dionysius, biſhop of Corinth, flouriſhed under the emperors Marcus Antoninus and Commodus, about the year 170. Some have aſſerted, but without ſufficient authority, that he was a martyr. St. Jerom repreſents him as a man of great eloquence and induſtry, and he appears to have been actuated in a very eminent degree by a truly Chriſtian ſpirit. Deſirous of extending his uſefulneſs beyond the limits of his own eccleſiaſtical charge, he addreſſed epiſtles to Chriſtian churches in different provinces of the Roman empire, with a view of confirming them in the faith, and guarding them againſt noxious errors. Of theſe epiſtles we have remaining only ſome fragments cited by Euſebius; but theſe ſeem to evince the genuineneſs of the Chriſtian ſcriptures, and to pourtray the judgment, candour, and peaceable ſpirit of the author. Cave's H. L. vol. i. Lardner's Works, vol. ii.

Dionysius, biſhop and probably native of Alexandria, ſucceeded Heraclas in the chair of the catechetical ſchool of that city, A.D. 231 or 232, and upon his death was choſen biſhop in his room, A.D. 247 or 248. He died in the 12th year of the emperor Gallienus, in the year of Chriſt 264 or 265. Dionyſius was deſcended from a Gentile family of rank and wealth; and after his converſion to the Chriſtian faith, became a diſciple of Origen, and was afterwards numbered among his moſt diſtinguiſhed ſcholars. The period of his epiſcopate was peculiarly trying and difficult, but ſuch was his prudence, that he conducted himſelf in ſuch a manner as to cloſe life with reputation. During this period there happened the two perſecutions of Decius and Valerian, beſide a peſtilence that ravaged the whole Roman empire, and other public calamities, together with ſome private commotions, in which Alexandria was concerned. It was alſo at this time that the Chriſtian church was agitated by the controverſies about Novatianiſm, the Millennium, the baptiſm of heretics, and the doctrine of the Trinity, in all which Dionyſius ſignalized himſelf by his learning, zeal, moderation, and prudence. Soon after Decius's edict of perſecution, which was publiſhed at Alexandria in the beginning of the year 250, Dionyſius was ſeized by order of Sabinus, prefect of Egypt, and committed to cuſtody at Tapoſyris, a ſmall village in that part of Egypt called Mareotis. But being reſcued from this confinement, he retired to a deſert part of Libya till the termination of this perſecution, when he returned to his charge at Alexandria ſome time in the year 251.

Soon after the commencement of the perſecution under Valerian and his ſon Gallienus, before the end of the year 257, Dionyſius was ſummoned before Emilian, then prefect of Egypt; who required him to renounce the Chriſtian religion; but to this authoritative mandate the biſhop replied, without heſitation, that *we ought to obey God rather than man* (Acts, v. 29.), and aſſured the prefect, that he was a worſhipper of the one God, and could worſhip no other, nor could he ever ceaſe to be a Chriſtian. Upon which he ordered Dionyſius and his aſſociates to a place called Cephro, in Libya, under a ſtrict prohibition that they ſhould not hold any aſſemblies. During his exile, he retained a tender affection and concern for his people, and exerciſed his miniſtry among thoſe who were his companions in tribulation. In this ſtate of baniſhment he continued about two or three years; and in the year 261, he returned to his people at Alexandria, among whom he officiated to their great ſatisfaction and profit. But the peace of this city was of ſhort duration; for it was again afflicted with ſedition and war, and then with peſtilence. In theſe diſtreſſing ſcenes, Dionyſius exhibited an admirable example of fortitude, piety, and humility, and of zeal in promoting the edification and tranquillity of the Chriſtian church. Of the numerous epiſtles and treatiſes which were written by him, we have remaining only one entire epiſtle, and conſiderable fragments of others preſerved by Euſebius. In the controverſies of his time, Dionyſius ſeems to have taken an active part. He ſtrongly oppoſed the opinion of Novatian on the ſubject of repentance, and the treatment of lapſed Chriſtians. He was alſo adverſe to the groſs notions of the millennium, that prevailed in ſome parts of Egypt; and he endeavoured to appeaſe the contentions that ſubſiſted between Stephen biſhop of Rome, and Cyprian biſhop of Carthage; and the letters which he wrote on this occaſion manifeſt an excellent ſpirit of candour and Chriſtian charity. He wrote alſo againſt the doctrine of Sabellius concerning the Trinity, and againſt Paul of Samoſata, whoſe peculiar opinions will appear under their reſpective articles. Dionyſius's own opinion, with regard to the Trinity, ſeems to have been much the ſame with that of Arius. Euſebius's E. H. l. vi. and vii. Cave's Hiſt. vol. i. Fab. Bib. Græc. T. v. Lardner's Works, vol. iii.

Dionysius, pope, or biſhop of Rome, was advanced from the office of preſbyter to the epiſcopal dignity in this city, July 22, A.D. 259, and died December 26th, A.D. 269.

269. About the commencement of his epiſcopate, in the year of our Lord 260, or 261, the Chriſtians at Cæſarea, in Cappadocia, were reduced to great diſtreſs by the invaſion of ſome barbarous people; upon which this good biſhop wrote them a letter of ſympathy and comfort, and ſent ſome perſons to redeem ſuch of the brethren as had been taken captive. This benefit was long held in grateful remembrance at Cæſarea. Dionyſius was a writer in the Sabellian controverſy, and correſponded with his name-ſake of Alexandria on this ſubject. A large fragment of what he wrote on this point remains cited in a work of Athanaſius. He alſo addreſſed a letter to the biſhop of Alexandria upon the queſtion of the baptiſm of heretics. The decretal epiſtles that have been aſcribed to him are allowed to be ſpurious, nor does any thing of his genuine writings remain beſide the fragments above-mentioned. Euſebius and Baſil repreſent him as a perſon of great learning and perſonal merit. From the fragments that remain of his writings, it ſufficiently appears that he concurred with other Chriſtians of that time in acknowledging the divine ſcriptures, contained in the Old and New Teſtaments, to be the rule of faith by which all doctrines were to be tried. Euſebius's E. H. l. vii. c. 7. Cave's H. L. Lardner's Works, vol. iii.

Dionysius, ſurnamed *Exiguus*, or the Little, on account of his ſhort ſtature, was a native of Scythia, flouriſhed under Juſtinian towards the beginning of the ſixth century, and died, according to Cave, before the year 556, or, according to Blair's Tables, in the year 540. He was a monk and abbot of Rome, and an intimate friend of Caſſiodorus, who extols his learning and character. This writer informs us that he was a complete maſter of the Greek and Roman languages, that he had diligently ſtudied the ſcriptures, and that he was eminently diſtinguiſhed by a combination of great wiſdom, learning, and eloquence, with the moſt amiable virtues. His works, recited by Cave (ubi infra) were numerous; and he is ſaid to have been the author of the vulgar Chriſtian *epocha* (which ſee), and to have invented the *Cycle* of Eaſter (which alſo ſee), aſcribed by others to Victor, or Victorinus. Cave's H. L. vol. i. p. 513.

Dionysius, a Greek poet and muſician, author of the words and muſic of three hymns, of which the firſt is addreſſed to Caliiope, the ſecond to Apollo, and the third to Nemeſis. Of theſe the muſic has been preſerved and publiſhed by Dr. Fell, biſhop of Oxford, in 1672. This precious manuſcript, which was found in Ireland, among the papers of the famous archbiſhop Uſher, was bought, after his deceaſe, by Mr. Bernard, fellow of St. John's college, who communicated it to the editor, together with remarks and illuſtrations by the reverend Mr. Edmund Chilmead, of Chriſt-church, who likewiſe reduced the ancient muſical characters to thoſe in common uſe. It appears by the notes, that the muſic of theſe hymns was compoſed in the Lydian mode, and diatonic genus.

Vincenzo Galilei, father of the great Galileo, firſt publiſhed theſe hymns, with their Greek notes, in his "Dialogues upon Ancient and Modern Muſic," printed at Florence, 1581, folio. He aſſures us, that he had them from a Florentine gentleman, who copied them very accurately from an ancient Greek manuſcript, preſerved in the library of cardinal St. Angelo, at Rome, which MS. likewiſe contained the treatiſes of muſic by Ariſtides Quintilianus, and Bryennius, ſince publiſhed by Meibomius and Dr. Wallis. The Florentine edition of theſe hymns entirely agrees with that printed at Oxford. In 1602, Hercules Bottrigari mentioned the ſame hymns in his harmonical diſcourſe, called "Melone," printed at Ferrara, in 4to. But he derived his knowledge of theſe pieces only from the Dialogues of Galilei; however, he inſerted, in the beginning of his book, ſome fragments of them in common notes; but they were diſfigured by a number of typographical errors.

At length, in the year 1720, M. Burette publiſhed theſe three hymns in the "Memoirs of the Academy des Inſcriptions," tome v. from a copy found at the end of a Greek manuſcript in the king of France's library at Paris, No. 3221, which likewiſe contained the muſical treatiſes of Ariſtides Quintilianus, and of Bacchius ſenior. But though the words were confuſed, and confounded one with another, they appeared much more complete in this manuſcript than elſewhere, particularly the hymn to Apollo, which had ſix verſes more at the beginning; and that to Nemeſis, which, though deficient at the end in all the other editions, was here entire, having fourteen verſes, excluſive of the ſix firſt.

We have been the more ſolicitous to trace the manner in which theſe curious fragments were diſcovered, in order to afford our readers all poſſible ſatisfaction with regard to their authenticity; indeed they have been ſifted, collated, and corrected by the moſt able critics in the Greek language, as well as the moſt ſkilful muſicians of the two laſt centuries. M. Burette has publiſhed the muſic to theſe hymns, in the Memoirs of the Academy des Inſcriptions, tome v. and Dr. Burney, in the firſt volume of his "General Hiſtory of Muſic," has had this muſic engraved both in ancient and modern notation.

Dionysius *Halicarnaſſenſis*, junior, flouriſhed, according to Suidas, under the emperor Adrian, and wrote twenty-ſix books of the "Hiſtory of Muſicians," in which he celebrated not only the great performers on the flute and cithara, but thoſe who had riſen to eminence by every ſpecies of poetry. He was, likewiſe, author of five books, written in defence of muſic, and chiefly in refutation of what is alleged againſt it in Plato's Republic. Ariſtides Quintilianus has alſo endeavoured to ſoften the ſeverity of ſome animadverſions againſt muſic in the writings of Cicero; but though time has ſpared the defence of this author, yet it does not indemnify us for the loſs of that which Dionyſius junior left behind him; as teſtimonies are ſtill remaining of his having been a much more able writer than Ariſt. Quintilianus.

The loſs of the entire works of this writer is ſeverely felt by all muſical hiſtorians, but particularly by thoſe who ſeek information concerning the muſic and muſicians of the ancient Greeks.

Dionysius, *Ear of*, in *Geography*, a large cavern in the iſland of Sicily, cut horizontally into a rock, 72 feet high, 27 broad, and 219 in depth; the entrance of which reſembles the ſhape of an ear, and the inſide ſomewhat the form of the letter S. On the top of the cave there is a groove, which runs from one end to the other, and has communication with a ſmall room at the entrance, now inacceſſible, by reaſon of the height and ſteepneſs of the rock. This is imagined to have been a guard-room, where the tyrant placed a centinel, who, by hearing every the leaſt whiſper of the priſoners within, made his report accordingly to his maſter. Mr. Brydone, in his Travels, gives to the cave the exact form of the human ear, but aſſigns to it larger dimenſions than thoſe above ſtated from Sandwich's "Voyage round the Mediterranean." Some, among later travellers, deny the exiſtence of any other than a rude or fancied reſemblance in the cave to the ſtructure of the ear, and deride the idea of ſuch a deſign in its original formation. Lord Sandwich ſuppoſes this cavern to be the "Latumiæ Syracuſanæ" mentioned by Cicero; but moſt other travellers agree, that the immenſe cavern, which has been converted into a ſubterraneous garden, and belongs to the convent of the capuchins, was the "Latumiæ" to which Cicero alluded.

DIONYSOPOLIS, in *Ancient Geography*, a town of the Hither India, according to Ptolemy, who adds, that it was alſo called *Nagara*. Arrian places it between the Indus and the Cophenes. It was the *Nyſa* of Alexander, and the modern *Nughz*, or *Nagaz*.—Alſo, a town of Lower Mœſia, in the vicinity of the Euxine ſea. Pliny ſays, that it was alſo called *Crunos*; but Pomponius Mela ſays, that Crunos was the name of the port of Dionyſopolis. It is ſaid to have had this name from a ſtatue of Bacchus, which was carried by ſea to this place.—Alſo, an epiſcopal town of Aſia, in the ſecond Pacatian Phrygia; founded by Eumenes and Attalus, who found in this place a ſtatue of Bacchus. Steph. Byz.

DIOPA, or DIONE, a town of the Peloponneſus, in Arcadia.

DIOPHANTINE PROBLEMS, ſo called from the inventor, Diophantus, a ſpecies of indeterminate problems relating to ſquare and cube numbers, and often admitting a variety of anſwers. The ſolution of them depends,

1. On aſſuming ſuitable poſitions to denote the number ſought.

2. On making the propoſed expreſſion a ſquare.

3. Or, on making two propoſed expreſſions ſquares, &c. called the reſolving of a duplicate equality.

Theſe problems ſeldom involve equations of a high order; nevertheleſs, it is extremely difficult to give any general rules by which their ſolution can, with certainty, and in all caſes, be effected.

Yet it will be found, that there are two or three very general principles, on a due application of which the ſolution of almoſt all of them, in great meaſure, depends: theſe are,

1. To reſolve a *ſingle equality*, or to make an expreſſion a ſquare, which is fully illuſtrated in Prob. I. and Art. 30.

2. To find the ſides of whatever right-angled triangles may be required: this is founded on Euc. 47. 1, and is fully illuſtrated in Prob. VII. and the following ones, and forms a tranſition to the

3d Principle. To reſolve a duplicate equality, or to make two given expreſſions ſquares, ſee Prob. XI. &c. and Art. 30, and Edingb. Tranſ. vol. ii. p. 194. This is of very extenſive application, and is the foundation of the

4th Principle. To reſolve two given ſquares into as many other pairs of ſquares as may be required, ſee Prob. XX. and Art. 30. It may be diſtinguiſhed by the name of the variation principle, and may be ſolved, likewiſe, as follows:

Let a^2 and b^2 be the given ſquares, and x^2 and y^2 the required ones. Then $a^2 + b^2 = x^2 + y^2$, or $x^2 = -a^2 - b^2 + y^2$, or $\overline{x+a} \times \overline{x-a} = \overline{b+y} \times \overline{b-y}$, or $\overline{x+a} \times \overline{mx-ma} = \overline{b+y} \times \overline{mb-my}$. Now, if $x + a = mb - my$, then $\overline{mx - ma} = b + y$, or $x - a = \frac{b+y}{m}$, and $x = \frac{b+y+ma}{m}$; whence $\frac{b+y+ma}{m} = mb - my - a$, or $b + y + ma = m^2 b - m^2 y - ma$, or $m^2 y + y = m^2 b - 2ma - b$, and $y = \frac{m^2 b - 2ma - b}{m^2 + 1}$, and $x = \frac{m^2 a + 2mb - a}{m^2 + 1}$.

Cor. 1. If $b = 0$, or one ſquare a^2 be to be divided into two others, we have $x = \frac{m^2 a - a}{m^2 + 1}$, and $y = \frac{-2ma}{m^2 + 1}$, or $\frac{2ma}{m^2 + 1}$, which is Prob. VIII.

PROBLEM I.

To make a Propoſed Expreſſion a Square.

Rule.—Aſſume a ſuitable ſide for it, and make its ſecond power equal to the propoſed expreſſion.

Examples.

1. Required ſuch a value of n, that $n^2 + 1$ may be a ſquare.

Aſſume $n^2 + 1 = \overline{nz - 1}^2 = n^2 + 2nz + z^2$ = a ſquare; then $2nz = z^2 - 1$, and $n = \frac{z^2 - 1}{2z}$, and z may be any number greater than 1.

If $z = 2$; $n = \frac{3}{4}$, and $n^2 + 1 = \frac{9}{16} + \frac{16}{16} = \frac{25}{16}$ = a ſquare.

If $z = 3$, $n = \frac{8}{6}$, and $n^2 + 1 = \frac{64}{36} + \frac{36}{36} = \frac{100}{36}$ = a ſquare, &c. &c. Hence we may find as many right-angled triangles as we pleaſe, all having 1 for their baſe.

2. Required x when $x^2 + x$ is a ſquare.

Aſſume $x^2 + x = \overline{x - z}^2 = x^2 + 2xz + z^2$, then $2xz + x = z^2$, and $x = \frac{z^2}{2z + 1}$.

If $z = 1$, $x = \frac{1}{3}$, and $x^2 + x = \frac{1}{9} + \frac{3}{9} = \frac{4}{9}$ = a ſquare.

If $z = 2$, x is $= \frac{4}{5}$, and $x^2 + x = \frac{16}{25} + \frac{20}{25} = \frac{36}{25}$ = a ſquare, &c.

3. Find an integral value of x, ſuch that $16x^2 + x - 1$ may be a ſquare.

Aſſume $16x^2 + x - 1 = \overline{4x - a}^2 = 16x^2 - 8ax + a^2$, $8ax + x = a^2 + 1$, and $x = \frac{a^2 + 1}{8a + 1} = \frac{2}{9}, \frac{5}{17}$, or $\frac{2}{5}, \frac{17}{33}, \frac{26}{41}, \frac{37}{49}, \frac{50}{57}, \frac{65}{65} = 1$.

Anſ. If $a = 16$, $x = \frac{257}{129}$ almoſt 2.

4. Make $2x^2 - 2x + 1$, a ſquare.

Aſſume $2x^2 - 2x + 1 = \overline{2ax - 1}^2 = 4a^2x^2 - 4ax + 1$, then $2x - 2 = 4a^2 x - 4a$, or $4a^2 x - 2x = 4a - 2$, and $x = \frac{2a - 1}{2a^2 - 1} = 1 \cdot \frac{3}{7}, \frac{5}{17}$, &c.; if $a = \frac{3}{4}$ x is $= 4$, and the given expreſſion $= 25$, &c.

5. Find a value of y, ſuch as may make $3y^2 + 12y + 9$, a ſquare.

Aſſume $3y^2 + 12y + 9 = \overline{3y - 3}^2 = 9y^2 - 18y + 9$, then $3y + 12 = 9y - 18 \cdot 6y = 30$, and $y = 5 \therefore 144$ = ſquare required.

6. Given $\sqrt{7z^2 + 1} = m$, to find m a whole number.

Since $7z^2 + 1 = m^2$, m is leſs than $3z$. Aſſume $7z^2 + 1 = \overline{3z - a}^2 = 9z^2 - 6az + a^2$, $2z^2 - 6az = -a^2 + 1$; $z^2 - 3az = \frac{-a^2 + 1}{z}$; $z^2 - 3az + \frac{9a^2}{4} = \frac{7a^2 + 2}{4}$, and $z = \frac{3a + \sqrt{7a^2 + 2}}{2}$. If $a = 1$, $z = 3$, and $m = 8$.

7. Required a rational value of $\sqrt{v^4 - 2}$.

Aſſume $v^4 - 2 = \overline{v^2 - a^2}^2 = v^4 - 2a^2 v^2 + a^4$, $2a^2 v^2 = a^4 + 2$; $v^2 = \frac{a^4 + 2}{2a^2} = \frac{2a^4 + 4}{4a^2}$. Here $2a^4 + 4$ muſt

be made a ſquare, ſuppoſe $\overline{2 + a^2 b^2}|^2 = 4 + 4 a^2 b^2 + a^4 b^4$, or $2 a^2 = 4 b^2 + a^2 b^4$, $2 a^2 - a^2 b^4 = 4 b^2$, and $a^2 = \frac{4 b^2}{2 - b^4}$ = a ſquare. If $b = 1$, then $a = 2$, $v = \frac{3}{2}$, $v^4 - 2 = \frac{81}{16} - \frac{32}{16} = \frac{49}{16}$, and $\sqrt{v^4 - 2} = \frac{7}{4}$.

8. Find ſuch a value of v as may make $\sqrt{2 - v^4}$ rational, v is leſs than 1.

Aſſume $v = 1 - a$, or $v^4 = 1 - 4a + 6a^2 - 4a^3 + a^4$, then $2 - v^4 = 1 + 4a - 6a^2 + 4a^3 - a^4$ = ſuppoſe $\overline{1 + 2a - 5a^2}|^2 = 1 + 4a - 6a^2 - 20a^3 + 25a^4$; or $25a^4 - 20a^3 = 4a^3 - a^4$; $26a = 24$, and $a = \frac{12}{13}$ $\therefore v = 1 - a = \frac{1}{13}$, and $\sqrt{2 - v^4} = \sqrt{\frac{57122 - 1}{28561}} = \frac{239}{169}$.

9. Make $2x^3 + 2x + 4$ a rational ſquare, when x is not $= \frac{1}{8}$.

Aſſume $2x^3 + 2x + 4 = \overline{2 + 2ax}|^2 = 4 + 8ax + 4a^2x^2$, $x^2 + 1 = 4a + 2a^2x$; $x^2 - 2a^2x = 4a - 1$; $x^2 - 2a^2x + a^4 = a^4 + 4a - 1$, and $x = a^2 + \sqrt{a^4 + 4a - 1}$. To make $a^4 + 4a - 1$ a ſquare, let $b = 4a - 1$, or $a = \frac{b + 1}{4}$, then $a^4 = \frac{b^4 + 4b^3 + 6b^2 + 4b + 1}{256}$, or $a^4 + 4a - 1 = \frac{b^4 + 4b^3 + 6b^2 + 260b + 1}{256}$ to be made a ſquare, ſuppoſe it $= \frac{\overline{1 + 130b - b^2}|^2}{16} = \frac{b^4 - 260b^3 + 16898b^2 + 260b + 1}{256}$, then $4b^3 + 6b^2 = 16898b^2 - 260b^3$, or $2b + 3 = 8449 - 130b$; $132b = 8446$, and $b = \frac{4223}{66}$ $\therefore a = \frac{b + 1}{4} = \frac{4289}{264}$, $x = 528$, and $2x^3 + 2x + 4 = 294396964 = \overline{17158}|^2$.

10. Find ſuch values of x and y, that $x^2 + ay^2 = b^2$ may be rational.

Aſſume $x = b - my$, or $x^2 = b^2 - 2bmy + m^2y^2$, then $b^2 - 2bmy + m^2y^2 + ay^2 = b^2$, or $m^2y^2 + ay^2 = 2bmy$, $m^2y + ay = 2bm$, and $y = \frac{2bm}{m^2 + a}$. But $x^2 = b^2 - ay^2$ $= b^2 - \frac{4b^2am^2}{\overline{a + m^2}|^2} = \frac{b^2 \times \overline{a + m^2}|^2 - 4am^2}{\overline{a + m^2}|^2} = \frac{b^2 \times a^2 - 2am^2 + m^4}{\overline{a + m^2}|^2}$, and $x = \pm \frac{b \cdot \overline{a - m^2}}{a + m^2} = b - my$ $= b - \frac{2bm^2}{a + m^2} = \frac{b \cdot a + m^2 - 2m^2}{a + m^2} = \frac{b \cdot \overline{a - m^2}}{a + m^2}$.

11. Make $1 + 2x - x^2 + x^3$ a ſquare.

Aſſume $\overline{1 + x}|^2 = 1 + 2x + x^2 = 1 + 2x - x^2 + x^3$, or $x^2 = x^3 - x^2$, $2x^2 = x^3$ and $x = 2$.

12. Make $4 + 6x - 5x^2 + 3x^3$ a ſquare.

Aſſume it $= \overline{2 + ax}|^2 = 4 + 4ax + a^2x^2$. Now to make the ſecond term vaniſh from each ſide, as well as the 1ſt, $4a$ muſt be $= 6$, or $a = \frac{3}{2}$. Then $\frac{9x^2}{4} = 3x^3 - 5x^2$, or, $\frac{29x^2}{4} = 3x^3$, and $x = \frac{29}{12}$, and the expreſſion $= \sqrt{\frac{8}{2} + \frac{29}{2} + \frac{29}{64}}^2 = \frac{45}{8} = 5\frac{5}{8} = \sqrt{\frac{18235}{576}} = \sqrt{\frac{2025}{64}}$.

13. Make $a^2 + bx + cx^2 + dx^3 + ex^4$ a ſquare. Aſſume it $= \overline{a + mx + nx^2}|^2 = a^2 + 2amx + \left.\begin{matrix}2an \\ m^2\end{matrix}\right\} x^2 + 2mnx^3 + n^2x^4$. Here $2am = b$, or $m = \frac{b}{2a}$, and $2an + m^2 = c$, or $n = \frac{c - m^2}{2a}$, then $dx^3 + ex^4 = 2mnx^3 + n^2x^4$: $d + ex = 2mn + n^2x$; $ex - n^2x = 2mn - d$, and $x = \frac{2mn - d}{e - n^2}$.

14. Make $a + ex^4$ a ſquare. Suppoſe one value of $x = n$, and $a + en^4 = s^2$. To find other values of x, put $x = n + y$, or $x^4 = n^4 + 4n^3y + 6n^2y^2 + 4ny^3 + y^4$, then $a + ex^4 = a + en^4 + 4en^3y + 6en^2y^2 + 4eny^3 + ey^4$, or writing s^2 for $a + en^4$, $s^2 = 4en^3y + 6en^2y^2 + 4eny^3 + ey^4$ is to be made a ſquare, as the 13th.

Prob. II.

15. To find two numbers, x and y, ſuch that $x^2 + y$ may be a ſquare, and $x + y$ its root. We have $x^2 + y = \overline{x + y}|^2 = x^2 + 2xy + y^2$, $y = 2xy + y^2$, $y + 2x = 1$, and $y = 1 - 2x$, where x may be any fraction leſs than $\frac{1}{2}$. Suppoſe $x = \frac{1}{3}$, then $y = \frac{1}{3}$, $x^2 + y = \frac{4}{9}$, and $x + y = \frac{2}{3}$ its root, if $x = \frac{2}{5}$, $y = \frac{1}{5}$, $x^2 + y = \frac{9}{25}$, and $x + y = \frac{3}{5}$, &c. &c.

Prob. III.

16. To find two numbers, x and y, ſuch that $x + y$ may be a ſquare, and $x^2 + y$ its root.

Let $x^2 + y = nx$, then $x + y = n^2x^2$, whence $y = n^2x^2 - x = nx - x^2$, $n^2x + x = n + 1$, and $x = \frac{n + 1}{n^2 + 1}$, $y = \overline{n - x} \cdot x$, ſuppoſe $n = 2$, $x = \frac{3}{5}$, $y = \frac{21}{25}$, and $x + y = \frac{36}{25}$, and $x^2 + y = \frac{36}{25} = \frac{6}{5}$.

Prob. IV.

17. To find a number which being divided into any two parts, x and y, $x^2 + y$ may be always equal to $y^2 + x$.

1. Let az and bz denote the required parts, then $a^2z^2 + bz = az + b^2z^2$; $a^2z + b = a + b^2z$, or $a^2z - b^2z = a - b$, and $z = \frac{a - b}{a^2 - b^2} = \frac{1}{a + b}$, and $az = \frac{a}{a + b}$ = one part, and $bz = \frac{b}{a + b}$ = the other part, and both added together = $\frac{a + b}{a + b} = 1$, the number required.

For let x and $1 - x$ be any two parts of 1. Then $x^2 + 1 - x = \overline{1 - x}|^2 + x = 1 - 2x + x^2$, or, 2d if $x^2 + y + x = y^2 + x$, or $x^2 - y^2 = x - y$, then $x + y = 1$.

To find two numbers, ſuch that their ſum being increaſed and leſſened either by their difference, or the difference of their ſquares, the ſums and remainders ſhall be all ſquares.

18. Let $25x^2$ be the ſum, and $24x^2$ the difference of the required numbers. Then $25x^2 \pm 24x^2$ are evidently ſquares.

More-

Moreover, $\frac{25x^2}{2} + \frac{24x^2}{2} = \frac{49x^2}{2}$ = greater number, and $\frac{x^2}{2}$ = leſs; the diff. of their ſquares is $\frac{2400x^4}{4} = 600x^4$.

The two remaining conditions are, that $25x^2 \pm 600x^4$ are to be ſquares. Divide by $25x^2$, then $1 \pm 24x^2$ are to be ſquares; firſt make $1 - 24x^2$ a ſquare: Aſſume $\overline{1 - ax}|^2 = 1 - 2ax + a^2x^2 = 1 - 24x^2$, or, $a^2x^2 + 24x^2 = 2ax$; $a^2x + 24x = 2a$, and $x = \frac{2a}{a^2 + 24}$ (if $a = 4$) $\frac{8}{40} = \frac{1}{5}$, and $x^2 = \frac{1}{25}$. Therefore, $\frac{49}{50}$, and $\frac{1}{50}$, are the numbers required.

Prob. V.

19. To find two ſquare numbers ſuch, that the ſum of them may be a ſquare, the difference of them a cube, and the roots of the ſquare and cube equal.

Since the ſum of the two numbers is to be a ſquare, let $9x^2$ and $16x^2$ denote the numbers ſought, then their ſum $25x^2$ is a ſquare, but their diff. $7x^2$ is to be a cube, and $5x = \overline{7x^2}|^{\frac{1}{3}}$ per the laſt condition of the queſtion. We have $125x^3 = 7x^2$, or $x = \frac{7}{125}$, $9x^2 = \frac{441}{15625}$, and $16x^2 = \frac{784}{15625}$ = the numbers required.

Prob. VI.

20. To find three numbers A, B, and C, ſuch that $A^2 + BC$, $B^2 + AC$, and $C^2 + AB$, may be all ſquares.

Let 1, $x-1$, and $4x$, denote the three numbers required; then the two firſt conditions are ſatisfied; for $A^2 + BC = 1 + 4x^2 + 4x = \overline{2x - 1}|^2$, and $B^2 + AC = \overline{x-1}|^2 + 4x = x^2 + 2x + 1 + 4x = \overline{x + 1}|^2$; ſo that we have only to make $C^2 + AB = 16x^2 + x - 1$ a ſquare.

Aſſume $\overline{4x - a}|^2 = 16x^2 - 8ax + a^2 = 16x^2 + x - 1$, or $8ax + x = a^2 + 1$, or $x = \frac{a^2 + 1}{8a + 1}$; and the three numbers are 1, $\frac{a^2 - 1}{8a + 1} - 1$, and $\frac{4 \cdot \overline{a^2 + 1}}{8a + 1}$; or in a common denominator $\frac{8a + 1}{8a + 1}$, $\frac{a^2 - 8a}{8a + 1}$, and $\frac{4 \cdot \overline{a^2 + 1}}{8a + 1}$. Or, $8a + 1$, $a^2 - 8a$, and $4 \cdot \overline{a^2 + 1}$, where a may be any number greater than 8. If $a = 9$, the numbers are 73, 9, and 328. If $a = 10$, the numbers are 81, 20, 404, &c. &c.

Prob. VII.

21. To find two ſquare integers, whoſe ſum may be a $\square$; or to find as many right-angled triangles, in whole numbers, as we pleaſe.

Take r and s, any two unequal numbers, r the greater; then make $\overline{r^2 - s^2}|^2 = r^4 - 2r^2s^2 + s^4$, and $\overline{2rs}|^2 = 4r^2s^2$, the ſquare number required. For their ſum is $r^4 + 2r^2s^2 + s^4 = \overline{r^2 + s^2}|^2$ = a ſquare.

Prob. VIII.

22. To divide a given ſquare C^2 into two other ſquares a^2 and b^2: or from a given hypothenuſe, to find the ſides of a right-angled triangle.

1. We have $C^2 - a^2 = b^2 = \square$, which put $= \overline{na - c}|^2 = n^2a^2 - 2nac + c^2$; then $c^2 = a^2 + b^2 = a^2 + n^2a^2 - 2nac + c^2$, or $2nac = n^2a^2 + a^2$; $2nc = n^2a + a = a \cdot \overline{n^2 + 1}$, and $a = \frac{2nc}{n^2 + 1}$; therefore, if a and n be rational, b will be ſo.

Ex. If $c = 5$, $n = 1$, then $a = 5$, and $b = 0$. If $c = 2$, $n = 3$, then $a = \frac{6}{5}$,

$n = 2$ $\quad a = 4$ $\quad b = 3$,
$n = 3$ $\quad a = 3$ $\quad b = 4$,
$n = 4$ $\quad a = \frac{40}{17}$ $\quad b = \frac{75}{17}$.

Or, thus:

2. Let C^2 = the given ſquare, a^2 one of its parts, and $c^2 - a^2$, the other to be made a ſquare. Aſſume it $= \overline{ra - c}|^2 = a^2r^2 - 2arc + c^2$; or, $2arc = r^2a^2 + a^2$, $2rc = r^2a + a$, and $a = \frac{2rc}{r + 1}$, as above.

Or, thus: 3. Let $\overline{sa}|^2 = s^2a^2$, and $\overline{ra - c}|^2 = r^2a^2 - 2arc + c^2$ be the two ſquares into which c^2 is to be reſolved. Then $c^2 - s^2a^2 = r^2a^2 - 2arc + c^2$; $2arc = r^2a^2 + s^2a^2$; $2rc = r^2a + s^2a$, and $a = \frac{2rc}{r^2 + s^2}$. $\therefore sa = \frac{2rsc}{r^2 + s^2}$ = the root of one of the ſquares ſought, and $ra - c = \frac{2r^2c}{r^2 + s^2} - \frac{c}{1} = \frac{2r^2c - r^2c - s^2c}{r^2 + s^2} = \frac{r^2c - s^2c}{r^2 + s^2}$ = root of the other.

1. Hence c, $\frac{2rsc}{r^2 + s^2}$, and $\frac{r^2c + s^2c}{r^2 + s^2}$ are the roots of three ſquares, of which the ſum of the two laſt ſquares is equal to the firſt, or the three roots are the ſides of a right-angled triangle, whoſe hypothenuſe is equal c.

2. If each of theſe ſides be multiplied by $r^2 + s^2$, we ſhall have $r^2c + s^2c$, $2rsc$, and $r^2c - s^2c$ for the three ſides of another triangle; or, by dividing each by c, we have $r^2 + s^2$, $2rs$, and $r^2 - s^2$.

Prob. IX.

23. To find two numbers whoſe ſum and difference may be both ſquares. If $r^2 + s^2$ be one of the numbers, and $2rs$ the other, the problem is ſolved. But $r^2 + s^2$ is equal the ſquare of the hypothenuſe of a right-angled triangle, and $2rs$ the double product of its ſides; therefore, the ſquare of the hypothenuſe $\pm$, the double product of its ſides, is always a ſquare.

Prob. X.

24. Given the difference of two ſquares to find the ſquares.

Rule.—Reſolve the given difference into any two factors, and the $\frac{1}{2}$ ſum of them is the root of the greater ſquare, and the $\frac{1}{2}$ difference the root of the leſſer. For $c^2 - a^2 = \overline{c + a} \cdot \overline{c - a}$.

Ex.—Find two ſquares whoſe difference may be 12. Factors 2 and 6, $\frac{1}{2}$ ſum 4, $\frac{1}{2}$ diff. 2. Or, factors 3 and 4, $\frac{1}{2}$ ſum $\frac{7}{2}$, $\frac{1}{2}$ diff. $\frac{1}{2}$, and $\frac{49}{4} - \frac{1}{4} = 12$.

Prob XI.

25. To reſolve a duplicate equality, or to make two propoſed expreſſions ſquares.

General Rule.

Reſolve the difference of the propoſed ſquares into two ſuch factors, that the ſquare of the $\frac{1}{2}$ ſum of them may be made

made equal to the greater ſquare, or the ſquare of their $\frac{1}{2}$ difference to the leſs.

Ob.—This problem differs from the laſt in having the propoſed ſquares limited in form or magnitude.

Examples.

Of the reſolution of a duplicate equality.

1. Find ſuch a value of x, that $x + 1$, and $x - 1$, may both be ſquares. The difference is 2. Factors 1 and 2, $\frac{1}{2}$ ſum $\frac{3}{2}$, $\frac{1}{2}$ diff. $\frac{1}{2}$ and $\frac{9}{4}$, $\frac{1}{4}$ the two ſquares, therefore $x = \frac{5}{4}$.

2. Find x when $x^2 + x$, and $x^2 - x$, are ſquares, their ſum is $2x^2$, we are to find two ſquares whoſe ſum is $2x^2$. But $\frac{x}{25} + \frac{49x^2}{25} = \frac{50x^2}{25}$. Put $x^2 - x = \frac{x^2}{25}$, or $x - 1 = \frac{x}{25}$, $24x = 25$, and $x = \frac{25}{24}$.

Or let c^2 = hypothenuſe, and p = double product of ſides, then $c^2 + p$ and $c^2 - p$ are ſquares (per 23.), conſequently $c^2 z^2 + p z^2$, and $c^2 z^2 - p z^2$ are ſquares. We have only to find ſuch a value of z, that $c^2 z^2$ may be = the ſquare of $p z^2$. Let $c z = p z^2$, and $z = \frac{c}{p}$; $z^2 = \frac{c^2}{p^2}$, and $p z^2 = \frac{c^2}{p} = x$ = the number required, *i. e.* the ſquare of any hypothenuſe divided by the double product of the ſides gives x.

As 3, 4, 5, gives $\frac{25}{24} = x$, 5, 12, 13, gives $\frac{169}{120}$, &c.

3. Make $2x^2 + 1$, and $4x + 1$, ſquares, while x has the ſame value in both. The difference is $2x^2 - 4x$, the factors $2x$ and $x - 2$, the difference $\frac{x}{2} + 1$. Put the leſs ſquare $4x + 1 = \overline{\frac{x}{2} + 1}^2 = \frac{x^2}{4} + x + 1$, or $16x = x^2 + 4x$, or $x = 12$, and the propoſed expreſſions are $289 = \overline{17}^2$ and 49.

4. Find ſuch a value of x, as may make $10 - 2x$, and $10 - x^2$ ſquares. Diff. $x^2 - 2x$. Factors x and $x - 2$. The $\frac{1}{2}$ diff. = 1 = leſs ſquare = $10 - x^2$, or $x = 3$. Or, $\frac{1}{2}$ ſum = $x - 1$, and $x^2 - 2x + 1 = 10 - 2x$, $x^2 = 9$, and $x = 3$.

5. To make $ax + c$, and $bx + d$ both ſquares, where a is greater than b, and the ſigns either + or −.

Rule. Let $q = \frac{b}{a - b}$. Mult. the diff. of the given ſquares by q, and ſubtract the prod. from the leſs ſquare. Call the remainder r. Then if r, or $\frac{-q}{r}$, be a ſquare, the duplicate equality is reſolvable: thus, find two ſquares m^2 and n^2, the diff. of which may be to the exceſs of the leſs above r as 1 : 9. When r is a ſquare, $\overline{y + \sqrt{r}}^2$ muſt be made equal to $n^2 = bx + d$, but when $\frac{-q}{r}$ is a ſquare, n^2 muſt be made equal to $bx + d$.

Ex.—Make $8x + 4$, and $6x + 4$ both ſquares; their difference is $2x$ and $q = 3$, product $6x$, and $r = 4$ a ſquare. Here $\overline{y + 2}^2 = n^2 = y^2 + 4y + 4$, or $n^2 - 4 = y^2 + 4y$ $\therefore m^2 - n^2 = \frac{y^2 + 4y}{3}$, and $m^2 = y^2 + 4y + 4 + \frac{y^2 + 4y}{3} = \frac{4y^2}{3} + \frac{16y}{3} + 4$; to avoid fractions multiply by 9, then $9m^2 = 12y^2 + 48y + 36$ or $\frac{9m^2}{4} = 3y^2 + 12y + 9$ to be made a ſquare: $y = 5$ $\therefore n^2 = 49 = 6x + 4$, and $x = \frac{45}{6}$ $\therefore 8x + 4 = 64$.

PROB. XII.

26. To find two numbers, A and B, ſuch that A + B, $A^2 + B$, and $B^2 + A$, may be all ſquares. Let $x = A$, $3x^2 = B$,

Then $A^2 + B = 4x^2$ is a ſquare.

But $A^2 + B = 3x^2 + x$,

And $B + A = 9x^4 + x$ are to be ſquares.

The difference is $9x^4 - 3x^2$. Factors $3x^2$ and $3x^2 - 1$, &c. $x = \frac{1}{6}$, $A = 3x^2 = \frac{1}{12} = B$.

PROB. XIII.

27. To find two numbers, A and B, ſuch that, A + 1, B + 1, A + B + 1, and A − B + 1, may be all ſquares.

1. Let $A = x^2 + 2x$, and $B = x^2 - 2x$, and the two firſt conditions are ſatisfied; but $2x^2 + 1$, and $4x + 1$, are alſo to be ſquares; (per XI. 3.) $x = 12$, $A = 168$, $B = 120$.

2. Let $A = 9x^2 + 6x$, $B = y^2 - 1$, then $A + B + 1 = 9x^2 + 6x + y^2$ = a ſquare is the third condition, ſuppoſe it $= z^2$; then $z^2 - y^2 = 9x^2 + 6x$. Factors x and $9x + 6$, $\frac{1}{2}$ diff. $= 4x + 3$; or $y^2 = 16x^2 + 24x + 9$; or $B = 16x^2 + 24x + 8$. But $B - A + 1 = 7x^2 + 18x + 9$ is alſo to be a ſquare, ſuppoſe $= \overline{3x - 3}^2 = 9x^2 - 18x + 9$; or $2x^2 = 36x$, and $x = 18$ $\therefore A = 3024$, $B = 5624$; $B + A = 8648$, $B - A = 2600$, each of which + 1 is the ſquare of 55, 75, 93, and 51.

PROB. XIV.

28. To find three numbers ſuch, that if the ſquare of each be added to the ſum of the two, the three ſums may be ſquares.

1ſt. $\overline{x + 1}^2 = x^2 + 2x + 1$ $\therefore$ if x, $2x$, and 1, denote the three numbers, the firſt condition is ſatisfied. But $4x^2 + x + 1$, and $3x + 1$, are alſo to be made ſquares.

Difference is $4x^2 - 2x$. Factors x, and $4x - 2$, $\frac{1}{2}$ diff. $\frac{3x}{2} - 1$ $\therefore \frac{9x^2}{4} - 3x + 1 = 3x + 1$. $9x^2 = 24x$, $x = \frac{8}{3}$ $2x = \frac{16}{3}$, and 1, are the numbers required.

PROB. XV.

29. To find two numbers, A and B, ſuch that A B + A, A B + B, and A B + A + B, may be all ſquares.

Let $x = A$, $x^2 = A B + A$ = a ſquare; then $x^2 - x = A B$, and $x - 1 = B$, and $2x - 1 = A + B$. But $A B + B = x^2 - 1$, and $A B + A + B = x^2 + x - 1$, are to be made ſquares. Diff. is x. Factors $2x$ and $\frac{1}{2}$, $\frac{1}{2}$ diff. $x - \frac{1}{4}$, or $x^2 - \frac{x}{2} + \frac{1}{16} = x^2 - 1$, or $\frac{x}{2} = 1 + \frac{1}{16} = \frac{17}{16}$, and $x = \frac{17}{8} = A$, and $B = x - 1 = \frac{9}{8}$.

Scholium. 30. To find the proper factors, into which the difference of any propoſed ſquare ought to be reduced.

Rule. Put z = one of the factors, and the given difference divided by z = the other; then by making the ſquare of the $\frac{1}{2}$ ſum or $\frac{1}{2}$ difference equal to the greater or leſs of the propoſed ſquares, find ſome ſuitable value of z.

Examples.

1. Find the proper factors of the diff. x, when $x^2 + x - 1$ and $x^2 - 1$ are to be ſquares.

Let z and $\frac{x}{z}$ = the factors; the $\frac{1}{2}$ diff. = $\frac{x}{2z} - \frac{z}{2}$, or $\frac{x^2}{4z^2} - \frac{x}{2} + \frac{z^2}{4} = x^2 - 1$. We ſee that x may have a rational value, if $\frac{x^2}{4z^2} = x^2$, or $4z^2 = 1$, and $z = \frac{1}{2}$ $\therefore$ $\frac{x}{z} = 2x$ the factors.

2. Find the proper factors for making two ſquares, m^2 and n^2, whoſe difference is d, ſuch that the leaſt, n^2, may exceed any given number c.

Factors z and $\frac{d}{z}$; $\frac{1}{2}$ difference $= \frac{z}{2} - \frac{d}{2z}$, or $\frac{\overline{z^2 - d}^2}{2z} = \frac{z^4 - 2dz^2 + d^2}{4z^2} = n^2$, is to be greater than c, or $z^4 - 2dz^2 + d^2$ greater than $4z^2c$, or $z^2 - 4z^2c - 2dz^2 + d^2$ greater than 0.

Let $z^4 - 4z^2c - 2dz^2$ greater than 0, or $z^2 - 4c - 2d$ greater than 0; and $z^2 =$, or greater than $4c + 2d$.

Cor. If $c = nd$, then $z^2 =$, or greater than $d \cdot \overline{4n + 2}$. Hence, if we take $d =$ a ſquare, as many right-angled triangles as we pleaſe may be found, all having the ſame baſe $= \sqrt{d}$.

PROB. XVI.

31. To find two numbers ſuch, that the ſquare of each, being added to the ſum of both, may make two ſquare numbers.

1. Let $x =$ one of the numbers; its ſquare is x^2, and $x^2 + 2x + 1$ is a ſquare. Let $2x + 1$ be the ſum of both numbers; then $x + 1 =$ the greater, its ſquare is $x^2 + 2x + 1$, and if we add the ſum of both, $x^2 + 4x + 2$ is to be made a ſquare, ſuppoſe $= \overline{x - z}^2 = x^2 - 2xz + z^2$, or, $2xz + 4x = z^2 - z$, and $x = \frac{z^2 - 2}{2z + 4}$, where z may be any number greater than $1\frac{1}{2}$, if $z = 2$, $x = \frac{1}{4}$, and $x + 1 = \frac{5}{4}$, &c.

PROB. XVII.

32. To find two ſuch numbers, that their product $\pm$ their ſum may be ſquares.

1. Let $x =$ one of the numbers, and $a^2x + b^2x =$ the other: the $a^2x^2 + b^2x^2 =$ their product: but $a^2x^2 \pm 2abx^2 + b^2x^2 = \overline{ax \pm bx}^2 =$ a ſquare. We have only to make $2abx^2 = a^2x + b^2x + x =$ the ſum of the two numbers: or, $x = \frac{a^2 + b^2 + 1}{2ab}$, where a and b may be any numbers at pleaſure: if $a = 1$, $b = 2$, then $x = \frac{3}{2}$, and $\frac{15}{2} =$ greater: for their product $= \frac{45}{4}$, and ſum $= \frac{36}{4}$; and $\frac{81}{4}$, or $\frac{9}{4}$, are ſquares.

PROB. XVIII.

33. To find three numbers ſuch, that their ſum and the ſum of every two of them may be ſquares.

1. Let $x^2 + 2x + 1 = \overline{x + 1}^2$ be the ſum of the three: Let x^2 be the ſum of the firſt and ſecond: then $2x + 1 =$ third number: Let $x^2 - 2x + 1$ be the ſum of the ſecond and third numbers: then $x^2 - 4x$ is the ſecond number, which taken from x^2 leaves $4x$ for the firſt number $\therefore$ the three numbers required are $4x$, $x^2 - 4x$, and $2x + 1$.

2. But the ſum of the firſt and third $= 6x + 1$ is alſo to be a ſquare, ſuppoſe $= a^2$: then $x = \frac{a^2 - 1}{6}$: where a^2 may be any ſquare number greater than 25; becauſe the ſecond number $= x^2 - 4x$, or $x - 4$ muſt be greater than 0 $\therefore$ x greater than 4, bx greater than 24, and $bx + 1$ greater than 25.

Examples.

1. Suppoſe $a^2 = 49$: then $x = 8$, $4x = 32$, $x^2 - 4x = 32$, and $2x + 1 = 17$

$a^2 = 121$ $x = 20$ 80 320 41, &c.

PROB. XIX.

34. To find a number which being divided into any two parts, the ſquare of either part + 100 times the other part, ſhall make a ſquare number.

Let $y =$ the number ſought: x one part, and $y - x =$ the other: then $x^2 + 100y - 100x$ is to be a ſquare, ſuppoſe $\overline{x - z}^2 = x^2 - 2xz + z^2$, or $100y - 100x = z^2 - 2zx$: Now as the object is to find y without limiting x; let $2z = 100$, or $z = 50$: then $100y = 2500$, or $y = 25$: therefore $x^2 + 100 \cdot \overline{25 - x}$ will be a ſquare, let x be what it will.

GENERALLY.

To determine y when $s^2x^2 + z \cdot \overline{y - x}$ is a ſquare.

Let $s^2x^2 + ry - rx = \overline{sx - z}^2 = s^2x^2 - 2szx + z^2$: let $r = 2sz$, then $2szy = z^2$, and $y = \frac{z}{2s}$; but $z = \frac{r}{2s}$ $\therefore$ $y = \frac{r}{4s^2}$, where r may be $=$ any ſquare number, and $s = 1$.

PROB. XX.

35. To find two numbers in the ratio of $a : b$, ſuch that either of them, added to the ſquare of the other, may make a ſquare.

Firſt, let $n - x =$ the leſs of the two numbers ſought, and $4nx =$ greater: then $\overline{n - x}^2 + 4nx = \overline{n + x}^2$ one condition ſatisfied. Second, but $a : b :: n - x : 4nx$: or $4anx = bn - bx$; or $x = \frac{bn}{4an + b}$.

Therefore, $n - x = \frac{4an^2 + bn - bn}{4an + b} = \frac{4an^2}{4an + b} =$ leſs number, and $4nx = \frac{4bn^2}{4an + b} =$ greater. the ſquare of which + the leſs is alſo to be a ſquare.

Or, $\frac{16b^2n^4}{16a^2n^2 + 8abn + b^2} + \frac{4an^2}{4an + b} = \frac{16b^2n^4 + 16a^2n^3 + 4abn^2}{16a^2n^2 + 8abn + b^2}$; or, $4b^2n^4 + 4a^2n^3 + abn^2$ is to be made a ſquare: ſuppoſe $= \overline{2bn^2 - zn}^2$ (z being greater than ab) $= 4b^2n^4 - 4bzn^3 + z^2n^2$, or $4a^2n^3 + 4bzn^3 = z^2n^2 - abn^2$: or $n = \frac{z^2 - ab}{4a^2 + 4bz}$. Third, or to make $16b^2n^4 + 16a^2n^3 + 4abn^2$ a ſquare, ſuppoſe it $= \overline{4bn^2 - zn}^2$ (z^2 being greater than $4ab$). Then $16a^2n^3 + 8bzn^3 = z^2n^2 - 4abn^2$; or $n = \frac{z^2 - 4ab}{16a^2 + 8bz}$.

If $z = 10$, $a = 2$, $b = 3$, then $n = \frac{1}{4}$ and $\frac{2}{20}$ and $\frac{3}{20}$ the numbers required.

Lemma.

Lemma.—36. There are many numbers which cannot be divided into two rational ſquares.

1ſt. Every even ſquare number is diviſible by 4: for its root may be $2x$ and $4x^2$ the number.

2d. Every odd ſquare number -1 is diviſible by 4: for its root is $2x+1$ and $4x^2+4x+1$ the number.

3d. Every number = the ſum of two even ſquares is diviſible by 4. Per 1ſt.

4th. Every number = the ſum of two odd ſquares -2 is diviſible by 4. Per 2d.

5th. Every number = the ſum of an even and an odd ſquare -1 is diviſible by 4. Per 1ſt and 2. Hence,

6th. If any number being divided by 4 leave a remainder equal 3, it cannot be compoſed of two integral ſquares. Nor of two ſquare fractions.

Prob. XXI.

37. To divide any number compoſed of two known ſquares, as a^2+b^2 into two other ſquares.

Let r be greater than s, and not as $a:b$, nor as $a+b:a-b$.

Aſſume $\overline{rx-a}^2 = a^2$, and $\overline{sx-b}^2 = b^2$, or $a^2+b^2 = a^2+b^2+(r^2x^2+s^2x^2-2arx-2bsx)$, or $r^2x+s^2x = 2ar+2bs$, and $x = \frac{2ar+2bs}{r^2+s^2}$ $\therefore rx - a = \frac{2ar^2+2bsx-ar^2-as^2}{r^2+s^2} = \frac{ar^2+2bsx-as^2}{r^2+s^2}$ = ſide of greater ſquare, and $sx-b = \frac{2asx+2bs^2-bx^2-bs^2}{r^2+s^2} = \frac{2ars+bs^2-bx^2}{r^2+s^2}$ = ſide of leſs ſquare.

Let $d = r^2-s^2$, $e = 2rs$, and $f = r^2+s^2$: then

$ar^2-as^2+2brs = ad+be$
$2ars-br^2+bs^2 = ae-bd$
} and $\begin{cases} \frac{ad+be}{f} = \text{ſide of greater ſq.} \\ \frac{ae-bd}{f} = \text{ſide of leſs ſq.} \end{cases}$

Ob. 1. If $b = 0$, this prob. and its ſolution, becomes the ſame as Prob. VIII. *viz.* $\frac{ad}{f}$ and $\frac{ae}{f}$ are the ſides of the required ſquares.

Ob. 2. If $\overline{sx+b}^2$ had been aſſumed $= b^2$, the reſults would have been $\frac{ad-be}{f}$ = ſide of greater, and $\frac{ac+bd}{f}$ = ſide of the leſſer ſquare.

The four fractions exhibiting both ſolutions are, $\frac{ad}{f}$, $\frac{ac}{f}$, $\frac{bd}{f}$, $\frac{be}{f}$. Hence, if d, e, and f be the ſides of a right-angled triangle, and a and b the roots of the original ſquares, and the two ſides of the triangle be multiplied by the roots of the ſaid ſquares, and ſet down in order, thus, $\frac{ad}{f}$, $\frac{ac}{f}$, $\frac{bd}{f}$, $\frac{bc}{f}$: then the ſum of the extremes and difference of the means will be the ſides of the two ſquares required.

Examples.

38. 1. Required to divide $2 = 1^2+1^2$ into two unequal ſquares. 1. Let the triangles be 3, 4, and 5; then the fractions are $\frac{3}{5}$, $\frac{4}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, and $\frac{7}{5}$, and $\frac{1}{5}$, the ſides of $\frac{49}{25}+\frac{1}{25} = 2$.

2. Let the triangle be 8, 6, 10; then the fractions are $\frac{8}{10}$, $\frac{6}{10}$, $\frac{8}{10}$, $\frac{6}{10}$, $\frac{14}{10}$, and $\frac{2}{10}$, as above.

If the triangle be 5, 12, 13, then $\frac{5}{13}$, $\frac{12}{13}$, $\frac{5}{13}$, $\frac{12}{13}$, $\frac{17}{13}$, and $\frac{7}{13}$ are the ſides of $\frac{289}{169}+\frac{49}{169} = \frac{338}{169} = 2$.

3. Let 1 be divided into two ſquares. Here $b = 0$, and $\frac{ad}{f}$ and $\frac{ae}{f}$ are the ſides of the ſquares required.

If the triangle be 3, 4, 5, we have $\frac{4}{5}$ and $\frac{3}{5}$.

If the triangle be 5, 12, 13, we have $\frac{12}{13}$ and $\frac{5}{15}$ the ſides of $\frac{144}{169}$, and $\frac{25}{169} = 1$.

Prob. XXII.

39. To find four right angled triangles, in whole numbers, all having the ſame hypothenuſe.

Solution.—1. Take any two right-angled triangles, not ſimilar, as $\left\{\begin{matrix} a, & b, & c. \\ 3, & 4, & 5, \end{matrix}\right\}$ and $\left\{\begin{matrix} d, & e, & f. \\ 5, & 12, & 13. \end{matrix}\right\}$.

Multiply the three ſides of the firſt by f, and we have af, bf, $cf = 39, 52, 65$. Mult. 2nd by c, we have dc, ec, $cf = 25, 60, 65$, per 37, $ad+be$, $ae \sim bd$, and $cf = 63, 16, 65$; or, $ae+bd$, $ad \sim be$, and $cf = 56, 33, 65$.

Prob. XXIII.

40. To find four numbers, which, being ſeverally added to, or ſubtracted from, the ſquare of their ſum, ſhall make the ſeveral ſums, or remainders, all ſquare numbers.

1. Find (per 39.) four right-angled triangles, having the ſame hypothenuſe, which ſuppoſe $= h$.

Let p, p', p'', p''', denote the double product of their ſides. Then $h^2 \pm p$, $h^2 \pm p'$, $h^2 \pm p''$, $h^2 \pm p'''$, are all ſquares (per 23.); conſequently, $h^2x^2 \pm px^2$, $h^2x^2 \pm p'x^2$, $h^2x^2 \pm p''x^2$, and $h^2x^2 \pm p'''x^2$, are all ſquares.

2. But the condition is, that h^2x^2 ſhall be the ſquare of the ſum of $px^2+p'x^2+p''x^2+p'''x^2$.

Let $p+p'+p''+p''' = e$. Then h^2x^2 is to be = the ſquare of ex^2, or $hx = ex^2$, and $x = \frac{h}{e}$, or $x^2 = \frac{h^2}{e^2}$. Therefore, px^2, $p'x^2$, $p''x^2$, $p'''x^2$, are $= \frac{ph^2}{e^2}$, $\frac{p'h^2}{e^2}$, $\frac{p''h^2}{e^2}$, $\frac{p'''h^2}{e^2}$, which are reſpectively the numbers required.

Demonſtration.—For the ſum of theſe four numbers is $\frac{ph^2+p'h^2+p''h^2+p'''h^2}{e^2} = \frac{eh^2}{e^2} = \frac{h^2}{e}$, and the ſquare of their ſum is $\frac{h^2}{e^2}$. But $\frac{h^4}{e^2} \pm \frac{ph^2}{e^2} = \frac{h^2 \pm ph^2}{e^2} = \frac{h^2}{e^2} \cdot h^2 \pm p$ = a ſquare (per 23,) &c. with the reſt.

Example. The four triangles in 39 give $h^2 = 4225$, $p = 4056$, $p' = 3000$, $p'' = 2016$, $p''' = 3696$, and $e^2 = 27888049$, and the four numbers are $\frac{17136600}{27888049}$, $\frac{12675000}{27888049}$, $\frac{8517600}{27888049}$, and $\frac{15615600}{27888049}$, and their ſum $= \frac{53944800}{27888049}$.

Prob. XXIV.

41. To find three numbers a, b, c, ſuch that, e being any given number, $ab+e$, $ac+e$, and $bc+e$, may be all ſquares.

Firſt.

1. Suppoſe a and b found. Put $ab + e = n^2$, then $ab = n^2 - e$. 2. To find a, b, and n, without trials, take any two numbers, r and s, r the greater, ſo that the ſquare of either may be greater than e, and let $a = n + r$, $b = n - s$, then $ab = n^2 + rn - sn - rs = n^2 - e$ (1), or $n = \frac{rs - e}{r - s}$, $n + r = a = \frac{r^2 - e}{r - s}$, $n - s = b = \frac{s^2 - e}{r - s}$.

3. From $ab + e$, already made a ſquare, take $ae + e$, the difference is $ab - ac = a \cdot \overline{b - c}$ the factors (25.) The $\frac{1}{2}$ ſum is $\frac{a + b - c}{2}$, the $\frac{1}{2}$ difference is $\frac{a - b + c}{2}$. 4. Again, from $ab + e$ take $bc + e$, the diff. is $ab - be = b \cdot \overline{a - c}$, the $\frac{1}{2}$ ſum is $\frac{a + b - c}{2}$, and $\frac{1}{2}$ diff. $\frac{a - b - c}{2}$. Therefore if ſuch a value of c can be found, that $\left|\frac{a + b - c}{2}\right|^2$ may be $= ab + e = n^2$, the problem is ſolved.

Let $\frac{a + b - c}{2} = \pm n$, then $c = a + b \pm 2n$, either of which values of c with a and b above are the numbers required.

5. But $a = n + r$, and $b = n - s$ $\therefore$ $a + b = r - s + 2n$, and $a + b - 2n = r - s =$ leſs value of c, &c.

6. Corollary. Hence if $r - s = 1$, then n, a, b, &c. will be integers.

7. Example. Let $e = 3$, $r = 4$, and $s = 3$, then $a = 13$, $b = 6$, and $c = 1$, or 37, ſo that $c + e$, $b + e$, and $a + e$, are all ſquares.

Scholium. If the prob. had been to find $ab - e$, $ac - e$, and $bc - e$ all ſquares, the only alteration would be to change the ſign of e, or find $a = \frac{r^2 + e}{r - s}$, $b = \frac{s^2 + e}{r - s}$, and the leſs value of $c = r - s$, or the greater $=$ the exceſs of $2a + 2b$ above $r - s$ as before.

Prob. XXV.

42. To find four numbers, ſuch that, if 1 or any ſquare number be added to the product of every two of them, all the ſums may be ſquares.

1. Take a, b, and c, in arithmetical progreſſion, their common difference 1. Then if x, $a^2x + 2a$, $b^2x + 2b$, and $c^2x + 2x$ denote the four numbers ſought, every condition is anſwered, except $BD + 1 =$ ſquare. Let $a = 2$, $b = 3$, $c = 4$, then the four numbers ſought are x, $4x + 4$, $9x + 6$, and $16x + 8$, $BD + 1 = 64x^2 + 96x + 33$. Let $\overline{8x - 6}^2 = 64x^2 - 96x + 36$; $192x = 3$, and $x = \frac{1}{64}$.

3. Let $\overline{8x - 12}^2 = 64x^2 - 192x + 144$; $288x = 111$, and $x = \frac{111}{288} = \frac{37}{96}$. Let $\overline{8x - 9}^2 = 64x^2 - 144x + 81$; $240x = 48$, and $x = \frac{4}{20} = \frac{2}{10} = \frac{1}{5}$. Therefore, $\frac{2}{10}$, $\frac{48}{10}$, $\frac{78}{10}$, $\frac{112}{10}$, or, $\frac{1}{5}$, $\frac{24}{5}$, $\frac{39}{5}$, and $\frac{56}{5}$, are the numbers required, when 1 is the additive number. But if we ſuppoſe it ſome other ſquare number, as 100, and multiply each of theſe numbers by its root, we ſhall have 2, 48, 78, 112, for the numbers required.

Prob. XXVI.

43. To find x and y, when $x - y$, $x^2 - y^2$, and $x^3 - y^3$ are all ſquares. Aſſume $x - y = a^2$, and $x + y = m^2a^2$, or $x^2 - y^2 = m^2a^4 =$ a ſquare.

Now, $2x = m^2a^2 + a^2$, or $x = \frac{m^2a^2 + a^2}{2}$, and $y = \frac{m^2a^2 - a^2}{2}$. But $x^3 - y^3 = \frac{a^6 \cdot 3m^4 + 1}{4}$, or $3m^4 + 1$ muſt be made a ſquare; m muſt be $= 2$. Hence this

Rule. Take $x - y =$ any ſquare number, and $x + y =$ 4 times that number, and find x and y required.

Examples. Let $x - y = 4$, and $x + y = 16$, then $x = 10$, and $y = 6$, and the three expreſſions 4, 64, and 784.

Prob. XXVII.

44. To find three numbers in geometrical progreſſion ſuch, that a given number being added to each may make them all ſquares.

Let a^2, ax, and x^2 denote the three numbers ſought, and the firſt condition is ſatisfied.

Find two ſquares whoſe difference is s (24), and let the leſs $= a^2$, and the ſecond condition is ſatisfied. But $ax + s$, and $x^2 + s$, are alſo to be ſquares. Their difference is $x^2 - ax$. Factors x and $x - a$, the $\frac{1}{2}$ difference is $\frac{a}{2}$ $\therefore$ $\frac{a^2}{4} = ax + s$, or $ax = \frac{a^2}{4} - s =$ 2d number, and the third is found by proportion.

Ob. $ax = \frac{a^2}{4} - s$ muſt be affirmative $\therefore$ a^2 greater than $4s$. Whence this

Rule. Find two ſquares whoſe difference is s, and the leſs of them greater than $4s$, (30. 2.) call this leſs ſquare a^2; the mean term is $\frac{1}{4}a^2 - s$, and the other extreme is found by proportion.

Examples.

1. Find three numbers in geometrical progreſſion ſuch, that $21 = s$ added to each, may make the ſums ſquares. Factors 21 and $\frac{21}{21}$ and $\frac{1}{2}$ diff. $= 10\frac{1}{2} - \frac{1}{2} = 10$. The two ſquares are 121 and $100 = a^2$ greater than $4s = 84$ $\therefore$ 100 : 4 and $\frac{4}{25}$ are the numbers required.

2. Let $s = 19$, then 100 and $81 = a^2$ greater than $4s = 76$ and 81, $\frac{5}{4}$ and $\frac{25}{1296}$ are the numbers. Factors 19 and $\frac{19}{19}$ and $\frac{1}{2}$ diff. $= 9\frac{1}{2} - \frac{1}{2} = 9$.

Prob. XXVIII.

45. To find three ſquare numbers in arithmetical progreſſion.

Let, 1. $1 + 4d$, and $1 + 8d =$ denote the three numbers, then $1 + 4d$ and $1 + 8d$ are to be made ſquares.

Difference is $4d$, factors 2, and $2d$, $\frac{1}{2}$ ſum $d + 1$, and $d^2 + 2d + 1 = 1 + 8d$, or $d^2 - 6d = 0$, or $d = 6$, ſo that 1, 25, and 49 are the numbers. Or, let x^2, x^2y^2, and $2x^2y^2 - x^2$ denote the three ſquare numbers, then 1, y^2 and $2y^2 - 1$ are ſquares; and $y = 5$ $\therefore$ 1, 25, 49 multiplied by x^2, will give as many anſwers as we pleaſe.

Prob. XXIX.

46. To find three ſquare numbers in harmonical proportion, *i. e.* to find x^2, b^2, a^2; when as $x^2 : a^2 :: x^2 - b^2 : b^2 - a^2$. Aſſume two known ſquares for b^2 and a^2, ſuppoſe 49 and 25, then as $x^2 : 25 :: x^2 - 49 : 24$, or $24x^2 = 25x^2 - 1225$, or $x^2 = 1225$.

Prob. XXX. *vide* Prob. XXVIII.

47. Firſt find three ſquare numbers in arithmetical progreſſion, each of which will be the ſum of two of the numbers ſought, and have the ſame common difference as the numbers ſought.

Thus let x^2, $x^2 + 20y$, and $x^2 + 40y$, denote three ſquare numbers in arithmetical progreſſion. Then diff. $= (25.)\ 20y$, the factors $2y$ and 10, the $\frac{1}{2}$ diff. of them is $y - 5 = x$. Firſt $x^2 = \overline{y-5}^2 = y^2 - 10y + 25$ $\therefore x^2 + 20y = y^2 + 10y + 25$ = a ſquare; but $x^2 + 40y = y^2 + 30y + 25$ is alſo to be made a ſquare.

Aſſume $\overline{y+a}^2 = y^2 + 2ay + a^2$; $30y + 25 = 2ay + a^2$, or $30y - 2ay = a^2 - 25$, and $y = \frac{a^2 - 25}{30 - 2a}$; a is evidently limited between 5 and 15. Let $a = 13$, then $y = 36$, $20y =$ common diff. $= 720$, and $x = 31$. So that 961 = ſquare of 31, 1681 = ſquare of 41, and 2401 = ſquare of 49, are the three ſquares ſought, and from the ſum 961, and diff. 720, we find $120\frac{1}{2}$, $840\frac{1}{2}$, and $1560\frac{1}{2}$, the three numbers required. Or, by denoting the three required ſquares by x^2, $x^2 + 40y$, and $x^2 + 80y$, and proceeding as above, we have $y = \frac{a^2 - 100}{60 - 2a}$, a between 10 and 30; if $a = 26$, then $y = 72$, and $40y = 2880$, and $x = 62$, and the three ſquares, as well as the three numbers ſought, $= 4$ times thoſe above the ſmalleſt poſitive integral anſwer.

A more general ſolution may be had by denoting the required ſquares thus; x^2, $x^2 + 4ay$, and $x^2 + 8ay$, then $y^2 + 6ay + a^2$ is to be made a ſquare, aſſume $= \overline{y+ma}^2$ $= y^2 + 2may + m^2a^2$, and we ſhall have $y = \frac{m^2a^2 - a^2}{6a - 2ma}$ $= \frac{m^2a - a}{6 - 2m} = \frac{a \cdot \overline{m^2 - 1}}{6 - 2m}$, where m muſt evidently be between 1 and 3. If $m = \frac{13}{5}$, and $a = 5$, then $y = 36$, $x = 31$, &c. as above.

Prob. XXXI.

48. To find in whole numbers the three ſides of a triangle having one angle $= 120$. *Plate* VI. *Geometry*, *fig.* 84.

Lemma. When angle B $= 120°$, then $c^2 = a^2 + ab + b^2$. When $\angle$ B $= 60°$, then $c^2 = a^2 - ab + b^2$.

Demonſtration. 1. In A B produced, take B D $=$ B C $=$ C D. ſince $\angle$ C B D $= 60°$. Draw the perpendicular C E, then B E $= \frac{1}{2}b = \frac{1}{2}$ B C; but 47 . E . 1 . B E^2 + E C^2 = B C^2, or $\frac{1}{4}b$ + E C^2 $= b^2$, or E C^2 $= \frac{3b^2}{4}$. Now A E $= a + \frac{1}{2}b$, and A E^2 $= a^2 + ab + \frac{1}{4}b^2$ $\therefore$ 47 . E . 1 . A C^2 $= c^2 = a^2 + ab + b^2$.

2. Again; let A D $= a$, &c. as before; then A E $= a - \frac{1}{2}b$, and A E^2 $= a^2 - ab + \frac{1}{4}b^2$; or A C^2 $= c^2 = a^2 - ab + b^2$. Q. E. D.

Cor. 3.—If a, b, c, be the ſides of a triangle, and a and b contain an angle of 120°; then $a + b$, b and c are the ſides of a triangle, and $a + b$ and b contain an angle of $60° =$ A D C; and $a + b$, a and c are the ſides of a triangle, and $a + b$ and a contain an angle of $60° =$ C F A.

Cor. 4.—The ſame is true of any equimultiples of a, b, and c, as ad, bd, cd, &c.

Solution. 1.—Aſſume any number b for one of the containing ſides, and put $x =$ the other; then the ſquare of the third ſide is $b^2 + bx + x^2$ per lemma.

Aſſume it $= \overline{a-x}^2 = a^2 - 2ax + x^2$; or $a^2 - 2ax = b^2 + bx$, or $2ax + bx = a^2 - b^2$, and $x = \frac{a^2 - b^2}{2a + b}$. Therefore the three ſides are b, $\frac{a^2 - b^2}{2a + b}$, and $a - \frac{a^2 - b^2}{2a + b}$, or $\frac{2ab + b^2}{2a + b}$, $\frac{a^2 - b^2}{2a + b}$, and $\frac{a^2 + ab + b^2}{2a + b}$. Or (48. 4.) $2ab + b^2$, $a^2 - b^2$, and $a^2 + ab + b^2$ are the three ſides, all integers.

2. Put $s = a + b$, then $s^2 = a^2 + 2ab + b^2$, and $2ab + b^2 = s^2 - a^2$, and $a^2 + ab + b^2 = s^2 - ab$; whence this

Rule.—Take any numbers, a and b. whoſe ſum is s, then the containing ſides are $a^2 - b^2$, and $s^2 - a^2$, and the oppoſite ſide is $s^2 - ab$.

Example.—Let $a = 2$, $b = 1$, and $s = 3$, then 3, 5, and 7, are the ſides; or by taking the ſum of the leaſt ſides $3 + 5 = 8$, we have 5, 8, 7, or 3, 8, 7, for the ſides of two other triangles, having the angle oppoſite the ſide $7 = 60°$.

Moreover, the ſum of the ſquares +, the product of the containing ſides, is a ſquare. (per 48.)

Prob. XXXII.

49. To find in whole numbers, three right-angled triangles, having all the ſame area: the hypothenuſe is out of the queſtion.

1. Find (per 48.) the three ſides a, b, and c, of a triangle, having the angle oppoſite $c = 120°$, then of a and c, b and c, and $\overline{a+b}$, &c. form three right-angled triangles (per 21.) and they will all have the ſame area.

Demonſtration. 2. The triangle formed of a and c will have $c^2 - a^2$, and $2ac$ for its ſides, and $\therefore ac \cdot \overline{c^2 - a^2}$ for its area. But (per 48.) $c^2 = a^2 + ab + b^2$ $\therefore c^2 - a^2 = ab + b^2 = b \cdot \overline{a+b}$, and $ac \cdot \overline{c^2 - a^2} = acb \cdot \overline{a+b}$ = area of 1ſt triangle.

3. The ſides of the 2d triangle, from b and c, are $c^2 - b^2$ and $2bc$, and its area $bc \cdot \overline{b^2 - c^2}$; but $c^2 - b^2 = a^2 + ab$ $= a \cdot \overline{a+b}$ $\therefore bc \cdot \overline{c^2 - b^2} = bca \cdot \overline{a+b}$, the ſame as the area of the 1ſt triangle.

4. From $\overline{a+b}$ and c the ſides are $\overline{a+b}^2 - c^2 = a^2 + 2ab + b^2 - a^2 + ab + b^2 = ab$, and $2c \cdot \overline{a+b}$.

Therefore its area is $abc \cdot \overline{a+b}$, the ſame as the other two. Q. E. D.

Example.—The numbers in 48. were 3, 5, 7. Of 3 and 7 the triangle is 40 and 42, and area 840. Of 5 and 7 the triangle is 24 and 70, and area 840. Of 8 and 7 the triangle is 15 and 112, and area 840.

Prob. XXXIII.

50. To find three numbers a, b, and c, ſuch that s being their ſum $a^2 \pm s$, $b^2 \pm s$, and $c^2 \pm s$, may be all ſquare numbers.

1. The

1. The ſquare of the hypothenuſe $\pm$ the double product of the ſides = a ſquare, but the double product of the ſides = 4 times the area ∴ the ſquare of the hypothenuſe = 4 times the area = a ſquare number.

2. Find, (per 49.) three right-angled triangles having all the ſame area, and let their hypothenuſes be a, b, and c, let m = 4 times the common area, and $s = a + b + c$: then $a^2 \pm m$, $b^2 \pm m$, and $c^2 \pm m$, are all ſquare numbers.

3. Aſſume any indeterminate ſquare, as x^2; then $a^2 x^2 \pm m x^2$, $b^2 x^2 \pm m x^2$, and $c^2 x^2 \pm m x^2$ are ſquares. We have only to find ſuch a value of x, that $m x^2$ may be $= a x + b x + c x$ = the ſum of the three numbers: let $m x^2$ be $= a x + b x + c x$: then $x = \frac{a + b + x}{m} = \frac{s}{m}$. Therefore the three numbers $a x$, $b x$, $c x$, are $\frac{a s}{m}$, $\frac{b s}{m}$, and $\frac{c s}{m}$, reſpectively.

Example. 4. The three triangles having the ſame area in 49, are 40, 42, 58 — 24, 70, 74 — and 15, 112, 113 ∴ $a = 58$, $b = 74$, and $c = 113$, $s = 245$, $m = 840.4 = 3360$, and $\frac{s}{m} = \frac{245}{3360} = \frac{49}{672} = \frac{7}{96}$ ∴ $\frac{406}{96}$, $\frac{518}{96}$, and $\frac{791}{96}$, are the three numbers required: for their ſum is $\frac{1715}{96} = \frac{164640}{9216}$ and $\overline{\frac{400}{96}}^2 = \frac{164836}{9216}$ and $\frac{164836 \pm 16460}{9216} = \frac{329476}{9216}$ or $\frac{196}{9216}$ the ſquares of $\frac{574}{96}$, or $\frac{14}{96}$, &c.

PROB. XXXIV.

51. To find three ſuch numbers that the ſum or difference of any two of them may be a ſquare.

1. Aſſume $4x$, $4 + x^2$, and $1 + 4x^2$, for the three numbers ſought: then the ſum and difference of the firſt, and each of the others, are ſquares: it remains to make the ſum and difference of the two laſt ſquares. We are to make $5x^2 + 5$, and $3x^2 - 3$, ſquares; their product $15x^4 - 15 = 15 . x^4 - 1$ muſt be a ſquare. If $x = 2$, it is $15 . \overline{16 - 1} = 15 . 15$ evidently a ſquare, and the three numbers 8, 8, and 17: the firſt and ſecond the ſame.

2. Put $x = z - 2$, then $15x^4 - 15 = 225 - 480z + 360z^2 - 120z^3 + 15z^4$ = a ſquare, ſuppoſe $= \overline{15 - az + bz^2}^2 = 225 - 30az + \left\{\begin{matrix} 30b \\ a^2 \end{matrix}\right\} z^2 - 2abz^3 + b^2 z^4$, where it is evident that the co efficients of the correſponding powers of z muſt be equal, elſe all the terms brought to one ſide could not be = 0. From $30a = 480$, we have $a = 16$; from $30b + a^2 = 360$, $30b = 104$; and $b = \frac{52}{15}$, and from $15z^4 - 120z^3 = b^2 z^4 - 2abz^3$, $15z - 120 = b^2 z - 2ab$; $15z - b^2 z = 120 - 2ab$, and $z = \frac{120 - 2ab}{15 - b^2} = \frac{2040}{671}$ ∴ $x = z - 2 = \frac{2040}{671} - \frac{1342}{671} = \frac{698}{671}$. Which, ſubſtituted in the aſſumed expreſſions, gives $4 . \frac{698}{671}$, $4 + \overline{\frac{698}{671}}^2$, and $1 + 4 . \overline{\frac{698}{671}}^2 = \frac{2792}{671}$, $\frac{2288168}{\overline{671}^2}$, and $\frac{2399057}{\overline{671}^2}$; or, rejecting the common denominator, we have the numbers ſought.

		1873432	
		2399057	
		2288168	
Sum	=	4687225	= □ of 2165.
Difference	=	110889	= □ of 333.
		2288168	
		1873432	
Sum	=	4161600	= □ of 2040.
Difference	=	414736	= □ of 644.
		2399057	
		1873432	
Sum	=	4272489	= □ of 2067.
Difference	=	525625	= □ of 725.

PROB. XXXV.

To find the leaſt biquadratic number, that can be divided into four integral parts, ſuch that the ſum of every two of them may be a ſquare number.

Let n^4 denote the biquadratic number ſought, and a, b, c, and d, its four integral parts, then the queſtion requires, that $a + b = \mu^2$, $a + c = \mu'^2$, $a + d = \mu''^2$, $c + d = \nu^2$, $b + d = \nu'^2$, and $b + c = \nu''^2$. Hence we get $n^4 = a + b + c + d = \mu^2 + \nu^2 = \mu'^2 + \nu'^2 = \mu''^2 + \nu''^2$.

We ſee, therefore, that the biquadratic number ſought muſt be reſolvable into three ſquares, three different ways, and this condition being fulfilled, we derive

$a = \frac{1}{2}(\mu^2 + \mu'^2 - \nu''^2)$, $b = \frac{1}{2}(\mu^2 + \nu''^2 - \mu'^2)$

$c = \frac{1}{2}(\mu'^2 + \nu''^2 - \mu^2)$, $d = n^4 - \frac{1}{2}(\mu^2 + \mu'^2 + \nu''^2)$,

from which formulæ it may be inferred, that the three ſquares μ^2, μ'^2, and ν''^2, muſt either be all even, or two of them muſt be odd and only one even, in order that no fractions may ariſe from the diviſions by 2, and likewiſe that the ſum of every two of them muſt be greater than the third; and, at the ſame time, the ſum of all three leſs than $2n^4$, in order to avoid negative numbers.

It is then neceſſary to find a biquadratic number that may be divided into two ſquares three different ways. We owe to Fermat the curious diſcovery, that every prime number, exceeding a multiple of 4, by unity, or comprehended in the form $4x + 1$, is the ſum of two ſquares; and this property, which is univerſal for prime numbers of the form $4x + 1$, belongs excluſively to that form, ſo that no prime number, which is not of the form $4x + 1$, can poſſibly be the ſum of two ſquares. This curious propoſition was firſt demonſtrated by the celebrated Euler, and to effect the demonſtration, it was neceſſary to prove this other propoſition, *viz.* that every diviſor of a number, which is the ſum of two ſquares that are prime to one another, is likewiſe the ſum of two ſquares. From theſe principles we may eaſily gather, that the biquadratic number, n^4, which we are ſeeking, muſt have prime diviſors of the form $4x + 1$; for if it had none, it could not poſſibly be the ſum of two ſquares: and as the leaſt value of n^4 is required, we may ſet aſide all other diviſors; for if n^4 had any other diviſors, theſe could only enter as common meaſures, into every two ſquares that

compoſe n^4. We may, therefore, ſuppoſe n^4, and conſequently n, to have no diviſors, but prime numbers of the form $4x + 1$; and, in the firſt place, let us ſee whether a prime number p, of the form $4x + 1$, will anſwer for n. We have already mentioned, that p is the ſum of two ſquares, $\alpha^2 + \beta$; and we have now to add, that p can be the ſum of two ſquares only one way. In like manner, we find $p^2 = (\alpha^2 + \beta^2)^2 + 4\alpha^2\beta^2$, nor can p^2 be reſolved into two ſquares any other way. Proceeding to the fourth power, we ſhall find $p^4 = (\alpha^4 - 6\alpha^2\beta^2 + \beta^4)^2 + (4\alpha^3\beta - 4\alpha\beta^3)^2$, $p^4 = p'^2\alpha^2 + p^2\beta^2$. All theſe two are all the ways that p^4, that be reſolved into two ſquares, therefore no ſingle prime number, of the form $4x + 1$, will anſwer the conditions required. Let us now try the product of two prime numbers of the ſame form as p and p'; then, according to what has been ſhewn, we ſhall have

$p^4 = (\alpha^4 - 6\alpha^2\beta^2 + \beta^4)^2 + (4\alpha^3\beta - 4\alpha\beta^3)^2$,
$p^4 = p'^2\alpha^2 + p^2\beta^2$; and in like manner
$p'^4 = (\alpha'^4 - 6\alpha'^2\beta'^2 + \beta'^4)^2 + (4\alpha'^3\beta'^3 - 4\alpha'\beta'^3)^2$,
$p'^4 = p''^2\alpha'^2 + p'^2\beta'^2$: therefore, combining the two values of p^4 with the two values of p'^4, the biquadratic $p^4p'^4$ will be the product of the ſums of two ſquares four different ways; but the product of two ſums of two ſquares, is the ſum of two ſquares twice; for $(M^2 + N^2).(P^2 + Q^2) = (MP + NQ)^2 + (MQ - NP)^2 = (MP - NQ)^2 + (MQ + NP)^2$.

Therefore, by combining the two values of p^4 with the two values of p'^4, the biquadratic p'^4p^4 will be the ſum of two ſquares no leſs than eight different ways. To theſe eight we may add four other ways, by combining p^4 with the two values of p'^4, and p'^4 with the two values of p^4. Therefore the fourth power of a number which is the product of two primes of the form $4x + 1$ is the ſum of two ſquares no leſs than twelve different ways.

We ſee then, that no prime number of the form $4x + 1$, can ſatisfy the conditions required in the queſtion, but a number which is the ſum of two ſuch primes is the ſum of two ſquares twelve different ways, one ſquare of each ſum being even and one odd. Therefore, as every combination of three out of the twelve will give one ſolution of the queſtion, and as twelve numbers admit of 220 combinations of three, there will be ſo many different ſolutions, unleſs ſome are excluded as producing negative numbers. It is eaſy to ſee that one combination of three will only give one integral ſolution.

The two laſt primes of the form $4x + 1$ are 5 and 13, and their product 65, is conſequently the leaſt number that will ſatisfy the queſtion. We have $5 = 2^2 + 1$, and $13 = 3 + 2^2$. Whence $65^4 = 3713^2 + 2016^2$
$65^4 = 3047^2 + 3696^2$
$65^4 = 2145^2 + 3640^2$;
which are only three of the twelve ways that 65^4 is the ſum of two ſquares. And taking the three even ſquares for μ, μ', and ν'', our formulæ give $a = 1826720$, $b = 2237536$, $c = 11422880$, and $d = 2363489$, which is one ſolution. In like manner, if we take another three of the twelve ways that 65^4 is the ſum of two ſquares, as
$65^4 = 2047^2 + 3696^2$
$65^4 = 2145^2 + 3640^2$
$65^4 = 4095^2 + 1040^2$ we ſhall derive another ſolution; $a = 740208$, $b = 12914208$, $c = 335392$, and $d = 3854817$.

DIOPHANTUS, in *Biography*, a celebrated mathematician and analyſt of Alexandria, who flouriſhed at a period which has not been preciſely aſcertained. According to Abulpharagius, in his "Hiſt. Dynaſt." he flouriſhed under the emperor Julian, or towards the year 366 of the Chriſtian era. It is certain that he could not be later than this time, becauſe the ingenious female Hypatia commented on his work; and it is well known that ſhe flouriſhed towards the commencement of the fifth century. Hypatia alſo commented on the "Canon aſtronomicus," which is juſtly aſcribed to this author. Such was his reputation among the ancients, that they ranked him with Pythagoras and Euclid, in reſpect to mathematical learning. Bachet de Méziriac has collected from Diophantus's epitaph, in the Greek Anthologia, which furniſhes a kind of arithmetical problem, the following particulars of his life: *viz.* that he was married when he was 33 years old, and had a ſon five years after; that this ſon died at the age of 42, and that his father did not ſurvive him above four years: whence it appears, that Diophantus was 84 years of age when he died. The problem amounts to this: to find a number ſuch that its 6th, 12th, 7th parts with five, its half and four amount to *the whole* number, which is evidently 84. He is ſaid to have been the inventor of algebra, or at leaſt he is the firſt of the Greeks who has written on this ſubject. Although we ſhould not be warranted in aſcribing the invention of algebra to Diophantus, he introduced the uſe of various ſymbols into this ſcience. He denotes the unknown number by $\sigma\tau\iota$; its ſquare he called $\delta\upsilon\nu\alpha\mu\iota\varsigma$ or power, and he marked it by δ^{ν}; the cube he called $\kappa\upsilon\beta\circ\varsigma$, and diſtinguiſhed it by κ^{ν}: the biquadrate by $\delta\delta^{\nu}$; the fifth power by $\delta\kappa^{\nu}$. But the diſcovery which demands our more particular attention was the method adopted by Diophantus, of applying the algebraic analyſis to indeterminate problems. (See the preceding article.) He wrote ſix books of arithmetic, or algebra, which Regiomontanus, in his preface to Alfraganus, informs us, are ſtill preſerved in MS. in the Vatican library. Indeed we learn from Diophantus himſelf, at the cloſe of his addreſs to Dionyſius, prefixed to his work, that it conſiſted of 13 books; whence Regiomontanus might infer that the 13 books were in that library. But no more than ſix books, with part of a ſeventh, have ever been publiſhed; and it may be preſumed that no more are extant. Bombelli, in the preface to his Algebra, written in the year 1572, ſays, that there were but ſix of the books then in the library. Theſe ſix books, with the imperfect ſeventh, were firſt publiſhed at Baſil by Xylander, in the year 1575, in a Latin verſion, with the Greek ſcholia of Maximus Planudes upon the two firſt books, and obſervations of his own. The ſame books were afterwards publiſhed in Greek and Latin at Paris, in 1621, by Bachet, who made a new Latin verſion, and added learned commentaries. He paid ſome regard to Xylander's notes, but treated thoſe of the ſcholiaſt Planudes with the utmoſt contempt. He ſeems to intimate, that the ſix books of Diophantus, now extant, may be merely a collection made by ſome novice of ſuch propoſitions, as he thought proper to ſelect out of the whole 13; but Fabricius thinks that his ſuppoſition is altogether unfounded. M. de Fermat made ſome notes on the edition of Bachet, which was republiſhed by his ſon in 1670. Father de Belli, a jeſuit, publiſhed a work under the title of "Diophantus Redivivus," containing queſtions of more difficult ſolution than thoſe of the ancient analyſt. The ſame ſubject has engaged the attention of Ozanam, Preſtet, Kerſey, M. de Lagni, Frenicle, Wallis, Saunderſon, Euler, Playfair, Ivory, &c.—Montucla, Hiſt. Math. vol. 1.

DIOPOLIS, in *Ancient Geography*, a town of Aſia, in Armenia Minor, formerly called *Cabira*, and afterwards *Sebaſte*.

DIOPSIS, in *Entomology*, a genus of the dipterous order of

of inſects, generically diſtinguiſhed by having the eyes placed at the tip of two long filiform immoveable horns, which project from the head, inſtead of being ſeated, as in other inſects, within the head itſelf. Of this moſt ſingular genus we are acquainted with two ſpecies; one, the example deſcribed by Linnæus, under the ſpecific name of Ichneumonea; the other, non-deſcript. Linnæus, to whom only the firſt ſpecies was known, as uſual with him under ſuch circumſtances, does not aſſign any ſpecific character; the following is taken from Mr. Donovan's ſplendid illuſtration of the inſects of India, in which this extraordinary inſect is deſcribed at conſiderable length, with an appropriate accompaniment of figures.

"*Diopſis Ichneumonea:* nigra capite abdomine antice pedibuſque ferrugineis, thorace poſtice biſpinoſo."—"Black; head, anterior part of the abdomen and legs ferruginous: two ſpines on the poſterior extremity of the thorax."—"The appearance of this curious inſect is peculiarly ſtriking. Nothing can be more ſingular than the diſpoſition of the eyes, which are ſituated at the extremity of two long immoveable pedicles ariſing from the head, moſt exactly in that part which in other inſects bears the antennæ. In this particular the diopſis differs not only from other inſects of the kindred genera, but alſo from all other kinds we are acquainted with. Some few of the cancri (which Linnæus admits among the inſect race) have indeed the eyes placed at the extremity of elongated pedicles, as is for example inſtanced in the cancer angulatus; yet theſe are obviouſly diſſimilar in conſtruction, for they are moveable at the baſe, and may be directed towards any object at the will of the animal with the utmoſt facility; but, to accompliſh this, the motion of the pedicle in the diopſis muſt be neceſſarily accompanied by that of the head, or even of the whole body. The eyes of the latter are notwithſtanding ſo conveniently ſtationed at the globular extremity of the pedicles, as to embrace a far more comprehenſive range of ſight than is uſual in the generality of inſects.

"To the inexperienced entomologiſt, the diopſis would rather ſeem to be furniſhed with remarkable horns, and be deſtitute of eyes, although the latter are ſo conſpicuous when their ſituation is pointed out; it is, on the contrary, the true horns or antennæ that are ſo minute as to be moſt likely to eſcape attention, for each of theſe conſiſts only of a ſingle ſetaceous hair or briſtle ſeated on a very ſmall tubercle juſt beneath the eye.

"It has been previouſly intimated that the firſt account of the diopſis was given by Linnæus: it is inſerted in a ſmall tract, publiſhed at Upſal in 1775. From this we learn, that the diopſis was firſt obſerved by Andreas Dahl, among a parcel of inſects, in the poſſeſſion of Dr. Fothergill of London, by whom they were ſent to Linnæus. They conſiſted chiefly of inſects collected in North America and Guinea, but the habitat of the diopſis in particular was by no means exactly known. Fueſly, notwithſtanding, deſcribes the latter upon this ambiguous authority only as a native of Cayenne; and after him, Gmelin notes the ſame inſect from South America and Guinea, perhaps with as little reaſon. Latreille tells us, it is from the coaſt of Angola, on the information of Perrin, a zealous naturaliſt of Bourdeaux. Our ſpecimens were brought from Bengal; it was diſcovered by Mr. Fichtel, who has thus eſtabliſhed the habitat of this ſingular creature beyond diſpute." Vide *Inſ. India.*

This inſect is rather larger than the common houſe-fly, and is very ſcarce.

DIOPTER, or DIOPTRA, in *Writers of Aſtronomy*, is frequently uſed for the hole, or index, pierced in the pinnula, or ſight of an alhidade. See SIGHTS.

DIOPTRA, among the *Ancients*, an inſtrument invented by Hipparchus, which ſerved for ſeveral uſes, as to level water, to take the height of towers, or places at a diſtance; to determine the places, magnitudes, and diſtances of the ſtars.

DIOPTRA, among *Surgeons*, denotes an inſtrument whereby to dilate the matrix, or anus, and inſpect any ulcers therein; called alſo ſpeculum matricis and dilatatorium.

DIOPTRICS (from the Greek διοπτομαι, to ſee through) is a branch of the ſcience of optics, and treats of the different refractions of light paſſing through different mediums, ſuch as glaſs, water, air, &c.—When the rays of light paſs in an oblique direction from one medium into another, their direction, which is otherwiſe ſtraight, is generally bent at the point of tranſition, and that bending is called the *refraction of light*, the quantity of which differs in different mediums.

In their tranſition from one medium into another, the rays of light, beſides their being bent or refracted, ſuffer a ſort of decompoſition, or a ſeparation of their component parts, whence ſeveral remarkable phenomena ariſe. It is the object of dioptrics to ſtate and to examine all theſe particulars, together with the various and important uſes to which they are applied. The rain-bow, the colours of thin tranſparent plates, the apparent deviation of the celeſtial objects from their true ſituations, and various other natural phenomena, ariſe from the refraction of light; the action of the teleſcopes and microſcopes that are conſtructed with glaſs lenſes, the action of the camera obſcura, of ſpectacles, and of lenſes in general, together with that of all the inſtruments that contain lenſes, depend entirely upon the refraction of light. However, agreeably to the plan of this dictionary, we ſhall only treat of the general theory of dioptrics in the preſent article; but we ſhall deſcribe the rain-bow, the teleſcope, camera obſcura, magic lantern, &c. under the articles of their reſpective denominations. When the rays of light paſs obliquely from any tranſparent ſubſtance into a vacuum, or from the latter into the former, or, in general, from one tranſparent medium into another tranſparent ſubſtance of different denſity, then they are *refracted* (*viz.* bent) at the point of inſertion. But if, inſtead of falling obliquely on the ſurface of any medium, they fall perpendicularly upon it; or if they continue in the ſame medium, then they proceed in ſtraight lines without any perceptible deviation one way or another. The light of the celeſtial objects, in its paſſage through the atmoſphere to our eyes, has been found to move in curves, which is owing to the various denſities of the air at different diſtances from the ſurface of the earth. The refraction of light may be illuſtrated by the following eaſy and familiar experiments.

1. Provide a glaſs veſſel A B C, (*Plate* IV. *Optics, fig.* 2.); lay a card, having a ſmall hole F in its middle, upon the aperture of it, and fix a candle or lamp E above the veſſel, ſo that its flame may ſtand perpendicularly over the hole F in the card, which may be eaſily accompliſhed by means of a plummet. In this ſituation of the apparatus the image of the hole will be caſt at D, upon the bottom of the veſſel; and the line which paſſes through the flame E, the hole F, and the image D, will be a ſtraight line, as may be determined by holding the plummet on one ſide of the veſſel. Now, without altering any part of the apparatus, let the glaſs veſſel A B C be filled with water, which done, it will be found that the image of the hole remains at its original place D; which ſhews that the light of the flame E, paſſing through the hole F, and falling *perpendicularly* upon the ſurface W S of the water, proceeds in a ſtraight line to D, without ſuffering any bending or refraction at the point of its entrance into the water.

2. Take a veſſel A B D C, *fig.* 3. open at top, place a lighted

a lighted candle on one ſide of it, and a little above the upper edge of it, as at G, and the edge of the ſhadow of the ſide of the veſſel B will be found to fall upon the bottom at E, ſo that the line G B D may be a ſtraight line. Now, without diſturbing any part of the apparatus, let the veſſel A B C D be filled with water, and when this has been done you will find that the edge of the ſhadow falls at F, *viz.* at a place different from D, which proves beyond a doubt, that the light which falls obliquely upon the ſurface of the water at B is refracted, *viz.* bent by it; for if it proceeded in a ſtraight line, G B F would coincide with G B D, which is by no means the caſe.

3. An eaſier way of ſhewing this remarkable property of light is as follows. Place a piece of money D, *fig.* 4. in the bottom of a common empty baſon, and let a perſon ſituate his eye at F; *viz.* at a place whence he may juſt ſee the piece of money D along the edge B of the veſſel. In this caſe the line F B D is a ſtraight line, becauſe the light from the piece of money D to the eye at F paſſes entirely through air. Now let the obſerver place his eye a little below F, as at G, and from this latter place he will not be able to ſee the piece of money; but if in this diſpoſition of the apparatus, eye, &c. the baſon be filled with water, the eye at G will immediately perceive the piece of money; for the ray of light D B, in paſſing from the water into the air at B is bent, *viz.* refracted into the direction B G.

At the point B of *fig.* 3. raiſe B K perpendicular to the ſurface of the water, and let the line B I be a prolongation of that ſurface, or an horizontal line. Then the ray of light G B, which falls upon the ſurface of the water at B, is called the *incident ray*; that part of it B F, which after the bending at B, paſſes through the water, is the *refracted ray*; the water, or any other tranſparent ſubſtance, which produces a ſimilar effect, is called the *refracting medium*; the angle which the incident ray G B makes with the perpendicular to the ſurface at the point of incidence B; *viz.* the angle G B K is the angle of incidence, the angle which the refracted ray makes with the ſame perpendicular produced; *viz.* the angle G B F, is the angle of refraction. But ſome authors call G B I the angle of incidence; and F B A, the angle of refraction; which are the angles made by the incident and the refracted rays, with the ſurface or horizontal line A B I.

Inſtead of water, the veſſel A B D C, *fig.* 3. may be filled with oil, or with ſpirit of wine, or with a lump of glaſs, or in ſhort with any other tranſparent medium different from air, and the ray of light G B will always be bent; with this difference, however, that the ray will be bent, *viz.* refracted, more or leſs according as one tranſparent medium or another is employed; which ſhews that every tranſparent ſubſtance has a peculiar degree of refracting power. And accordingly if the experiment be ſucceſſively repeated with different refracting mediums, and the place of the edge of the ſhadow on the bottom of the veſſel, be marked at each experiment; then from the diſtances of thoſe places, or marks from the point C, the reſpective refractive powers of the tranſparent ſubſtances that have been employed, may be determined. As a matter not of mere curioſity, but of very great uſe in the conſtruction of optical inſtruments, as well as in the inveſtigation of natural phenomena, theſe different refractive powers of tranſparent ſubſtances, have been attentively determined by various able philoſophers. A liſt of thoſe powers as belonging to different ſubſtances, together with the beſt methods of aſcertaining them, will be found under the article REFRACTION.

A remarkable property has been obſerved with reſpect to the refractive power of tranſparent ſubſtances, which is that in the ſame ſubſtance the ſine of the angle of refraction always bears the ſame proportion (either preciſely or very nearly) to the ſine of the angle of incidence. This requires illuſtration by means of a diagram. Let F G H Z (*fig.* 5.) be a quantity of water; B is a narrow tube through which the ſun ſhines obliquely upon the water at C. Then, on account of the refractive property of water, that light will not paſs through the water along the line C Z, which is in the ſame ſtraight direction with B C; but it will paſs in the direction C D; making the angle of refraction D C E, with the line A C E (which is perpendicular to the ſurface of the water, or to the boundary of the two mediums, *viz.* water and air) ſmaller than the angle of incidence A C B. Let a circle F H E be deſcribed about the centre or point of incidence C, in the ſame plane with the lines B C, C D; and from the interſection H of the circle with the incident ray, let a perpendicular H K be dropped on the line A E; then H K is the ſine of the angle B C A. Alſo, if from the interſection I of the circle with the refracted ray, a perpendicular I L be dropped on the ſame line A E, then I L will be the ſine of the angle D C E.

Now it has been found that the ſine I L is always nearly three-fourths of the ſine H K, let that ſine be what it may; for inſtance, if the tube B be placed at M, then O R will be the ſine of the angle of incidence M C A; and Y Q will be the ſine of the angle of refraction, or of the angle in water Y C E. And in this caſe it will be found, as above, that the ſine Y Q is nearly three-fourths of the ſine O R.

It is evident, that when the incident ray comes along the line A C, the angle of incidence, as well as its ſine, vaniſhes or becomes nothing; conſequently, the angle of refraction and its ſine, muſt vaniſh too; *viz.* the ray of light muſt proceed ſtraight along the line A C E; hence it is ſaid that there is no refraction when the rays of light enter a medium in a direction perpendicular to its ſurface.

If inſtead of water, F G H Z be ſuppoſed to be a lump of glaſs, every thing elſe remaining as above; then the difference in the reſult would be, that the ratio of the ſine of refraction to that of incidence would be that of 2 to 3; (inſtead of being that of 3 to 4, which is the caſe with water) *viz.* the angles of refraction will be reſpectively ſmaller when F G H Z is glaſs than when it is water. And if inſtead of water or glaſs, F G H Z were a diamond, then the angle of refraction would be ſmaller ſtill; *viz.* the ſine of the angle of refraction in the diamond would be to the ſine of the angle of incidence in the air, nearly as 2 to 5. Hence it appears, that the power of bending or refracting the rays of light is ſtronger in glaſs than in water, and ſtronger in diamond than in glaſs. See the article REFRACTION. The refractive property of tranſparent ſubſtances, and eſpecially of fluids, is increaſed a little, when their temperature is raiſed. Two other remarkable phenomena accompany the refraction of light, the firſt of which is that the light is not only bent whenever it paſſes obliquely from one medium into another of different denſity, but is likewiſe enlarged in a ſectoral, or fan-like, manner. The ſecond is that this enlarged part of the refracted light is tinged with the colours of the rainbow. In *fig.* 6, I C repreſents a ſmall beam of ſolar light, which paſſes through the air, and enters another refracting medium at C. There the beam of light is refracted, *viz.* is diverted from its ſtraight line direction I C, and is ſpread, or diſperſed, into the ſectoral ſhape *v* C *r*, which is called *the angle of diſperſion*, or *of diſſipation*, and which is itſelf divided into ſmaller ſectors of different colours; *viz.* next to the upper line C *r*, the light appears red, and thence it gradually degenerates into orange, then yellow, green,

blue

blue, indigo, and laſtly violet, which ſtands neareſt to the lower line or boundary C *v*. This diſperſion of the beam of light is in the ſame plane with the incident and the refracted ray I C *m*. The line C *m*, drawn through the middle of the angle of diſperſion *v* C *r*, is the mean direction of the refracted light, and *m e* is its ſine, which is called *the ſine of the mean angle of refraction*: *v f*, and *r d*, are the ſines of the extremes; *v f* being called *the ſine of the moſt refrangible colour, viz.* of the violet, and *r d*, *the ſine of the leaſt refrangible colour*, which is the red. This ſeparation of the white, or colourleſs light, into various colours, juſtly induced ſir Iſaac Newton to conclude, that white light conſiſts, or is a mixture, of differently coloured rays, which, being differently refrangible, are of courſe ſeparated by the refracting medium.

Through the ſame refracting medium the angle of diſperſion is always proportionate to the mean angle of refraction; conſequently when the mean angle of refraction is very ſmall, then the angle of diſſipation muſt be comparatively much ſmaller, in which caſe the different colours of the refracted light cannot be diſcerned; but when the angle of incidence, and of courſe the mean angle of refraction, is conſiderably large, then the angle of diſſipation will be ſo large as to exhibit the different colours. In order to render this coloured diſperſion of light as apparent as poſſible, philoſophers generally receive the light, either of the ſun or of any other luminous object, upon the ſide of a priſmatic lump of glaſs; for in that caſe the light, entering into and going out of the priſm with a great angle of inclination, its refraction and its diſperſion become very great; conſequently its colours, or as it is commonly called, *the priſmatic ſpectrum*, is broad and vivid. Hence the above-mentioned colours, or the component coloured rays of white light, have likewiſe been called *the priſmatic colours*. See PRISMATIC *Colours*.

Different refractive mediums have different diſperſive powers; for inſtance, the angle of incidence I C H, *fig.* 6. remaining the ſame, not only the mean angle of refraction *m* C E will vary according as the refractive medium A B D G is water, or glaſs, or oil, or other tranſparent ſubſtance; but the angle of diſſipation *v* C *r* will alſo vary. And in ſome refracting mediums the mean angle of refraction is larger, whilſt the angle of diſperſion is ſmaller. In other refracting mediums the mean angle of refraction is ſmaller, whilſt the angle of diſperſion is larger. In ſhort the knowledge of the mean refractive power of any given ſubſtance, will not enable us to determine the preciſe quantity of its diſperſive power, and *vice verſâ*. Therefore, in each particular tranſparent ſubſtance, both its refractive and its diſperſive properties muſt be aſcertained by means of actual experiments.

There is a remarkable ſort of tranſparent mineral bodies, which have the ſingular property of refracting the light in a double, and even in a multiple, direction; ſo that an object, ſeen through a plane plate of the tranſparent mineral, will appear double, and ſometimes even treble and quadruple. Rock cryſtal, and eſpecially the Iceland cryſtal, beſides a few other bodies, are poſſeſſed of this double, or even multiple refractive power.

A liſt of the diſperſive powers of various tranſparent ſubſtances will be found annexed to the liſt of refractive powers, under the articles REFRACTION, and DISPERSION, to which we refer our readers. We ſhall, however, here add a few uſeful and general remarks on refraction, &c.

Upon the whole it appears, that the denſer bodies; *viz.* thoſe which have a greater ſpecific gravity, refract, or bend, the rays of light, more than thoſe which are leſs denſe; excepting (as ſir Iſaac Newton expreſſes it) that unctuous and ſulphurous bodies refract more than others of the ſame denſity. There is no ſubſtance that has an intermediate refractive power between air and rain water, or diſtilled water. The refractive power of the diamond exceeds that of any other known ſubſtance, and to this property its peculiar brilliancy, when properly ſhaped, is in great meaſure to be attributed. Spirituous liquors have a greater refractive power in proportion to their ſtrength. Spirit of turpentine is the moſt refractive amongſt the fluids.

The above-mentioned properties of tranſparent bodies, or of light, or of both, however trifling they may appear to the novice in philoſophy, have proved extremely uſeful to the human ſpecies. Sir Iſaac Newton, who firſt paid particular attention, and made ſeveral important diſcoveries relative to the coloured rays of white light, had no ſuſpicion of the laſt above-mentioned property of tranſparent ſubſtances. He thought that the diſperſive power was conſtantly proportionate to the refractive. Experiments made ſubſequent to his, have ſhewn, that the fact is otherwiſe; ſo much ſo, that even glaſſes formed of different materials, or of the ſame ingredients in different proportions, are poſſeſſed of different diſperſive powers with the ſame refractive property, or of different refractive powers, and an equal diſperſive property. By a combination of lenſes conſiſting of different kinds of glaſs, the famous Dollond formed his achromatic object lenſes of teleſcopes; whence thoſe optical inſtruments received a moſt capital improvement; the nature of which may be briefly pointed out in this place, whilſt the detail of particulars will be found under the articles ACHROMATIC, and LENSES.

A glaſs lens, ſuch as is uſed for teleſcopes, bends the rays of light towards a particular point or ſmall ſpot, which is called its *focus*; but this bending of the rays of light is accompanied with a decompoſition of the ſame into their coloured component rays; therefore, the magnifying powers of the lenſes of the old teleſcopes were always attended with tints of the various priſmatic colours, which became more apparent in proportion as the magnifying power was greater, under a given length of teleſcope; hence thoſe teleſcopes could not be made to magnify the object beyond a very moderate degree; nor could their object lenſes have a large aperture. But Mr. Dollond formed each object lens by placing two, or three lenſes, cloſe to each other, which were made of different ſorts of glaſs, and ſuch as the diſperſive and refractive powers of one of them, ſhould counteract the diſperſive and refractive powers of the other; whence the compound lens might produce the effect of bending the rays of light to a focus, and at the ſame time not decompoſe them into their coloured parts. And from this effect the achromatic lenſes, or the achromatic teleſcopes, have derived their diſtinctive appellation. This ſort of teleſcope, then, has a vaſt advantage over thoſe of the old conſtruction; for ſince the effect of its object lens is not tinged with colours, the power of the teleſcope may be increaſed to a conſiderable degree, and its object lens may be made conſiderably larger, in conſequence of which the inſtrument will repreſent the objects very bright. In fact, a modern achromatic teleſcope of about four feet in length, and properly conſtructed, may be reckoned about equal in effect to a forty feet teleſcope of the old conſtruction.

We might now proceed to explain ſeveral natural phenomena, as alſo the nature and the effects of glaſs lenſes, of priſms, of teleſcopes with lenſes, and various other optical inſtruments, which undoubtedly belong to the dioptric branch of optics, but it has already been mentioned, that theſe will be found deſcribed under the articles of their particular names.

DIOPTRIC *Teleſcope*, is a teleſcope through which the light paſſes directly from the object to the eye of the obſerver. See DIOPTRICS.

Towards the cloſe of the 16th century, the wonderful diſcovery of the teleſcope was accidentally made by placing two glaſs lenſes at the two extremities of a tube, and looking through it. This diſcovery was no ſooner made, than the ingenuity of philoſophers began to vary and to improve the conſtruction, in order to render the inſtrument as powerful as poſſible, and to adapt it to the numerous purpoſes which it was juſtly thought capable of anſwering. But it being found that teleſcopes of this kind had a very limited power on account of the diſperſive power of the lenſes, and which at that time was looked upon as an unſurmountable obſtacle, (ſee DIOPTRICS) ſir Iſaac Newton firſt conſtructed a teleſcope, which inſtead of an object glaſs lens, had a reflector; whence the rays of light, inſtead of being *refracted* to a focus, were *reflected* to a ſocus; and this latter caſe was not attended with a diſperſion of the light into its coloured component rays, whence Newton's contrivance was thought capable of a much greater magnifying power, and altogether capable of greater improvements; which, in fact, has been verified through the aſſiduous exertions of philoſophers and artiſts. This contrivance introduced the different denominations of the *refracting* or *dioptric* teleſcope, and of the *reflecting* or *catadioptric* teleſcope. The former of theſe two kinds, which conſtitutes the object of the preſent article, conſiſts entirely of lenſes fixed in a tube or tubes; but the form, the number, and diſpoſition of theſe lenſes, has been much varied in order to render the inſtrument ſubſervient to different purpoſes. And according to its various conſtructions, and its various uſes, the dioptric teleſcope has obtained various particular appellations, which we ſhall briefly enumerate in this place; for their peculiar conſtructions, their powers, uſes, &c. will be found minutely deſcribed under the articles of their particular denominations.

The *aſtronomical* teleſcope conſiſts of two, either ſingle or compound, lenſes. It repreſents the objects inverted, and is principally uſed for obſerving the celeſtial bodies. When this ſort of teleſcope is very long, the two lenſes are connected together not by a tube, but by a ſtring or pole, and in that caſe it is called an *aerial* teleſcope.

By adding two or more convex lenſes to the eye tube of the aſtronomical teleſcope, that inſtrument is enabled to repreſent the objects erect, in which caſe it may more particularly be uſed for viewing land objects; whence it has been called a *perſpective glaſs*, or the *terreſtrial* teleſcope.

The *Galilean* teleſcope, contrived by the great Galileo, conſiſts of two lenſes; but the eye lens is a concave one. It repreſents the object erect, and peculiarly diſtinct; but its field of view is ſmall, in compariſon with the aſtronomical teleſcope of an equal magnifying power.

The common *opera glaſs* is nothing more than a very ſhort Galilean teleſcope. It magnifies little, but it ſhews the objects erect and much illumined; hence it is moſtly uſed in places wherein the objects are rather obſcure.

The *night* teleſcope is a ſhort teleſcope, of about two feet in length, and often ſhorter. It repreſents the objects inverted, but much illumined; though little magnified. Its field of view is very extenſive; hence it is uſed moſtly or entirely in the night time either by navigators or by aſtronomers; the former uſing it for diſcovering objects that are not very diſtant, but which cannot otherwiſe be diſcerned for want of ſufficient light, ſuch as veſſels, coaſts, rocks, &c.; and the latter for diſcovering comets, or other not very luminous objects.

Almoſt all theſe different teleſcopes are often conſtructed with an achromatic object lens; in which caſe the epithet *achromatic* is annexed to their peculiar appellations.

DIORDULI, in *Ancient Geography*, a people placed by Ptolemy in the eaſtern part of the iſland of Taprobana.

DIORPHUS, a mountain of Aſia, in Armenia, near the Araxes, according to Plutarch.

DIORTHOSIS, διορθωσις, in *Surgery*, an operation, by which crooked or diſtorted members are made even, and reſtored to their primitive and regular ſhape.

DIORYX, in *Ancient Geography*, a canton of Aſia, in Aſſyria, near the Tigris.

DIOSANTHUS, in *Botany*, Διος ανθος of Dioſcorides, book vi. chap. 6, is merely enumerated by him among the coronary or ornamental plants, without any deſcription, except its being without ſcent. Hence it does not very clearly appear why ſome commentators have ſuppoſed this flower to be the Carnation, or Clove Pink, though others may be more correct who take it for the Sweet William. Linnæus, however, has adopted the name, a little changed, for his genus; to which both theſe plants belong. See DIANTHUS.

DIOSCOREA, (ſo called by Plumier after the Greek botaniſt Pedacius Dioſcorides.) The Yam. Plum. Gen. 9. t. 26. Linn. Gen. 525. Schreb. 693. Mart. Mill. Dict. v. 2. Jeſſ. 42. Gærtn. t. 17. Claſs and order, *Dioecia Hexandria*. Nat. Ord. *Sarmentaceæ*, Linn. *Aſparagi*, Juſſ.

Gen. Ch. Barren fl. *Cal.* Perianth of one bell-ſhaped leaf, in ſix deep, oblong ſegments, ſpreading at their extremities; the three innermoſt ſmalleſt. *Cor.* none, except the calyx be taken for ſuch. *Stam.* Filaments ſix, awl-ſhaped, very ſhort, oppoſite to the ſegments of the calyx; anthers of two diſtant lobes. Fertile fl. *Cal.* as in the barren ones. *Cor.* none. *Piſt.* Germen minute, triangular, inferior; ſtyles three, undivided; ſtigmas ſimple. *Peric.* Capſule large, three-lobed, with three cells, and three heart-ſhaped, compreſſed valves. *Seeds* two in each cell, imbricated, roundiſh, with a membranous border.

Eſſ. Ch. Barren fl. Calyx in ſix deep ſegments. Corolla none. Fertile fl. Cal. in ſix deep ſegments. Cor. none. Styles three. Capſule inferior, three-lobed, and three-celled, compreſſed. Seeds two in each cell, bordered.

Obſ. The capſule is juſtly repreſented inferior in the Hortus Malabaricus, though Linnæus, Juſſieu, and Gærtner thought it ſuperior.

Of this genus about 20 ſpecies are more or leſs perfectly known, their ſynonyms being greatly confuſed. We are not at preſent furniſhed with materials to elucidate them, for the plants being not very diſſimular in appearance, nor remarkable for beauty, they have been but little attended to by collectors. Their *roots* are generally tuberous, perennial, eſculent when boiled. *Stems* annual, twining, weak. *Leaves* moſtly alternate, ſtalked, heart-ſhaped, entire, with numerous ſimple ribs. *Flowers* in ſimple or branched cluſters, ſmall, greeniſh-white. Tuberous buds, which become roots, are frequently produced on the ſtem above the inſertion of the foot-ſtalks. D. *ſativa*, Linn. Sp. Pl. 1463. Hort. Cliff. t. 28, is generally taken for the Yam, and is certainly cultivated as ſuch in the warmer parts of America. But Forſter, in his Plantæ Eſculentæ 56, ſays D. *alata*, Linn. Sp. Pl. 1462, is the moſt univerſally cultivated in both Eaſt and Weſt Indies, the equinoctial part of Africa, and in the iſlands of the South Sea, its roots being no leſs grateful than wholeſome, when either boiled or roaſted, and uſed as bread. This is the *Katsjil Kelengú* of Hort. Mal. v. 7. t. 38; and, according to Forſter, the different ſpecies of *Ubium* in Rumph. Herb. Amboin. v. 6. book 9. t. 120.

to 123, and 125, referred by Linnæus to his D. *oppoſitifolia*, belong to the *alata*. The ſame author informs us "the root is often three feet long, as thick as a man's thigh, and weighs 30lb. Its bark is black, the internal part white and glutinous, becoming farinaceous when dreſt. The juice, when recent, is acrid, cauſing itching in the ſkin. A favourite diſh in Otaheite is compoſed of this root, with pulp of the *Muſa*, or Plantain-fruit, and grated cocoa-nuts." D. *bulbifera*, Linn. Sp. Pl. 1463. Saliſb. Parad. t. 17. (Katu Katsjil; Hort. Mal. v. 7. 69. t. 36.) A native of ſhady woods in Malabar, is not mentioned by Rheede as an eſculent plant, but the boiled root, mixed with powder of China-root, is uſed as an application to cleanſe and heal ulcers.

DIOSCORIDES, Pedacius, or Pedanius, in *Biography*, a celebrated Greek phyſician and botaniſt of Anazarba in Cilicia, now Caramania, who lived, as it is generally thought, in the time of Nero. He is ſaid to have been originally a ſoldier, but he ſoon became eminent as a phyſician, and travelled much, both in Europe and Aſia, for the purpoſe of acquiring knowledge. He paid particular attention to the Materia Medica, and eſpecially to Botany, as ſubſervient to Medicine. His knowledge of plants has been reckoned ſuperior to that of any other ancient writer; but Theophraſtus muſt always be excepted as by far the more philoſophical botaniſt, and one by whoſe information Dioſcorides profited, as Pliny ſubſequently did by them both.

Dioſcorides has left us a treatiſe on the Materia Medica, in five books, of which the beginning of the ſecond ſpeaks of animal ſubſtances, the reſt entirely of plants; alſo two books on the compoſition and application of medicines, an eſſay on counter-poiſons, and another on venomous animals. The beſt edition of his works was publiſhed in one volume folio, at Lyons in 1598, in the original Greek, with a Latin verſion and notes by Saracenus, or Saracin, a phyſician of that place. Aldus, however, had already publiſhed a Greek edition of Dioſcorides in 1495, and a Latin one had appeared at Cologne in 1478. His commentators have been numerous, but the moſt celebrated and valuable of them all is Matthiolus, whoſe numerous editions, illuſtrated with wooden cuts, are, ſome or other of them, eſſential to every botanical library. The fineſt of theſe, on account of the large ſize of the figures, were publiſhed in folio by Valgriſius at Venice, in Italian in 1565, and in Latin in 1583 and 1604. Linnæus uſed a ſmaller Latin edition of 1570 by the ſame printer, with cuts of the ſize uſual in the works of Cluſius, Gerarde, &c. Dioſcorides deſcribes or mentions about 600 plants, but his deſcriptions are often ſo ſlight and ſuperficial, founded on ſuch uncertain or variable characters, and ſo devoid of technical or ſyſtematical principles, that his commentators had ample ſcope for conjecture, and their controverſies with each other were, as Haller obſerves, terminated only by deſpair of ſucceſs. So vague were their conjectures in many inſtances, that not only the extremities of Europe, but even America, was ranſacked to explain a Greek plant. This has been a fertile ſource of error. Some good botaniſts have taken a more ſure way of aſcertaining the plants of Dioſcorides and Theophraſtus, by ſeeking them in the countries where they were originally deſcribed. Among theſe travelling botaniſts, Tournefort and the late Dr. John Sibthorp, Profeſſor of Botany at Oxford, will ever ſtand pre-eminent. The latter has determined ſome of the moſt celebrated Greek medical plants, hitherto miſtaken or unknown, as the φου and ελλεβορος μελας of Dioſcorides, the former of which proves a hitherto unknown ſpecies of Valerian, *Valeriana Dioſcoridis*, Fl. Græc. t. 33, and the latter a new *Helleborus*, intermediate, as it were, between the *niger* and *viridis* of Linnæus. Even amongſt the ſhepherds of the preſent day, Dr. Sibthorp met with traditionary accounts of the virtues of ſome plants handed down from the ancients. A root of the απιος, *Euphorbia Apios*, Linn., being ſhewn to a Cretan peaſant, the Profeſſor was aſſured by him that the upper part was emetic, the lower purgative, exactly as Dioſcorides relates. Several manuſcripts of this author's works with figures are extant, which have often been cited by his commentators. Of theſe the moſt celebrated is in the Imperial library at Vienna, the figures of which were partly engraved in the reign of the empreſs Maria Thereſa, under the inſpection of Jacquin. Two impreſſions only of theſe plates, as far as we can learn, have ever been taken off, as the work was not proſecuted. Of theſe one was ſent to Linnæus, with notes by Jacquin, and is now in the hands of the writer of this account; the other was given, out of Profeſſor Jacquin's own library, to Dr. Sibthorp, to aſſiſt his enquiries in Greece, and remains at Oxford. The Linnæan copy conſiſts of 142 plates, in oblong quarto, in alphabetical order, beginning with the αριστολοχια μακρα, and ending with ευζωμον, a kind of wild rocket or radiſh. Nothing can be more rude than theſe figures, except thoſe of Cuba and Dorſtenius, and they ſcarcely afford any information that is not familiar to botaniſts verſed in the ſubject. Haller aſſerts, that perhaps a third part of the plants of Dioſcorides is ſtill unknown, and it is to be feared they will never be entirely determined. The enquiry, indeed, at preſent, is rather a matter of curioſity than of any conſiderable medical importance. The remarks of this great Swiſs botaniſt on the botany of the ancient Greeks, are too juſt and ſtriking to be omitted here. "That ingenious people," ſays he, "were not formed for the ſlow and patient contemplation of nature. They noticed the moſt prominent points of their ſubject, but neither entered into the number of the parts of plants, nor their dimenſions, nor did they accurately define their forms. They ſcarcely ſought for any thing but plants uſeful in medicine, or neceſſary for ſome economical purpoſes. Yet they were not altogether ignorant of the importance of generic diſtinctions, for Dioſcorides adverts to ſeveral ſpecies of *Geranium*, and ſeveral of *Ranunculus*. The Greeks have by no means exhauſted the vaſt treaſures of nature which they might have obtained if they had examined, with equal care, the frozen regions of the Olympus and the warm iſles of the Archipelago. We muſt therefore in juſtice allow, that the botanical learning of the people in queſtion is no more to be compared with that of modern Europe, than with the induſtry of the Chineſe, Japaneſe, or Hindus. It is proper, nevertheleſs, to read the Greek authors, as the reputed virtues of plants have deſcended from them to us, with but little variation." Dioſc. Op. Haller Bibl. Bot. S.

DIOSCORON, or Dioscurum, in *Ancient Geography*, an iſland placed by Pliny on the coaſt of Magna Græcia, over-againſt the promontory Pacinium.

DIOSCURIA, διοσκουρια, from Διος, *Jupiter*, and κουροι, *infants*, in *Antiquity*, a feſtival in honour of the Διοσκουροι, or Caſtor and Pollux, who were reputed to be the ſons of Jupiter. It was obſerved by the Cyrenæans, but more eſpecially by the Spartans, whoſe country was honoured by the birth of theſe heroes. The ſolemnity was full of mirth, being a time wherein they ſhared plentifully of the gifts of Bacchus, and diverted themſelves with ſports, of which wreſtling matches always made a part. Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 384.

DIOSCURIAS, in *Ancient Geography*, a town of Aſia, ſituated on the N.E. coaſt of the Euxine ſea, that is, in the territory of Colchis. It was anciently called *Æa*, and, in proceſs of time, *Sebaſtopolis*. It was eſtabliſhed, according to Arrian, by a colony of Mileſians. P. Mela ſays, that it was founded by Caſtor and Pollux, who made a voyage to

Colchis with Jaſon. It muſt have taken the name Sebaſtopolis, denoting the town of Auguſtus, under the emperor, A great part of the commerce of the Euxine ſea centered in this town. It is now in ruins, under the name of *Sebaſtopoli.*

DIOSCURIUM, a town of the Peloponneſus, in Phlaſia, according to Polybius.

DIOS-GYS, in *Geography*, a town of Hungary; 32 miles W. of Tokay.

DIOS-HIERON, or *Temple of Jupiter*, in *Ancient Geography*, a town of Aſia Minor, in Ionia, ſituated at a ſmall diſtance from the ſea, between Lebedus and Colophone. It was conſecrated to Jupiter.

DIOSMA, in *Botany*, (ſo named by Linnæus from δις, διος, *Jove*, and οσμη, *a ſmell*, on account of its "divine odour," which in the *Dioſma hirſuta* he compares to that of the ſtarry aniſe, or *Illicium aniſatum*; ſee Hort. Cliff. 71. Nothing, however, can leſs deſerve the epithet of divine than the ſcent of ſome ſpecies, which makes the favourite perfume of the Hottentots, and approaches to that of rue and others of the ſame natural order with this genus.) Linn. Gen. 108. Schreb. 148. Willd. Sp. Pl. v. 1. 1133. Juſſ. 298. Gærtn. t. 94. (Hartogia; Linn. Gen 108.) Claſs and order, *Pentandria Monogynia*. Nat. ord. *Multiſiliquæ*, Linn. though referred by him, *Hartogia* at leaſt, to his *Aggregatæ*, from whence he ſubſequently eraſed it. *Rutaceæ*. Juſſ. next to *Dictamnus*, though placed by that author in a ſeparate ſection, the natural order in queſtion being at the time not well underſtood.

Gen. Ch. *Cal.* Perianth in five deep, ovate, acute, permanent ſegments. *Cor.* Petals five, eliptic-oblong, bluntiſh, ſeſſile, ſlightly ſpreading. *Nectary* five ſcales crowning the germen. *Stam.* Filaments five, awl-ſhaped; anthers ſomewhat ovate, incumbent. *Piſt.* Germen ſuperior, turbinate, with three or five angles, crowned with the nectary; ſtyle ſimple, erect, the length of the ſtamens; ſtigma ſmall, obtuſe. *Peric.* Capſules three or five, connected by their inner edge, ovate, pointed, compreſſed; their ſummits ſpreading; opening at the upper margin. *Seeds* ſolitary, oblong, poliſhed, encloſed in an elaſtic *arillus* of two valves.

Eſſ. Ch. Petals five. Nectary five ſcales crowning the germen. Filaments ſimple. Capſules three or five, connected. Seeds in an elaſtic bivalve arillus.

Obſ. From this genus are now neceſſarily ſeparated the D. *uniflora* and *unicapſularis* of Linnæus, the former being an *Erioſtemon*, the latter an *Empleurum*; ſee theſe genera. Hence the polymorphous character of *Dioſma*, alluded to by Linnæus in his Syſtema Vegetabilium, is in a great meaſure obviated.

Willdenow defines 30 ſpecies of *Dioſma*, all natives of the Cape of Good Hope or the adjoining country, and all ſhrubs of a moderate ſize, much branched with ſimple leaves, moſtly entire, ſometimes elegantly crenate; their form awl-ſhaped or linear, rarely elliptical or heart-ſhaped. The whole plant always abounds with pellucid glandular dots, the ſeat of a ſtrong-ſcented eſſential oil. Some few have ciliated leaves and calyx, but the general habit is ſmooth. The flowers are white or reddiſh, commonly handſome, and ſometimes ſweet-ſcented.

Nine ſpecies are enumerated in the Hortus Kewenſis, but ſome others have been brought into the Engliſh gardens ſince that work appeared. D. *hirſuta* is one of the oldeſt ſpecies. D. *ſerratifolia*, Curt. Mag. v. 13. t. 456, is a new and elegant one, ſaid to come from New South Wales, which is not improbable, as that country produces more genera of this natural order than any hitherto examined. The ſhrub in queſtion is very near the *crenata* of Linnæus, which laſt, with D. *pulchella* and *ericoides*, are ſaid to be principally uſed by the Hottentots, and called by them Bucku. The leaves are dried and powdered, and when mixed with greaſe ſerve to anoint the bodies of thoſe people, whoſe odour proved as diſagreeable to profeſſor Thunberg, as our more refined European pomatums frequently are to thoſe not accuſtomed to them, eſpecially ſince more cleanly habits have brought them into diſuſe.

Diosma, in *Gardening*, comprehends plants of the low growing ſhrubby exotic kinds; of which the ſpecies moſtly cultivated are the oppoſite-leaved dioſma (D. *oppoſitifolia*); the hairy-leaved dioſma (D. *hirſuta*); the red-flowered dioſma (D. *rubra*); and the heath-like ſweet-ſcented dioſma (D. *ericoides.*)

Method of Culture.—Theſe are plants which are capable of being increaſed by planting out the cuttings of the young ſhoots in the ſpring or ſummer ſeaſons, in pots filled with good mould, plunging them in a moderate hot-bed. After the plants have ſtricken good roots, they ſhould be carefully taken up and placed out ſeparately in pots, proper watering and ſhade being afforded; and they afterwards require to be protected from the effects of bad weather in the green-houſe, and to have the management of other ſhrubby exotic plants of a ſimilar low ſhrubby growth.

The great beauty of the bloom, and the fragrant ſmell of many of theſe plants, particularly entitle them to places in collections of the ſhrub kind.

DIOS-OROS, or Jovis mons, in *Ancient Geography*, a mountain of Africa Propria. Ptol.

DIOS-PAGE, a town of Aſia, in Meſopotamia. Pliny.

DIOSPOLIS, a town of Aſia, in Syria. Pliny places it near the town of Laodicea, on the ſea; Strabo places it in Phrygia. It is the ſame town with Laodicea on the Lycus, and is called alſo Rhoas and Laodicea.—Alſo, a town of Upper Egypt, called *Dioſpolis-magna*, the ſame with *Thebes*; which ſee.—Alſo, an epiſcopal town of Egypt, in the ſecond Thebaid, diſtinguiſhed by the epithet *little*, or *Dioſpolis parva*. (See Girge.)—Alſo, a town of Egypt, in the Delta, near Mendes, according to Strabo, and placed by Suidas in the nome of Buſiris.—Alſo, a town of Aſia Minor, in Bithynia, on the coaſt of the Euxine ſea. Ptol.—Alſo, a town of Arabia, afterwards called *Berytos*. Steph. Byz.—Alſo, an epiſcopal town of Thrace.—Alſo, a town of Paleſtine, called *Lydda*; ſituated on an extenſive plain, reaching from E. to W. from the Mediterranean to the mountains of Judæa, ſeven or eight leagues, and much more from S. to N. It was three miles from the town of Ramleh. The Itinerary of Antonine places it 32 miles from Jeruſalem, and 36 miles from Cæſarea. This place is mentioned under the name of Lydda in the ſacred writings; and anciently formed part of the kingdom of Iſrael, or Samaria, according to the 1ſt book of the Maccabees, ch. ii. v. 34. Mention is made of this town in the hiſtory of Pompey's expedition in Judæa. It ſuffered much during the civil wars of the ſecond triumvirate: Caſſius, when he was in the Eaſt, expoſed its inhabitants to public ſale; but Marc Antony, by a decree, reſtored their liberty, and re-eſtabliſhed them in their country. Joſeph. Antiq. lxiv. c. 18. The town of Lydda was burnt by Ceſtius Gallus, A. D. 66, when he went at the head of a powerful army to the ſuccour of king Agrippa. Pliny reckons it among the prefectures of Judæa, and Ptolemy places it in the number of the towns of that country. When Paleſtine was divided into three provinces under the reign of Arcadius, the town of Dioſpolis continued under the metropolis of Cæſarea.

DIOSPONTUM, a place of Aſia, in the ſecond Armenia,

nia, lying to the weſt of the Euphrates and the ſouth of Melas.

DIOSPORON, in *Botany*, (from διϛ, διος, *Jupiter*, and σπορος, a *ſeed*,) has ſometimes been uſed as a name for the Gromwell, or *Lithoſpermum officinale*, otherwiſe called by old writers *Milium Solis*. Theſe ancient names probably allude to the brilliancy and beauty of the ſeed, as the Linnæan appellation expreſſes its ſtony hardneſs. Pliny ſays ſome call it *Dioſ-pyron*. See DIOSPYROS.

DIOSPYROS, (from διϛ, διος, *Jupiter*, and either πυρ, a *fire*, or *flame*, or elſe πυρος, *wheat*. The latter is the opinion of Linnæus, the former of ſome commentators on Theophraſtus. The application of either is, in the preſent caſe, unintelligible. We have often ſuſpected that the Italian botaniſts of the 16th century, who firſt applied this name to the preſent genus, underſtood it as a jumble of Greek and Latin, *pyrus*, a pear, being not very unſuitable to the fruit in queſtion) Date-plum, or Perſimon. Linn. Gen. 550. Schreb. 736. Juſſ. 156. Gærtn. t. 179. (Guaiacana; Tourn. t. 371.) Claſs and order, *Polygamia Dioecia*, or rather *Octandria Monogynia*. Nat. Ord. *Guaiacanæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, in four, ſometimes five or ſix, deep, obtuſe, permanent, and finally enlarged ſegments. *Cor.* of one petal, urceolate, larger than the calyx, four-cleft; its ſegments acute and ſpreading. *Stam.* Filaments eight, (in D. *virginiana*, 16 in two rows) awl ſhaped, ſhort, firmly fixed in the receptacle; anthers oblong, acute, in moſt flowers ineffectual. *Piſt.* Germen ſuperior, roundiſh; ſtyle one, divided half-way down into four parts, permanent, longer than the ſtamens; ſtigmas obtuſe, cloven. *Peric.* Berry large, globoſe, with eight cells, (or rather from ſix to twelve), ſeated on the enlarged ſpreading calyx. *Seeds* ſolitary, roundiſh, compreſſed, very hard. Male flowers on a ſeparate plant, with a ſmall, acute, upright *calyx*; a ſquare, urceolate, coriaceous *corolla*, whoſe ſegments are revolute; long, acute, twin *anthers*, the innermoſt ſmalleſt; and only the rudiment of a *germen*.

Eſſ. Ch. Calyx four-cleft. Corolla urceolate, four-cleft. Style four-cleft. Stamens eight or 16. Berry with eight ſeeds. Male flowers on a ſeparate plant.

Obſ. This genus is very nearly related to *Royena*, as M. Desfontaines has ſhewn, in the Annales du Muſéum national d'hiſtoire naturelle, *v.* 6. 445, who aſſerts the only difference to be that *Royena* has only four cells in the fruit, *Dioſpyros* from ſix to twelve; and that the calyx of the latter has ſometimes five or ſix diviſions. Gærtner, *v.* 2. 80. *t.* 94, had already noticed the Linnæan deſcription of the fruit of *Royena*, taken, as he ſays, from Commelin's Hortus, *v.* i. *t.* 96, to be erroneous, and that it is really a berry of four cells, clothed with the calyx, which ſplits irregularly.

The ſpecies of *Dioſpyros* are not very numerous. They are trees, with very hard wood, and the fruit, when perfectly ripe, is in moſt caſes eatable, being ſweet and glutinous. In an unripe ſtate it is powerfully aſtringent. The leaves are alternate, ſimple, generally undivided. Flowers inconſpicuous, yellowiſh.

D. *Lotus*. Linn. Sp. Pl. 1510. Pallas Roſs. v. i. p. 2. 20. t. 58. Mart Mill. Dict. v. 2. (Guaicum patavinum; Ger. em. 1495. f. 1, 2.) "Leaves pale on the under ſide." This grows wild in the ſouth-eaſt parts of Europe, and will bear our climate in the open air, but we have never ſeen the ripe fruit. In Italy it comes to tolerable perfection, but is not eſteemed, otherwiſe than as a remedy for diarrhœas. D. *virginiana*. Linn. Sp. Pl. 1510. Mill. Ic. t. 126. Mart. Mill. Dict. v. 2. (Piſhamin, or Virginia Plum; Park. Parad. t. 569. f. 6.) "Leaves both ſides of the ſame colour." A native of Virginia, which has long been in our gardens. The leaves are ſmaller and broader in proportion than thoſe of the preceding, and though, like them, paler beneath, much leſs remarkably ſo. The flowers alſo are ſmaller. D. *Ebenum*. Linn. Suppl. 440. (D. melanoxylon; Roxburgh Corom. v. i. 35. t. 46.) Leaves elliptic-oblong, ſmooth, coriaceous, reticulated with veins. Buds hairy.—Found in the vaſt woods of Ceylon by Koenig, who ſent it to Linnæus as the true Ebony. Dr. Roxburgh alſo ſpeaks of it as the well-known and valuable Ebony. "It is only the centre of large trees," ſays that faithful obſerver, "that is black and valuable, and the quantity found is more or leſs, according to the age of the tree. The outſide wood is white and ſoft, and either decays ſoon, or is deſtroyed by inſects, which leave the black untouched. The ripe fruit is eaten by the natives, but is aſtringent and not very palatable." We are certain of the above ſynonyms and therefore cannot account for the report of a confuſion of two ſpecies in Linnæus, which Retzius calls D. *Ebenum* and D. *Ebenaſter*; the latter being the *Ebenum* of Linnæus, the former the genuine Ebony. See Martyn's Miller, and Retzius's Obſ. Bot. faſc. 5. 31, who quotes Rottboll in the New Copenhagen Tranſactions.

Four other Eaſt Indian ſpecies are deſcribed and figured by Dr. Roxburgh, D. *ſylvatica*, t. 47. D. *montana*, t. 48, D. *chloroxylon*, t. 49. "The wood of this is yellowiſh, very hard and durable, and uſed by the natives of the Orixa mountains for various economical purpoſes. The fruit when ripe is eaten raw, and is very palatable:" and D. *cordifolia*, t. 50.

Loureiro deſcribes the true Ebony as a diſtinct genus by the name of EBENOXYLUM, which ſee. This is a native of Cochinchina.

DIOSPYROS, in *Gardening*, contains plants of the deciduous ſhrubby flowering exotic kind; of which the principal ſpecies cultivated are, the European date plum (*D. Lotus*), and the American date plum (*D. virginiana*). The firſt of which riſes with a tree-like ſtem to the height of ſix feet; the ſmaller branches ſpread a little, and are yellowiſh; the leaves oval-lanceolate, large, quite entire, paler underneath, ſomewhat hoary, with the veins ſomewhat hairy; the flowers are ſmall, reddiſh white, rotate; the fruit the ſize of a cherry, yellow when ripe, ſweet with aſtringency; and the plant is a native of Europe.

The latter ſort riſes here to the height of from fourteen to ſixteen feet, commonly dividing into many irregular trunks near the ground; the wood is very hard, but brittle and ſomewhat white; the branches are many, and grow ſlender to the end, covered with a very thin greeniſh bark; the leaves many, broad, green, without dent or notch on the edges; ſo like the former, that it ſeems at firſt to be the ſame; it has a dark brown bark on the branches, but on the twigs it is greyiſh; the fruit is in form and bigneſs like a date, very firm as that fruit, almoſt as ſweet, with a great, flat, thick, large kernel within. It is found in Virginia and Carolina, in America.

Method of Culture.—The manner of increaſing theſe plants is by ſowing the ſeeds in a warm ſituation in the open ground, in the ſpring; but it is better when done in pots or beds filled with good earth, and plunged into a moderate hot-bed, as they riſe more quickly, and advance with greater rapidity. When the plants have attained ſome growth, they ſhould be gradually expoſed to the open air until the autumn, when thoſe in the full ground ſhould be carefully protected from froſt by mats or other means, and thoſe in pots placed under a garden frame, on moderate heat, free air being admitted when the weather is mild. Early in the following ſpring they ſhould be removed, and planted out in a warm ſituation in the nurſery, at proper diſtances, to remain two or more years, when they will be fit to be finally put where

they are to remain. They have a good effect in the large clumps, borders, and other parts of ſhrubberies, being ſufficiently hardy when of proper growth to reſiſt the effects of froſt in this climate.

DIOS-SACRA, in *Ancient Geography*, a place of Aſia Minor, upon the Thracian Boſphorus, near and in the northern part of the promontory Caracion.

DIOS-SOTEROS PORTUS, a port of the ſea of Laconia, ſituated at the bottom of the port, in which is found *Epidaurus Limera*.

DIOSTETWI, in *Geography*, a town of Sileſia, in the province of Oels; three miles S.S.W. of Mittelwalden.

DIOU, a town of Perſia, in the province of Choraſan; 270 miles N. of Herat.

DIOXIA, διοξεια, in *Muſic*, a name ſometimes given by the ancients to the diapente.

DIP *of the Horizon*.. See DEPRESSION.

DIP, in *Mining*, or *pitch*, ſignifies the greateſt inclination of a ſtratum to the horizon; the direction of this is always at right angles to the courſe, ſtretch, drift or run, which is that direction in which a level line might be drawn upon the ſtratum. The prevailing dip of the ſtrata in England is towards the S.E., and conſequently they are level in a N.E. and S.W. direction, and it ſeems more than probable, that the ſtrata of the whole iſland did occupy that poſition before the rupture and denudation of parts of its ſurface: the quantity of this dip was, however, but ſmall, probably not more than 1 in 70 or 80.

DIPÆA, in *Ancient Geography*, a ſmall town of Arcadia, in that part called Mœnalia.

DIPHACA, in *Botany*, (from δις, *double*, and φακη, a *legume*.) Loureiro Cochinch. 453. Claſs and order. *Diadelphia Decandria* Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth five-cleft, gibbous, permanent; its ſegments acute, the lower one longeſt. *Cor.* Papilionaceous. Standard roundiſh, ſomewhat triangular, notched, aſcending; wings ovate, ſhorter than the ſtandard; keel of two petals, lunate, equal to the ſtandard, with long ſlender claws. *Stam.* Filaments 10, united in two parcels, five in each; anthers oblong, incumbent. *Piſt.* Germens two, oblong, compreſſed, ſtraight; ſtyle of each awl-ſhaped, longer than the ſtamens; ſtigmas thickiſh. *Peric.* Legumes two, compreſſed, ſtraight, pointed, jointed; the joints ovate, ſtriated, ſmooth, unequal in ſize. *Seeds* ovate, compreſſed.

Eſſ. Ch. Legumes two. Stamens in two equal ſets. D. *cochinchinenſis*. Lour. Cochinch. 454. (Solulus arbor, or Roraco; Rumph. Amb. book 5. 100. t. 128.) A tree eight feet high, cultivated in the gardens of China and Cochinchina, and called in the laſt-mentioned country *Kim phung*. Its *bark* is uneven, brown, without thorns. *Leaves* pinnate, of about ſeven pairs, with an odd one, the leaflets ovate, rather ſmall, ſmooth, nearly ſeſſile, oppoſite or alternate. *Flower-ſtalks* in pairs, axillary, ſingle-flowered. *Flowers* pale.

Such is Loureiro's account, who quotes *Hedyſarum Ecaſtaphyllum*, now *Pterocarpus Ecaſtaphyllum*. Linn. Syſt. Veg. ed. 14. 642, as a ſynonym. But the latter is a Jamaica plant, with large ſimple leaves, ſilky beneath. The eſſential character, as given above, is truly wonderful, if correct, but Rumphius deſcribes and figures ſingle legumes from each flower, according to the univerſal courſe of nature in this tribe, as far as we have any knowledge. His ſynonym, therefore, or more probably the deſcription of Loureiro, muſt be erroneous.

DIPHRI, in *Ancient Geography*, a town of Phœnicia, Steph. Byz.

DIPHRYGES, or DIPHRYX, in the *Ancient Pharmacy*, the ſcoria or calx of melted copper gathered in the furnace, when the metal was run out.

The word is formed from the Greek δις, *twice*, and φυγειν, *to roaſt*.

DIPHTHERA, διφθερα, among the *Ancients*, a garment made of ſkins, and worn only by ſhepherds and country labourers.

DIPHTHONG, διφθογγος, in *Grammar*, a double vowel, or the union, or mixture, of two vowels pronounced together, ſo as only to make one ſyllable; as (1) the Latin *ae*, or *æ*; *oe*, or *œ*; (2) the Greek αι, ει; (3) the Engliſh *ai*, *au*, &c. See VOWEL, and SYLLABLE.

The word is Greek, and is compounded of δις, *twice*, and φθογγος *ſound*.

Ae anſwers to *ai*, the proper; and *æ*, the improper diphthong of the Greeks; *e. g.* Αινειας, *Æneas*; σφαιρα, *ſphæra*, &c. And, on the contrary, the Romans, when they had occaſion to divide the *ae*, changed it into the Greek *ai*; *e. g.* *aulai*, for *aulæ*, &c.

Ai, by ſome, is made a Latin diphthong, as in *aio*, *Caius*, &c. But in *ais*, and *ait*, *i* manifeſtly belongs to the latter ſyllable; and the Greek write not γαιος, but γαιος; whence it ſeems plain that *ai*, in the Latin tongue, is not a diphthong, as in the Greek.

The Latins pronounced the two vowels in their diphthongs much as we do, with this exception, that the two were not heard equally, but the one was ſomewhat weaker than the other; though the diviſion was made with all the delicacy imaginable; among us moſt of the Latin diphthongs are loſt in the pronunciation; their *æ* and *œ* are only ſpoken as *e's*; ſo alſo the Engliſh *ea*, *oa*, &c. though wrote with two characters, are pronounced as ſimple ſounds.

In Engliſh French, and divers other languages, one may diſtinguiſh diphthongs with regard to the eye, from diphthongs with regard to the ear.

A diphthong with regard to the eye is formed of two vowels, meeting in the ſame ſyllable, whether the particular ſound of each of them be heard in the pronunciation, or whether the ſound of one of them be drowned; or, laſtly, whether a new ſound, different from either of them, reſult from both. In the two latter caſes, it is with ſome impropriety that we call them diphthongs: the firſt only are real diphthongs, as being ſuch both to the eye and ear.

Diphthongs, with regard to the ear, are either formed of two vowels, meeting in the ſame ſyllable, whoſe ſounds are ſeverally heard; or of three vowels in the ſame ſyllable, which only afford two ſounds in the pronunciation.

On this laſt occaſion, diphthongs, with regard to the ear, are triphthongs with regard to the eye.

Engliſh dipthhongs, with regard both to the eye and ear, called *proper* diphthongs, are *ai*, as in *fair*; *au*, in *laud*; *ee*, in *bleed*; *oi*, in *void*; *oo*, in *food*; and *ou*, in *houſe*.

Engliſh *improper* diphthongs, or diphthongs with regard to the eye, are *aa*, pronounced only like *a*, as in *Aaron*; *ea* like *a*, as in *ſwear*, *heart*, or like *e*, as *already*; or like *ee*, as *veal*; *eo*, like *e*, in *feoffee*; or like *o*, as in *George*; *eu*, or *ew*, like *u*, in *Deuteronomy*; *ie*, like *e*, as *cieling*, *field*; *ei*, like *a*, in *feign*; or like *e*, in *deceit*; *oa*, as in *cloak*, *doat*; *oe*, as in *doe*, *oeconomy*; *ue*, as in *gueſs*; and *ui*, as in *guile*, *recruit*.

DIPHYES, from δις, and φυειν, *to generate*, in *Natural Hiſtory*, a name given by ſome authors to a kind of ſtone, which repreſents both the male and female parts of generation of the human ſpecies; and owes its figures merely to the accidental conformation of the hinge and protuberances of a ſhell, in which it has been formed. We have a ſpecies of chama, whoſe external form at the mouth repreſents the

female pudenda; but the figure of the ſtone is owing to the internal ſhape of the ſhell in which it has been caſt. This is an unknown ſpecies of concha anomia, which has ſuch ridges in one ſhell, and ſuch cavities in the other, that the ſtone caſt or moulded in it, has on one ſide the figure of the female pudenda, and on the other the male: it is uſually of a duſky brown colour, and of a ferruginous ſubſtance. As the ſame ſhell may, however, have received in different places different ſubſtances into its cavity, all which would neceſſarily be of this form, we hear, among authors, of ſome black, and ſome white ſtones of this kind. Authors have treated of this ſtone in a very idle and fabulous manner; but this is its true hiſtory.

DIPHYLLEIA, in *Botany*, (from δις *double*, and φυλλον *a leaf*, "becauſe the plant is conſtantly furniſhed with two leaves," Michaux Boreali-Amer. v. 1. 203. Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Ranunculaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of three oval, concave, deciduous leaves. *Cor.* Petals ſix, larger than the calyx, ſpreading, oval, concave, deciduous. *Stam.* Filaments ſix, very ſhort, flat; anthers oblong, vertical, their cells joined by a membrane from top to bottom, by the ſeparation of which they open. *Piſt.* Germen ſuperior, ovate; ſtyle ſcarcely any; ſtigma capitate. *Peric.* Berry nearly globular, of one cell, ſeſſile. *Seeds* two or three, roundiſh.

Eſſ. Ch. Petals ſix. Calyx of three leaves, deciduous. Berry ſuperior, of one cell, with two or three ſeeds.

D. *cymoſa*. Michaux, t. 19, 20. Found by that botaniſt in the rivulets of the high mountains of North Carolina, flowering early in May. *Root* creeping, apparently perennial, jointed. The *herb* has the habit of *Podophyllum peltatum*. *Stem* ſimple, two feet high. *Leaves* two, alternate, ſtalked, kidney-ſhaped, ſomewhat peltate, two-lobed, jagged, toothed, veiny, ſmooth. *Cyme* terminal, many-flowered, erect. *Flowers* white. *Stamens* ſhorter than the petals, and oppoſite to them. *Berries* blueiſh-black, with purple ſeeds.—From the deſcription and figures of Michaux, who thinks this genus allied to his *Caulophyllum*, t. 21, the *Leontice thalictroides* of Linnæus. The latter however belongs to the natural order of *Berberides* in Juſſieu.

DIPHYSA, (δις *double*, and φυσα a *bladder*, from the two inflated appendages to the legume,) Jacq. Amer. 208. Schreb. 500. Willd. Sp. Pl. v. 3. 1130. Juſſ. 362. Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*. Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, bell-ſhaped, a little compreſſed, divided half-way down into five ſegments; the two uppermoſt roundiſh, obtuſe, flat, widely ſpreading; the two lateral ones ovate, acute, erect, flattiſh; the lowermoſt lanceolate, pointed, concave, erect, rather longer than the reſt. *Cor.* papilionaceous. Standard obovate-oblong, large, notched, flat, with a concave claw as long as the tube of the calyx, the whole ſo bent back that the ſtandard itſelf is parallel to the claw; wings two, oblong, obtuſe, flat, ſhorter than the ſtandard, ſpreading in front, cohering behind ſo as to look like another ſtandard, furniſhed with a ſmall appendage at their baſe, tapering down into a ſlender claw, and curved backward in a ſemi-circle; keel ſickle-ſhaped, pointed, compreſſed, ſhorter than the wings, furniſhed with an appendage on each ſide at the baſe, divided behind at the lower part, and tapering into two ſlender erect claws, curved backward in the upper part ſo as to become parallel to the claws. *Stam.* Filaments 10, diadelphous, nine in one ſet, with a ſingle one, the length of the keel, in which they are encloſed; anthers ovate, ſmall. *Piſt.* Germen linear, roundiſh, ſtalked, about the length of the keel; ſtyle capillary, deſcending, extending beyond the keel; ſtigma ſimple, acute. *Peric.* Legume linear, compreſſed almoſt flat, obtuſe, of one cell; accompanied on each ſide by a large, longitudinal, membranous, inflated bladder, cloſed all round, originating from the oppoſite ſutures on each ſide. *Seeds* ſeveral, oblong, obtuſe, compreſſed, furniſhed with a ſmall hook. *Jacq.*

Eſſ. Ch. Calyx five-cleft, unequal. Legume of one cell, with many ſeeds, compreſſed, accompanied by a large longitudinal bladder at each ſide.

D. *carthagenenſis*. Jacq. Amer. 208. t 181. f. 51. Mart. Mill. Dict. v. 2. Common every where in buſhy places about Carthagena in New Spain, eſpecially at the foot of a hill near the leper's hoſpital, bloſſoming in Auguſt and September. The inhabitants call it *Vivaſeca*.

Jacquin, from whom alone we have any knowledge of this plant, Linnæus having left it unnoticed, deſcribes it as a ſhrub about ten feet high, of no beauty, and without thorns. *Leaves* pinnate, with an odd one, ſmooth, about two inches long, on the younger branches. *Flower-ſtalks* axillary, ſlender, each bearing two or three yellow inodorous flowers, about the ſize of the common *Colutea fruteſcens*. The bladders of the fruit are very remarkable. The *legume* is ſcarcely two inches long, and remains ſome time on the tree, failing to pieces at length tranſverſely, each portion containing one yellowiſh ſeed.

DIPLASIASMUS, from διπλασιαζω, of διπλοος, *double*; in *Medicine*, a reduplication of diſeaſes.

Diplasiasmus is alſo uſed for two muſcles in the arm, which ſerve to turn it about.

DIPLAZIUM, in *Botany*, (from διπλαζω, *to be double*). Swartz Syn. Filicum 91. (Hemionitis; Smith Act. Taurin. v. 5. 410. t. 9. f. 1. Tracts 235. t. 1. f. 1. Claſs and order, *Cryptogamia Filices*. Nat. ord. *Filices*. Linn. Juſſ.

Gen. Ch. *Capſules* annulated, in diſperſed twin lines, which are either ſimple or branched, running parallel, and cloſe, to the veins on the back of the frond. Sometimes one line is continued further than its companion, and in ſome parts of the frond even entirely ſolitary lines may be found; but it is ſufficient for the generic character if there be twin lines any where. *Involucrums* likewiſe in pairs, each conſiſting of an uninterrupted membrane, originating from each ſide of the vein, and ſeparating at its oppoſite margin.

Eſſ. Ch. Fructification in ſcattered lines, each of them double, with a vein running between. Involucrums originating from the vein and each ſeparating outwards.

Obſ. This genus was very properly eſtabliſhed by Dr. Swartz as diſtinct from the original *Hemionitis* of Linnæus, which he having ſeen in its native freſh ſtate found to have no involucrum. See Hemionitis. Dr. Smith, not having had the ſame opportunities of examining the latter, conceived his ſpecimens might have loſt this part from age, and therefore not being able to depend on a negative character which it was impoſſible to prove, he conſidered the ſpecies with involucrums as the only ones in a perfect condition.

Dr. Swartz enumerates nine ſpecies of *Diplazium*. Good examples of the genus are, D. *plantagineum*, Sw. Syn. Fil. 91. t. 2. f. 4. (Aſplenium plantagineum; Linn. Sp. Pl 1537. Hemionitis plantaginea; Sm.) "Frond ſimple, ovato-lanceolate, crenate, ſomewhat ſerrated; with a ſquare ſtalk." Found by Browne in Jamaica. The *ſtalk* is ſimple, ſmooth, naked, ſquare, about a ſpan high. *Leaf* about the ſame length, ovato-lanceolate; rather acute, crenate approaching to ſerrate with a ſtrong mid-rib, and numerous alternate, forked, diſtinct veins, along which the lines of fructification run on each ſide.

D. *grandifolium*. Sw. Syn. Fil. 91. (Aſplenium grandifolium; Sw. Prod. 130.) "Frond pinnate; leaflets lanceolate, broad, ſomewhat ſerrated, angular at the baſe."

Native

Native of Jamaica. *Frond* two or three feet high. *Leaflets* alternate, pointed, unequally ſerrated and ſlightly jagged. *Veins* numerous. *Lines* of fructification neither branched at their baſe, nor confluent at their extremities. *Involucrum* dark brown, revolute. *Capſules* pale.

DIPLOCONION, in *Ancient Geography*, a place of the Thracian Boſphorus, to the S. W. of *Rhodiorum Portus*.

DIPLOE, in *Anatomy*, is the reticular texture connecting together the two tables of the ſkull; ſee CRANIUM.

DIPLOIS, διπλοις, in *Antiquity*, a double pallium, or cloak, worn chiefly by the Cynics.

DIPLOMA, (διπλωμα, a διπλεμαι, *duplicor*) was originally a letter or writing of a ſovereign conferring a title or dignity, or granting ſome immunity or privilege, or ſome land, to be held in fief. The oldeſt is that of the emperor Galba diſmiſſing ſome veteran ſoldiers. They were called Diploms, becauſe they uſed anciently to be written on waxed tables folded together.

As theſe Diploms ſerve to eſtabliſh the rights of ſome families, towns, churches, convents, and provinces, to eſtates, lands, commons, or to any particular rights, privileges, and immunities, it is of material importance to be acquainted with the rules by which their authenticity may be proved or diſproved. See DIPLOMATICS.

In a more enlarged ſenſe, the word Diploma is ſynonymous with document, and ſignifies any writing which records a particular important tranſaction in a ſolemn form.

Latterly the meaning of the word Diploma has been reſtricted to a letter or writing of an univerſity, conferring the degree or dignity of doctor.

DIPLOMA, in *Chemiſtry*, denotes a double veſſel. Thus when one veſſel is put into another; the ingredients in the firſt, and the fire under the laſt, the chemiſt calls it boiling in diplomate.

DIPLOMACY, in *French, la Diplomatie*, is the knowledge of the relations of independent ſtates to each other.

The treaties, conventions, agreements, or rather the documents which more particularly eſtabliſh the relative rights of nations, and the obligations to which they are reſpectively pledged, were formerly called diplomas.

A diploma, ſays Johnſon, is a letter or writing conferring ſome privilege; but in a more enlarged ſenſe, it is any writing which ſtipulates a right, confers a privilege, or records one particular important tranſaction in a ſolemn form; and the ſcience which leads to the diſcovery of the age, authenticity, import and value of ſuch writings, is called *Diplomatics* (which ſee.)

But the relations of independent ſtates to each other do not originally reſt upon expreſs ſtipulations only. There is a natural law which traces the rights to which nations are reſpectively entitled. (See LAW of *Nations*.) Yet as there is no ſuperior coërcive power to enforce the performance of the correſponding obligations, nations are induced to unite together by means of treaties which are to render them more ſecure in the enjoyment of their rights. See TREATIES *of Peace and of Commerce*.

The collection of the principal treaties on which the external relations of the independent ſtates of Europe have depended till the year 1801, or the peace of Amiens, is to be found in "Leibnitz's Corp. Jur. Diplomat. Corps Diplomatique du Droit des Gens." Amſterdam, 1731. 8 vol. fol. "Hiſtoire des Traités de Paix et autres Négociations des Puiſſances de l'Europe depuis la paix de Vervins juſqu'à celle de Nimégue." Amſterdam, 1725, 2 vol. fol. "Lord Liverpool's Collection of Treaties of Peace." 1785. "Wenk's Codex Juris Gentium recentiſſimi." Lipſiæ, 1788, 2 vol. 8vo. "Recueil des principaux Traités conclus par les Puiſſances de l'Europe depuis 1761, par M. de Martens' Goetting. 1791, 8vo. "G. F. Von Martens, Grundriſo einer Diplomatiſchen Geſchichte der Europæiſchen Staatshændel und Friedens ſchlüſſe bis zŭm Frieden zŭ Amiens." Hamburg, 8vo.

Unfortunately theſe conventions labour under the ſame difficulty with the law of nations itſelf. Nothing enſures their performance. Independent and powerful ſtates break their contracts at pleaſure. In vain does juſtice condemn ſuch infractions of ſolemn engagements; there is no legitimate ſuperior power to which ſhe can truſt her ſword for the puniſhment of the offenders. Neither has the continual reſidence of diplomatic agents, introduced by cardinal de Richelieu, been able to keep up more ſecurely the relations of amity between independent ſtates; and vainly have the nations of Europe endeavoured to confide the guarantee of their rights to a combination of a certain number of ſtates leagued againſt others of nearly ſimilar ſtrength.

It was at the beginning of the ſixteenth century that the reformation, which broke down the overgrown power of Auſtria, and eſtabliſhed the independence of Holland, gave the firſt hopes of ſuch a balance. Theſe hopes were invigorated by Sweden and Turkey, obtaining in the political ſyſtem of Europe an importance which they had not before enjoyed. The progreſſive growth of the Pruſſian monarchy, and the interference of Ruſſia in the concerns of Europe, were ſuppoſed to render the equipoiſe ſtill more perfect; and the creation of a Tranſatlantic republic, which leſſened the weight of Great Britain, was hailed as the only circumſtance that had been wanting to conſolidate the admired fabric of a connected ſyſtem, in which one part of the European commonwealth was to be balanced by the other. (See POWER, *Balance of*.)

In this ſtate of apparent ſecurity, the ſtudy of diplomacy was almoſt every where neglected. The maintaining of the accuſtomed relations of amity was conſidered as being ſo eaſy and ſo ſimple that a moderate ſhare of talents, a fine figure, and a noble birth, were ſufficient recommendations for the moſt important diplomatic functions. They were entruſted to men capable of foſtering intrigues with courtiers, kept miſtreſſes, and favourites, but utterly unacquainted with the true intereſts of nations in their external concerns. The temper of the ſupreme magiſtrate abſorbed their fawning attentions, whilſt the nature of the component parts of the people which he governed never attracted their regard; ſo great was their confidence in the taliſman of modern diplomacy.

But the chimera of an equilibrium, that was to prevent the recurrence of wars, or at leaſt to ſhorten their duration, ſuddenly vaniſhed at the very time when it was triumphantly ſpoken of as realized. The partition of Poland, the incoherent and impolitic coalitions againſt France during her revolutionary frenzy, and the feebleneſs and unpopularity of the governments againſt which the fury of the French was directed when they began to yield to the luſt of conqueſts, overturned the baſis on which the relations of amity between the European powers had fondly been conſidered as immoveably fixed.

Whether the order of things, which will emerge from the preſent chaos of European politics, will ſuffer the ſuperſtructure of the connections of independent ſtates to be raiſed anew on the ſame foundation, it is impoſſible to conjecture. The principle of all external relations remains in the mean time what it has been. Alliances muſt be courted with thoſe powers from which no injury is to be apprehended, and which yet are able to annoy that power, or thoſe ſtates, which,

which, from their geographical poſition and ſuperior force, are dreaded as natural enemies. See ALLIANCE.

As diplomacy is the knowledge of the actual relative rights of nations, it conſtitutes the baſis of the negociations, to which governments have recourſe, when ſuch alliances are to be formed, when new ſtipulations are to be entered into on points in which two or more independent ſtates are mutually concerned, or when diſputes about the non-performance of ſome obligations, or about the violation of ſome rights, are to be ſettled. Hence, the term diplomacy is frequently applied, in a more reſtricted practical ſenſe, to the conducting of ſuch negociations, and to that branch of politics which provides for the ſafety of the ſtate by means of friendly connections with other independent powers. In this laſt acceptation, it is better known by the appellation of *Foreign Politics*.

The management of foreign politics is generally delegated by the executive power to one, or, in ſome countries, to two miniſters of ſtate, called "Miniſters for Foreign Affairs." In France, it is entruſted to the "Miniſtre des Relations Extérieures;" in Spain, to the "Miniſter del Deſpatcho Univerſal;" in Great Britain, to the "Secretary of State for the Foreign Department," whoſe province it is to watch over both the political and commercial intereſts of the country abroad, and to appoint its diplomatic and commercial agents.

The functions of diplomatic agents, in general, are, to watch, in the ſtate to which they are ſent over, the intereſts of the ſtate which ſent them; to endeavour to obtain, by ſkilful negociations, the conceſſion of the points which they are inſtructed to ſolicit; to collect the moſt complete information about the ſtrength, energy, connections, and projects of the government of the country where they reſide; and to tranſmit regular diſpatches, on thoſe different ſubjects, to their own governments. See DISPATCHES.

As theſe reports, or diſpatches, contain, in general, communications of importance, they are moſtly written in cyphers, which, for greater ſecurity, muſt frequently be changed. See CIPHER.

The qualities moſt requiſite in a diplomatic agent are, political information, an active and enlightened mind, a correct judgment, a dignified firmneſs, conciliating manners, and an inviolable fidelity and diſcretion, which, however, muſt not exclude candour and openneſs. See NEGOCIATOR.

The aggregate of all the diplomatic agents of foreign powers, reſiding at one time in the ſame place for diplomatic purpoſes, is called the *Corps Diplomatique*, diplomatic body.

There are three claſſes of diplomatic agents. The firſt is that of ordinary and extraordinary ambaſſadors. (See EMBASSADOR.) They are ſent to thoſe powers with which the ſtate wiſhes to treat on a footing of equality, whether they be really of equal rank, or only conſidered as ſuch by courteſy. The ſecond is that of plenipotentiaries, or envoys. (See ENVOY and PLENIPOTENTIARY.) They differ from ambaſſadors with regard to their preſentation only; they do not go, nor are they received, in ſtate at their firſt audience.

The third claſs of diplomatic agents is, that of reſidents and chargés d'affaires. The latter are generally firſt ſecretaries of ambaſſadors, left to tranſact the buſineſs of their reſpective ſtates, during the temporary abſence of the ambaſſadors. Reſidents are permanent diplomatic agents in ſmall principalities, ſmall republics, or Hanſeatic cities. See RESIDENT.

The ſubaltern agents in diplomacy are the ſecretaries of legation, private ſecretaries of the ambaſſadors, and dragomans, or interpreters. See DRAGOMAN and SECRETARY.

Commercial agents are appointed to watch over the commercial intereſts of the ſtate in the country where they reſide, to aſſiſt the trading ſubjects of the government, by which they are appointed, in their dealings, according to the ſubſiſting treaties, and to communicate to their reſpective governments any commercial or political information which they conceive to be of importance. They are of two ſorts; general conſuls, in foreign places of extenſive trade, and vice conſuls appointed by the former in leſs important commercial places of the ſame diſtrict or country, and approved of by government. See CONSUL.

DIPLOMATICS, DIPLOMATICA, is the knowledge of the age, authenticity, preciſe import, and relative value of old documents, formerly called diplomas.

Documents, or diplomas, are writings which ſtipulate a right, confer an eſtate, a fief, a privilege, a title, or a dignity, or record one particular important tranſaction in a ſolemn form. The word diploma occurs but rarely in the documents themſelves. They are generally ſtyled "Præceptum, Auctoritas, Privilegium, Pagina, Charta, Littera, or Litteræ, Apex, or Apices, Pancharta, Sanctio Pragmatica, Inſtrumentum, Indiculus, Placitum, Notitia, Bulla, Sigillum, Sigillati Apices, &c." The ancients called them "Syngrapha, Chirographa, Codicilli." The originals are named "Exemplaria, or Autographa, Chartæ Authenticæ, Originalia;" and the copies "Apographa, Copiæ, Particulæ." The collections that have been made of them are denominated "Chartaria, and Chartulia," and the places where they uſed to be kept "Scrinia, Tabularium, Aerarium," and in Greek "Archeium, or Archivum."

Documents are almoſt as ancient as writing itſelf. Every civilized nation, the Hebrews, Phœnicians, Egyptians, Babylonians, Perſians, Greeks, and Romans, had documents which they preſerved in their archives, and which they conſulted for hiſtorical and juridical information. Yet none have been diſcovered of a date anterior to the 5th century. The ancients were accuſtomed to reduce their contracts and treaties into writing; but they engraved them on tables, or covered them over with wax, braſs, copper, ſtone, or wood, and all thoſe which were not traced on braſs or marble have periſhed by the length of deſtructive time.

Documents, or diplomas, were anciently written on metals and ſtones. Job exclaims, "Oh! that my words were now written! Oh! that they were printed in a book! that they were graven with an iron pen and lead in the rock!" Job xix. 23, 24; afterwards they were written on paper and parchment. The paper of the ancients came from Egypt, and was formed of thin leaves, or membranes, taken from the branches of a tree named Papyrus. Hence it was called "Papyrus, Biblum Ægyptiacum," or ſimply "Charta." (See PAPER, PARCHMENT.) The Papyrus, however, was never uſed in England; neither was it known in Germany nor in Hungary. The two latter countries invariably employed parchment in their diplomas till the 14th century, when the uſe of modern rag-paper was introduced, even on ſolemn occaſions, or for the recording of important tranſactions. In England, all documents or writings of importance are ſtill invariably written on parchment.

The uſe of ink in writing is very ancient. Baruch declared, that he wrote Jeremiah's prophecies with ink in the book. Jeremiah, xxxvi. 18. Black ink, as it is the oldeſt, was the moſt common. The ancients alſo wrote with red ink, made of vermilion, red-lead, or purple colour, "ſacrum encauſtum;" ſometimes in letters of gold, ſilver, and purple; and ſometimes with blue, green, or mixed ink, of a variegated hue.

For

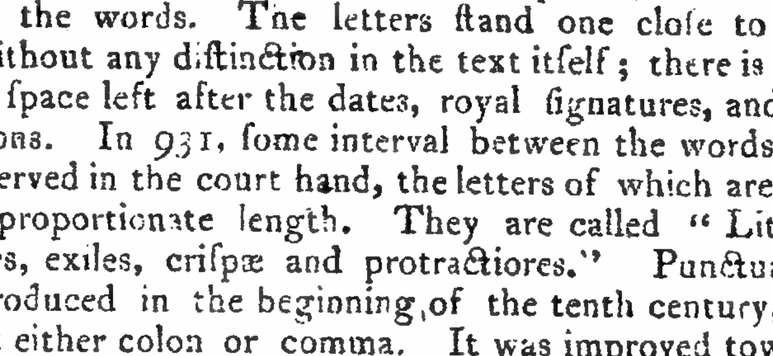
DIPLOMATICS.

For the invention of alphabetical writing, ſee LETTERS. With regard to the poſition of the lines, *verſus*, there were three ſorts of writings; the horizontal, from right to left, from left to right, or both ways, called βουστροφηδὸν; the perpendicular, from top to bottom, or from the bottom to the top, and both ways, either from right to left or from left to right; and the circular, *orbicularis ſcriptio*, as round ſeals, medals, &c.

In the oldeſt documents there are no points, no intervals between the words. The letters ſtand one cloſe to the other without any diſtinction in the text itſelf; there is only a ſmall ſpace left after the dates, royal ſignatures, and abbreviations. In 931, ſome interval between the words was firſt obſerved in the court hand, the letters of which are of a very diſproportionate length. They are called "Litteræ longiores, exiles, criſpæ and protractiores." Punctuation was introduced in the beginning of the tenth century, but without either colon or comma. It was improved towards the end of the twelfth and in the thirteenth century.

J. L. Walther, in his Lexicon Diplomaticum. Goettingæ. 1745. fol. which ſhould have properly been entitled Lexicon Abbreviaturarum, gives the beſt account of the abbreviations that have been uſed in different centuries.

The characters which are called "notæ, or notæ Tironis," Tiro's notes, are not to be found in any alphabet. They repreſent whole words. Their uſe is very ancient. They were invented to facilitate quick writing, and as ſuch they correſpond with the different characters of modern ſhort-hand writing. That ſuch characters were known to the Hebrews is inferred from king David's ſaying in the beginning of the 45th Pſalm: "My tongue is the pen of a ready writer." It is, however, certain that Xenophon was the firſt who uſed them among the Greeks, and that Cicero's amanuenſis, Tiro, from whom they derive their name, improved them into a perfect ſyſtem of ſhort-hand writing or tachygraphia. The following lines are a ſpecimen of Tiro's notes.



Lingua Mea Calamus

Seribæ Velociter Scribentis

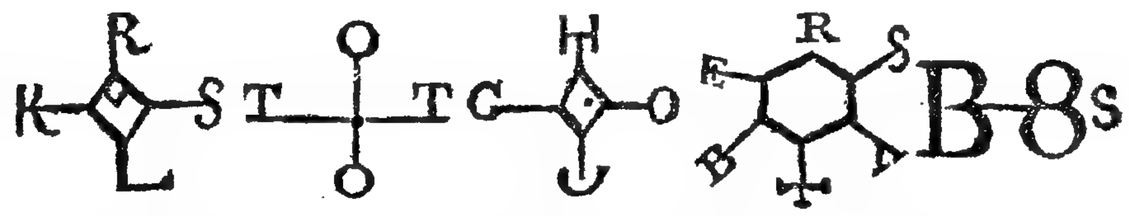
Conſult D. P. Carpentier's Alphabetum Tironianum. Paris, 1747. fol.

The knowledge of the different hand-writings of different ages and nations is beſt acquired in Henſelii Synopſis univerſæ Philologiæ; in Kapp's neu eröffnetem in hundert Sprachen beſtehendem A B C buch; in Mabillon De Re Diplomatica; and in the Nouveau Traité de Diplomatique. vol. ii. p. 479, and vol. iii. p. 687. In England, for inſtance, the old German hand prevailed from the fifth or ſixth century, till the year 1066, when William the Conqueror introduced the Capetian French writing. The new Gothic or black letter, ſuch as is ſtill uſed in the titles of ſome books, prevailed from the thirteenth to the ſixteenth century, when the old elegant Latin or Roman hand was reſtored and beautifully improved in Great Britain.

From the fifth to the thirteenth century the ſign of the croſs, called "Chriſmon, Chriſmum, Chriſmus, or Chriſmos," was uſed in ſignatures. In the ninth century the ſolemnity of the ſigning of documents was increaſed by the addition of the ſymbols of inveſtiture, as "per alapam, per amphoram plenam aquæ maris, per forfices," of which the following inſtance is recorded: "Odo Comes de Corboilo (Corbeil) conceſſit Deo et S. Germano Pontiſarienſi; quandam vieriam quam habebat in terra moriſſarti, deprecante matre ſua comitiſſa de Croceio, cum forficibus, quas in manu tenebat, cum quibus forficibus Robertus Monachus reinveſtivit eum de beneficio loci. Quibus etiam forficibus ſtatim idem comes totondit quendam armigerum Walteri Toſardi." Per oſculum, of which there is this inſtance: "Maino, filius Gualonis, annuente Eudone filio et vieta uxore ſua dedit Deo et S. Albino terram de Brilchiot pro cujus doni confirmatione Walterium Monachum pater et filius in fidei nomine oſculati ſunt. Uxor autem illius, eo quod a femina Monachum oſculari inuſitatum habemus, Lambertum quemdam Præfectum S. Albini, jubente Walterio Monacho, eadem ſententia deoſculata eſt." Per pileum. It was by the ſymbol of the hat that king Richard of England gave the emperor Henry VI., whoſe priſoner he was, the inveſtiture of his kingdom. Per virgam et pileum. The inveſtiture of duchies in England was generally given by the ſymbol of the rod and the hat.

The ſignatures frequently conſiſt of monograms or ciphers, (chifres,) compoſed of the letters or the initials of the names of thoſe who ſubſcribed the documents. The word monogramma is ſeldom mentioned in the text; but, inſtead of it, we find the following expreſſions, ſignum, *i. e.* crucis; "nominis or manus ſignum, manus propria, manus propriæ nota, chirographum, ſignaculum, character, character nominis, regius character, regii nominis character, ſigni character, nominis figura, &c." The firſt who uſed a monogram in the ſignature of a document was *Theodoric* king of the Oſtrogoths between the years 493 and 526. But it was Charlemagne, who rendered monograms faſhionable and introduced their conſtant uſe. Since pope Leo IX. or from the year 1050, almoſt all the bulls of the popes have two monograms, one before and the other after the ſignature of the pope's name. In Great Britain monograms have never been uſed.

The following are the monograms of Charlemagne, Otto the firſt, Hugo Capet, Robert of France, and Boſo king of Provence.



Seals, or ſignets have been uſed ever ſince the time of the patriarch Jacob. Geneſis xxxviii. 18. Exodus xxviii. 11. They were known to the Egyptians, Babylonians, Medes, Perſians, Greeks, and Romans. They are mentioned by the names of ſignum, till the 5th, 6th, and even the 14th century, "bulla, bulla cerea, ſignetum, ſignaculum, impreſſio, imago, imaginis impreſſio, imaginis ſignum ſecretum." But the moſt ancient name is annulus, (in diploms it is often ſpelt anulus,) which laſted until the tenth century, after which the word ſigillum is the moſt general. The Anglo-Saxons uſed ſeals, as appears from documents of the years 955 and 1066. Until the 8th century the affixing of a ſeal was abſolutely neceſſary to complete the ſolemnity of a tranſaction recorded in a document. From the 8th to the 12th century the uſe of ſeals was optional; the ſigns of the croſs and other ſolemnities frequently ſupplied their place. But from the 12th to the 15th century ſeals recovered their ancient

cient importance, and they have been conſtantly employed ſince that time by kings, princes, biſhops, abbots, noblemen and private gentlemen, ſo that no document was reputed valid unleſs properly ſealed; indeed the ſeal ſupplied the place of almoſt all the other formalities.

The ſeal was anciently of white wax imprinted on the parchment itſelf, ſigillum impreſſum. This method of ſealing was uſed in England until Edward the confeſſor and even William the conqueror, or the year 1087; in France until Louis le Gros or the year 1137; in Germany until Frederick I. or the year 1190. It was afterwards pendent from the document, and incloſed in a box or caſe, called *bulla*. The ſeal itſelf was then named *pendulum*. The oldeſt pendent wax ſeal is that of a document of Noricon biſhop of Laon in Picardy of the year 961. His cotemporary the Engliſh biſhop St. Dunſtan affixed his ſeal in the ſame manner, ſo that the pendent ſeals are of the ſame antiquity in England as in France. The kings of England uſed white wax until Charles I. Green wax is appropriated to the ſealing of charters. See SEAL.

Latin was the diplomatic language in both the eaſtern and weſtern empire until the year of our era 602, after which the Greek language alone was uſed in the documents of the eaſtern, and the Latin in thoſe of the weſtern empire. The Greek was alſo the diplomatic language of the kingdoms of Naples and Sicily during the 11th, 12th, and 13th centuries. In England the Latin and the native or vulgar language were uſed indifferently, the Anglo-Saxon from the 8th till the 13th century, except that from William the conqueror to Edward III. the French was the diplomatic language in public tranſactions; but private documents continued to be written in the Anglo-Saxon. The Latin was entirely diſcontinued and the Engliſh language alone employed after the year 1362.

Every document has a beginning (prologus), a text, (textus), and a concluſion (epilogus). The formulæ prologi were invocatio divina, nomen et titulus, promulgatio, exordium.

The invocations uſed under the firſt Carolingians were: "In nomine Dei et Salvatoris noſtri Jeſu Chriſti;" or "In nomine patris et filii et Spiritus Sancti." After Charles the Bald; "In nomine Sanctæ et individuæ Trinitatis;" and in a ſuppoſed document of Henry II. about the duchy of Benevent, of the year 1014; "In nomine domini Dei omnipotentis patris, filii et Spiritus Sancti," which affords an additional proof of the unauthenticity of this document. In the 13th century, the invocation was ſometimes omitted: but in the year 1512, the emperor Maximilian I. obliged the public notaries to uſe the invocatio divina in their inſtruments.

With regard to the name and title, the pronoun *ego* or *nos* was not prefixed to the names before the middle of the thirteenth century. Until the ſixteenth there never was but one Chriſtian name. Of the kings of the Saxon heptarchy in England, there was always one who was conſidered as the chief, or ſupreme monarch above the other ſix. Aetdibalt, in the year 730, is on that account ſtyled Rex Britanniæ, although he was only Rex Merciorum. The words Dei gratia were frequently expreſſed by "Divina clementia; divina favente clementia; divina concedente, auxiliante, juvante, opitulante, propitiante, diſponente, diſpenſante, miſeranda, præordinante clementia." The moſt common is divina favente clementia, which was introduced by Pepin.

The formula promulgationis was for inſtance; "Noverint omnes fideles noſtri tam præſentes quam futuri." Some documents are without an exordium. This generally expreſſed the motives of the tranſaction, which were derived "a pio, ab honeſto, ab utili, a decoro, &c.;" for inſtance: "Quia memoria hominum labilis eſt, et tempora prætereunt more fluentis aquæ."

In the text itſelf we may obſerve, that ever ſince Otto the Great, kings and emperors, in ſpeaking of themſelves, uſe the expreſſions "cellitudo, majeſtas, ſerenitas, regalis magnificentia, ſublimitas, regale culmen." The words cum conſilio principum, are not to be found before the tenth century, and the term feudum appears only in the time of the emperor Frederick. Till then it is always called beneficium.

The concluſion, or epilogus, contains the formula roborandi, as for inſtance: "Et ut hæc auctoritas noſtra firma ſtabiliſque permaneat, chartam hanc conſcribi juſſimus." It was ſometimes ſtrengthened by penalties or by maledictions, of which there are inſtances of the moſt ſhocking nature in J. G. Leuckfeld's Antiquitatibus Walkenredenſibus, p. 31, and in other collections of documents. It alſo mentions the witneſſes, the date of the tranſaction, when it was reſolved upon, which is called actum, and the votum finale; for inſtance; "in Dei nomine," or "in Dei nomine feliciter, amen," or "feliciter amen," or ſimply "feliciter." But this votum finale is frequently omitted.

Thus the different hand-writings of the different ages; the materials on, and with which the documents are written; their accentuation, punctuation, and abbreviations; their various ſignatures, marks, monograms, and ſeals; the language, ſtyle, and orthography of each age, as well as the different inchoative and final formulas, &c. conſtitute ſo many characters by which the authenticity of a diploma or document is to be aſcertained. When it bears all the marks which are requiſite for the time when and the place where it is ſuppoſed to be written, its authenticity is no longer to be doubted; but documents cannot be examined too minutely, becauſe the monks and prieſts of former ages have diſplayed uncommon ingenuity in making counterfeits. Their ſucceſs in theſe forgeries ceaſes, however, to aſtoniſh, when it is recollected that they enjoyed the confidence of princes and ſtateſmen, and were even ſometimes in poſſeſſion of their rings and ſeals.

With regard to manuſcripts or books written before the invention of printing, the art of judging of their antiquity and diſcerning their real authors, is a branch of literary criticiſm, and not of diplomatics. (See CRITICISM, MANUSCRIPT.)

The ſcience of diplomatics owes its origin to a Jeſuit of Antwerp, named Papebroch, who applied himſelf to the reſearch and expoſition of old diplomas, about the year 1675. His work is entitled "Propylæum." (See PAPEBROCH.) The Benedictine monk, John Mabillon, conſiderably improved this new ſcience in his learned work, "De Re Diplomatica," printed in 1681 (ſee MABILLON), which was unjuſtly and unſucceſsfully attacked in England by the celebrated Hickes, in his "Ling. veter. Septentr. Theſaurus. Præfatio," p. xxxv. The Italian Maffei's diplomatic hiſtory is but a ſupplement to Mabillon. But it is to Touſſaint and Taſſin, two Benedictine monks of St. Maur, that we are indebted for the largeſt work extant on diplomatics, entitled "Nouveau Traité de Diplomatique," Paris, 1750--1765. 6 vols. 4to. with plates. The founder of its practical ſtudy in Germany was John Heumann von Teutſchenbrunn. His "Commentar. de Re Diplom. Imper." was publiſhed in 4to. at Nurenberg in the year 1745. The "Dictionnaire raiſonné de Diplomatique," by Dom de Vaines, Paris, 1774, 2 vols. 8vo. is a compilation intended to aſſiſt beginners in the ſcience.

Diplomatics have been lately reduced to a complete ſyſ-

tematical ſcience by J. C. Gatterer, in his "Abriſs der Diplomatik," Goettingen, 1798, 8vo. and by C. T. G. Schoenemann, in his "Proluſio de finibus artis diplomaticæ practicæ regundis," and in his "Verſuch eines vollſtændigen Syſtems der allgemeinen beſonders æltern Diplomatik." Goettingen, 1802.

DIPLOPIA, in *Surgery*, is double viſion; from διπλοος, *double*, and ὄψις, *viſion*. (See the articles EYE, SIGHT, and VISION.) Perſons affected with this rare diſeaſe will perceive objects double, treble, or otherwiſe multiplied, when they look at them with both eyes; but they will generally ſee them ſingle, when viewed with only one eye. Sometimes, indeed, the objects may appear double when ſeen with one or both eyes. Commonly the patient ſees one of the ſpectra more diſtinct than the other; ſometimes, however, he ſees both equally diſtinct, ſo that he cannot aſcertain the real ſituation of the object by the ſenſe of ſight.

Double viſion is ſometimes temporary, and of ſhort duration; but ſometimes it is permanent, and even periodical. Sometimes the patient ſees double, only after he has exerted his eyes violently for a ſpace of time; ſometimes he ſees objects double only from one ſide or the other, either right or left; ſometimes alſo he ſees double, whichever way he may direct his eyes.

The cauſes of double viſion may be diſtinguiſhed into four claſſes. In the firſt, the object produces a double ſpectrum upon the retina; in the ſecond it forms a ſpectrum in one eye, which is different, with reſpect to apparent ſize, poſition, diſtance, diſtinctneſs, &c. from that which is formed in the other; in the third the ſpectrum is formed upon a part of one eye not correſpondent with that upon which it is formed in the other; or the ſenſation of the optic nerve is diſordered. When the diſeaſe ariſes from cauſes of the firſt and fourth claſs, the patient ſees double as well when he uſes a ſingle eye, as when he uſes both; but when it ariſes from cauſes of the ſecond and third claſs, he only ſees double when he uſes both eyes at once; and when he ſhuts the one, he ſees objects perfectly natural, that is, ſingle, with the other.

The principal cauſes of the firſt claſs are: 1ſt, an unevenneſs of the cornea, which is divided into two or more convex ſurfaces; 2d, an unevenneſs of the anterior ſurface of the cryſtalline lens, which is divided into ſeveral ſeparate ſurfaces; 3d, a double orifice in the iris, or a double pupil, as it is termed. Theſe cauſes are incurable. The cauſes of the ſecond claſs are, in general, ſuch as are rather poſſible, than that they have actually been obſerved. All the defects of viſion to be mentioned hereafter may ſometimes ariſe only in one eye; the refraction of the rays of light may be ſtronger in one eye than in the other; the patient may be in one eye *myops*, and in the other *preſbyops*; in conſequence of a peculiar defect of viſion, the patients ſee every ſtraight object as if it were crooked; all which defects may give riſe to double viſion. The third principal cauſe is ſquinting. In this diſeaſe the object is repreſented in both eyes in points not correſpondent with each other. But a perſon that ſquints does not ſee objects double, unleſs when he ſees equally diſtinct with both eyes, and the ſtrabiſmus does not ariſe from any weakneſs of either of the eyes, but from ſome other accidental cauſe. (See STRABISMUS.) This ſpecies of double viſion may be eaſily known by the patient's having begun to ſquint, and to ſee double at the ſame period of time. The cauſes of the fourth and moſt frequent claſs are the irritations which act upon the nerves of the eye, and modify their power of ſenſation in ſuch a manner, that objects which operate upon them are not repreſented in their natural form. Theſe irritations are of various kinds, and generally dependent upon the ſtate of the viſcera; they may, however, be produced by other irritating cauſes.

In the laſt ſpecies, the principal object muſt be to diſcover and remove the irritating cauſe. A boy, who became affected with double viſion in conſequence of a ſtroke which he received from the bough of a tree, was cured by the external uſe of infuſ. rad. valerian, with ſpir. vin. crocatus. A caſe of double viſion, produced by a violent fright, was cured by means of valerian, after cream of tartar had been uſed for three days previous to its adminiſtration; one ariſing from bilious obſtructions in the abdominal viſcera, was cured by pills of gum galbanum, guaiacum, rhubarb, and Venetian ſoap, combined with the uſe of emetics and purgatives.

When the irritation is of a tranſient nature, and after it has excited the diſeaſe, does not continue any longer to exiſt; or when the diſeaſe ſtill continues after the irritating cauſe has been removed, or finally when the irritating cauſe cannot be diſcovered and accurately determined, the ſurgeon muſt endeavour to remove the complaint by remedies that ſtrengthen the nerves and allay irritation. The following are particularly uſeful in theſe caſes: ſpir. ſal. ammon. dropped into the hand and held before the open eyes; ſpir. vin. crocat. externally; the warm eye-bath, eſpecially of capit. papav. alb. in decoction; the cold eye-bath; internally, Peruvian bark, valerian, ipecacuanha in ſmall doſes, Flor. zinci, and ol. cajeput. In one inſtance tart. ſolub. with fel tauri, and caſtoreum; in another, pulvis rhabarb., fel tauri, and aſa fœtida; and in a third, ſpirit. Mindereri with fel tauri, produced the moſt beneficial effects. In general, in all caſes, in which we cannot accurately determine the particular cauſe of the diſeaſe, we may ſuppoſe it to exiſt in the viſcera of the abdomen, and in ſuch caſes we may often do much good by the uſe of remedies that are gently purgative, and evacuant, and that allay irritation. See DELIRIUM.

DIPONDIUS. See DUPONDIUS.

DIPPEL's OIL, in *Chemiſtry*, ſo called from the inventor, Dippel, is the oil procured by the diſtillation of bones *per ſe*, and rectified by repeated diſtillations. The oil at firſt is extremely black, thick, tenacious, and fœtid. To rectify it, put it into a clean retort, taking care that none of it ſoils the neck of the veſſel in dropping it in. Then apply a moderate heat, by which a finer and clearer oil will riſe, and collect it in a clean receiver, ſtopping the proceſs as ſoon as it begins to drop foul and dark-coloured. This clearer oil is to be again diſtilled with the ſame precautions, taking only the firſt portion, and thus a perfectly limpid oil is obtained, the ſmell of which, though ſtrong and penetrating, is ſcarcely fœtid, and which is as fluid as water. It muſt be preſerved, however, in a dark place or an opaque bottle, for the action of the light renders it brown, fœtid, and nearly approaching to the ſtate of the oil from which it was obtained. Dippel's oil is a very powerful ſudorific in doſes of twenty or thirty drops, and it ſeems to deſerve more notice as a medicine than it has acquired, being now nearly diſuſed. See the article OIL.

DIPPER, in *Ornithology*. See COLUMBUS *minor*.

DIPPING, in *Calico-Printing*, a proceſs uſed in dyeing blue, in which the cloth is immerſed or dipped either in a ſolution of indigo, or of ſome ſubſtance capable of acting on indigo previouſly applied to the cloth.

The peculiar nature of indigo unfits it for the purpoſes of dyeing by the ordinary operations of the art. It conſiſts, as we ſhall have occaſion to ſhew more fully hereafter, of a peculiar vegetable baſis united to a portion of oxygen, to which it owes its colour and inſolubility. When deprived of this oxygen, by ſubſtances whoſe affinity for it are greater, it becomes ſoluble in the alkalies and alkaline earths, and in this

this ſtate readily contracts an union with animal or vegetable ſtuffs. On this property of the alkalies to diſſolve deoxygenated indigo, are founded two proceſſes for dipping or dyeing blue, which form the ſubject of the preſent article. The firſt conſiſts in immerſing the cloth in an alkaline ſolution of indigo, and is employed in dyeing thoſe goods, the ground of which is intended for blue or green. The parts meant to remain white, or which have already received ſome other colours, being covered with a reſerve or paſte, to protect them from the effect of the dye.

This proceſs is very ancient.

The ſecond is employed in dyeing thoſe goods intended to exhibit a deſign or pattern in one or more ſhades of blue, upon a white ground, and is called "China blue," or generally upon the continent, Engliſh blue, the proceſs having originated with the calico-printers of this country.

From time immemorial the nations of the eaſt appear to have poſſeſſed a mode of dyeing ſilk handkerchiefs, and other articles of dreſs, by a rude but ſimple proceſs, which is practiſed at this day, and has been adopted, and continues in uſe, in almoſt every part of Europe. It conſiſts in tying knots with great addreſs and nicety on the ſilk in ſuch a manner, that when dyed, the parts encloſed within the knot remain untouched, diſplaying a ground of red, blue, or any other colour, variouſly, and oftentimes not inelegantly diverſified with flowers of white or yellow, according to the primitive colour of the ſilk. This mode of dyeing handkerchiefs was introduced by the Saracens into Spain, where it is now practiſed to a very conſiderable extent. This, in all probability, was the firſt rude eſſay or attempt to imitate the printed linens of Egypt, and was ſucceeded by the mode now practiſed in India, of covering with a compoſition of wax and other ingredients, the parts intended to remain white. Hence we may date the origin of blue dipping, and though the proceſs, as may be ſuppoſed, has been conſiderably improved ſince its introduction into Europe, yet the ancient practice is ſtill in uſe; and wax printing is often employed with conſiderable advantage in the production of particular combinations of dark and light blue, which could not readily be obtained by any other proceſs.

Of the Indigo Vat, and the Proceſs of common blue Dipping.

The ſolution of indigo for blue dipping, is made in large oblong veſſels of wood, ſtone, or other materials, to which the name of vats is given. Thoſe which are made of wood require to be very accurately joined, and well ſecured with bolts and ſtraps of iron; otherwiſe great loſs may ariſe from the conſtant leakage, to which, without great precaution, they are ſubject. In general they are lined with lead, and though the expence in the firſt inſtance is four times that of wood, they are eventually much cheaper. They need fewer repairs, and afford abſolute ſecurity againſt all loſs by leakage, which, in a drug ſo coſtly as indigo, is a conſideration of great importance. Stone vats have been tried in ſome places. At Rouen, according to Berthollet, they are conſtructed of a kind of flint-ſtone, well ſecured both outſide and inſide with a fine cement: and Pileur d'Appligny mentions ſome he had ſeen compoſed of large ſtone ſlabs ſcrewed together at the corners, and the joints of which were covered with a kind of maſtic varniſh. Economy is the chief aim in all theſe various conſtructions, as it matters little what the vat is compoſed of, provided it will hold the dye; and thoſe, in fact, are the cheapeſt, whatever they have coſt, that ſuffer the leaſt to eſcape.

The ſize of the vat varies conſiderably in different dye-houſes, according to the nature and extent of the eſtabliſhment, and the kind of work they are intended for. Four feet wide, ſix feet long, and ſix or ſeven feet deep, are the dimenſions of a well-proportioned vat, calculated for two pieces of calico, or 56 yards of cloth on a frame. Much ſmaller than the ſize here given are in uſe for frames of ſingle pieces, and vats of ſtill larger dimenſions are employed by ſome, whoſe work and cloth require them one or two feet deeper.

The vats are all ſunk in the earth, down to a level, or nearly ſo, with the floor of the dye-houſe. In ſome few old eſtabliſhments, they ſtand two feet, or thereabouts, above the floor, as is univerſally the caſe on the continent. In this caſe, the frames are hoiſted in and out by a pulley ſuſpended over the vat, a moſt awkward and inconvenient practice, which is avoided by ſinking them to the level of the floor. The frames are lifted out with eaſe by the hand, by two men or boys, one at each end, and in a range of ſix or eight vats, the frames are hoiſted out and re-entered in half the time, and with half the trouble, required to manage the pullies.

The number of vats neceſſary in a well arranged dye-houſe muſt depend greatly on the nature and ſize of the eſtabliſhment. Eight of the ſize already given, ranged in one line ſide by ſide, form a good ſeries: double or treble that number may be required, but with fewer, a dyer, whoſe quantity of work is limited, yet various, will find much inconvenience, eſpecially when by long working the dregs or grounds have ſo accumulated as to require a repoſe of 24 hours at leaſt, after raking up before the vats are fit for work again. It is on this account that deep vats are preferable to ſhallow ones; the mud ſubſides in them much ſooner, and they require cleaning out and emptying leſs frequently.

The nature of the indigo vat is ſuch, that the indigo is revived and precipitated from it whenever it comes in contact with the air. On this account, it is impoſſible to dye a piece evenly by winching or working it in the dye liquor, as in other colours. Thoſe parts of the piece which had been moſt expoſed, and on which, of courſe, moſt indigo had been precipitated, would exhibit deeper ſhades than thoſe which had been leſs. The reſerve, or paſte, allo, for white, when ſuch had been applied, would be diſturbed and waſhed off by the uſual manipulations of dyeing.

On theſe accounts it is neceſſary to hook the pieces on a frame in ſuch a manner, that when immerſed in the vat, or taken out, the folds ſhall not touch each other. The frames are of wood, the length and width nearly of the vat, and of a depth ſufficient for the width of the goods. The horizontal ſide-rails at the bottom are fixed, and form the baſe of the frame, and are furniſhed with ſmall tenter hooks of copper an inch and a half, or two inches aſunder, to which the edge or ſelvedge of the piece is attached. The upper rails, which are alſo furniſhed with hooks, ſlide in a groove cut in the upright or corner poſts, and may be adjuſted to the width of any kind of cloth, and are retained in their place by a peg or pin. The piece is hooked in folds from ſide to ſide, and ſo evenly and tightly ſtretched, that when immerſed in the vat every part is equally and alike expoſed to the dye, and no one fold can touch another. The number of dips is regulated by the ſhade of blue required, and when finiſhed, the goods are taken off the hooks and ſubjected to the ordinary operations of waſhing, rinſing, &c. &c. The ſolution of indigo, which, as well as the veſſel that contains it, is generally called "blue vat" by the dyers, is made with lime and copperas, and in ſome caſes with the addition of a ſmall quantity of potaſh. In the due proportion of all the ingredients of this ſolution, and in the treatment of the vat, both during, and after working, conſiſt the chief art of "blue dipping," in the management of which, however, there is leſs difficulty than in any other branch of blue dyeing

whatever. The theory is ſo ſimple, and the practice, to thoſe acquainted with the theory, ſo very obvious, that with common care and obſervation it is ſcarcely poſſible to err.

Indigo, as we have juſt before obſerved, is inſoluble in the alkalies and alkaline earths, till deprived of its oxygen. Copperas is employed for this purpoſe in the vats we are ſpeaking of, and orpiment in others, and in the pencil blue; both theſe ſubſtances having a ſtronger affinity for oxygen than the baſe of the indigo. On adding together, therefore, indigo, copperas, and lime, in ſuitable proportions, the lime in the firſt inſtance decompoſes the copperas, and precipitates from it the oxyd of iron: this acts on the indigo, deoxygenates it, and renders it ſoluble in the lime, which, if in ſufficient quantity, immediately diſſolves it. The oxyd of iron, which has ſerved to deprive the indigo of its oxygen, the ſulphate of lime formed by the union of the lime with the acid of the copperas, and any lime in exceſs or more than neceſſary to effect the decompoſition of the copperas, and the ſolution of the deoxygenated indigo, all precipitate to the bottom of the vat, and there remains in ſolution only lime and the baſe of indigo. There are few dyers and calico-printers who do not imagine that the ſolution of indigo conſiſts of all the ſubſtances that have been uſed in its formation, and that the vat actually holds in ſolution indigo, copperas, and lime. They are not aware that ſolutions of theſe two latter ſubſtances are incompatible; they cannot exiſt together, one or other muſt predominate, as a very ſimple experiment will ſhew: Mix clear lime water, and copperas water together, and an inſtant precipitation will take place. As long as any copperas remains in ſolution, every ſucceſſive addition of lime water will cauſe a freſh precipitate, which conſiſts of oxyd of iron, and ſulphate of lime, formed by the union of the lime with the acid of the copperas. None of the lime remains in ſolution. The precipitation ceaſes only when the whole of the copperas is decompoſed, that is, when there is no longer any acid to form an inſoluble ſalt with the lime. The ſolution will then be found to conſiſt of lime water only. To thoſe in the leaſt acquainted with the principles of chemiſtry, theſe obſervations may appear minute and trifling, but to thoſe ignorant of theſe ſimple facts (and the majority of thoſe intereſted in the ſubject of the preſent article are ignorant of them,) the conſtitution of the blue vat muſt be wholly unknown, and its management, of courſe, expoſed to all thoſe chances of failure and derangement which muſt neceſſarily attend even long experience, when unaccompanied with clear and accurate ideas of the nature and properties of the different ſubſtances employed.

The proportions of indigo, copperas, and lime, neceſſary to form a blue vat, depend both on the quality of the indigo, and on the ſtrength of the ſolution required. The quality of indigo varies greatly, ſome kinds, as the fine Spaniſh and Eaſt India, containing twice, and even thrice, as much colouring matter as the coarſer kinds. In general from two to five pounds of good indigo to every hundred gallons of water, are ſufficient to form vats for moſt purpoſes. They are ſometimes, but rarely, required ſtronger; 40 pounds in a vat holding 800 gallons, will produce a ſolution of ſufficient intenſity to give a black nearly, at four or five immerſions.

The finer the quality of the indigo, and the greater the proportion of copperas and lime, neceſſary to effect its ſolution. In general, however, one of indigo, two of copperas, and two of lime, are conſidered as the beſt proportions, and as ſuch they are given by Berthollet, who, to profound chemical ſcience, unites conſiderable practical knowledge, and the beſt information concerning the proceſſes of the dyers and calico-printers of France.

The indigo is previouſly ground in a mill with water, till it is reduced to a ſmooth paſte of the conſiſtence of cream. In its ordinary ſtate of aggregation, it is ſcarcely, if at all, attacked by copperas and lime; all therefore that has eſcaped the action of the mill, and is put into the vat in a lumpy or imperfectly ground ſtate, may be conſidered as totally loſt. Every precaution therefore ſhould be employed to guard againſt this, and when by rubbing it between the fingers, or on a pane of glaſs, it appears fine and ſmooth, and free from ſmall hard, gritty particles, it may be removed from the mill, mixed up with four or five times its bulk of water, and poured through a fine ſieve into the vat. Any lumps which may have eſcaped grinding are thus retained, and may be returned into the mill with freſh indigo.

The vat having received its charge of indigo, and been filled up with clean water, the copperas is next added. It is beſt and moſt ſpeedily diſſolved by ſuſpending it in a wicker baſket at the ſurface of the vat; it is ſometimes thrown in, and will, in that caſe, when it is in large lumps, oftentimes lie undiſſolved at the bottom of the vat for weeks, in ſpite of frequent and even daily ſtirring. When the whole is diſſolved, the lime is added, and the vat well raked up, till all its contents are intimately mixed, the lime diſſolved, and the copperas decompoſed. The action of oxyd of iron upon indigo requires time, and alſo repoſe; after the firſt raking, which ſhould be continued during half an hour at leaſt, it is beſt to ſuffer the vat to remain two or three hours undiſturbed; the indigo and oxyd of iron fall down to the bottom, and are thus brought more within the ſphere of chemical action, than when floating in the whole maſs of water in the vat.

The choice of copperas is not a matter of indifference, as on its peculiar ſtate depends its fitneſs or not for deoxygenating indigo. Sulphate of iron exiſts in two ſtates dependent on the quantity of oxygen combined with its oxyd. At its minimum of oxydation, it forms a green ſolution, and when cryſtallized, a green ſalt, the green vitriol, or copperas of commerce; at its maximum, or ſecond ſtate of oxydation, it forms an orange-coloured, uncryſtallizable ſolution poſſeſſing very different properties from the former.

The green ſolution is diſtinguiſhed by its great avidity for oxygen, and its diſpoſition to paſs to the orange, or fully oxygenated ſtate. It is this affinity for oxygen that fits it for the ſolution of indigo. The copperas of commerce is however not unfrequently a mixture of the two ſalts or oxyds a portion of it either having acquired oxygen, whilſt in a ſtate of ſolution before cryſtallization, or more frequently perhaps by too great expoſure to the air afterwards.

In this latter caſe its ſurface is covered with a reddiſh orange ruſt, and a portion of the ſalt is rendered uſeleſs for the blue vat having already acquired its maximum of oxygen. The chief difference in the quality of copperas, is however in the more or leſs perfect ſaturation of the acid, forming two diſtinct ſalts, which were known and diſtinguiſhed by manufacturers long before chemiſts were acquainted with their exiſtence. The firſt, and leaſt eſteemed, is a pale emerald green, and contains a great exceſs of acid; the other, which is more fully ſaturated with iron, is a deep full green, and is univerſally preferred, eſpecially for indigo and China blue vats. Some calico-printers imagine that the reddiſh coloured copperas is the beſt, or, as they ſay, the *ſtrongeſt*, a prejudice which the manufacturer very eaſily accommodates, by ſprinkling a little fine ſifted quick lime over the ſurface, which ſoon covers it with a coat of orange ruſt.

The lime uſed for the indigo vat ſhould be quick. Fallen

lime,

lime, when not too old, and too long expoſed to the air, is the beſt. It ſhould be well ſifted, and freed from ſtones and lumps.

After two or three hours repoſe, the vat ſhould be again well raked. It will now exhibit ſigns of incipient ſolution; inſtead of black, it will appear of a dark bottle green, and the ſurface will break into marbled veins of blue. Theſe appearances will increaſe each time the vat is raked, which ſhould be three or four times a day during two days. At each time the colour of the vat will brighten, and get paler, the marbled or veined appearance become more marked and ſtrong, and when the ſolution is compleat, and ready for working, the colour, when raked up, will be a yellowiſh green. After a repoſe of ten or twelve hours, to allow the dregs time to ſubſide, the vat is ready for work.

It is the practice of ſome dyers to add potaſh in equal quantity with indigo to the vat. The only advantage ariſing from this, is greater concentration of the ſolution than can be obtained by lime alone; but this is ſeldom required, and never, indeed, for the purpoſes of calico-printing; on the other hand, if potaſh be added to a vat containing little indigo, and calculated only for the paler ſhades of blue, the colour it will produce is leſs intenſe, than when lime alone is uſed, and the hue not at all improved.

It was formerly the practice to grind the indigo with a ſolution of cauſtic potaſh, and boil it in a ſtrong lye, before adding lime and copperas, and pouring it into the vat. A great deal of trouble, and no advantage whatever attends this proceſs, which is now univerſally diſcarded, except by thoſe who regard all improvements as innovations.

Of the management of the vats both during work and after, we ſhall have occaſion to ſpeak whilſt treating of particular kinds of work; which, after the preceding general view of the nature of the proceſſes, and the mode of preparing the indigo vats, we ſhall now proceed to.

Of dark Blue ground, and white.

Dark blue grounds, with ſpots or figures of white, were amongſt the firſt attempts at calico-printing in the Eaſt, and were produced, as we have before remarked, firſt, by tying knots on the part intended to remain white, and afterwards by covering them with a compoſition of wax. This proceſs was ſubject to great inconveniencies, ariſing from the unmanageable nature of the compoſition, which required keeping fluid by heat during the time it was applied, and could only be uſed in certain plain figures, ſuch as round ſpots, ovals, &c. The deſigns were of courſe rude and ſimilar, little variety being practicable where lines, ſtalks, leaves, or any object more figured than a ſpot or oval, could not be obtained.

At what time the paſte or reſerve now in general uſe was introduced, is not known; we are indebted for it to the continent, from whence, indeed, our firſt knowledge of calico-printing was derived. Though the formulæ for this paſte differ much, every blue dyer almoſt, preparing it in a mode peculiar to himſelf, yet they are all eſſentially the ſame, a ſolution of copper of one kind or another being the principal ingredient.

If a ſolution of ſulphate, acetate, nitrate, or indeed any ſoluble ſalt of copper, properly thickened for printing, be applied to cloth, and when dry, immerſed in the blue vat, the part ſo covered will reſiſt the action of the dye, and remain white. This does not ariſe from the mere mechanical reſiſtance of the paſte, which prevents the ſolution of indigo from entering the fibres of the cloth, but from the chemical action of the oxyd of copper, which imparting oxygen to the indigo, reſtores it to its former blue ſtate, in which it poſſeſſes neither ſolubility in lime, nor diſpoſition to unite with the cloth. This effect of the oxyd of copper may be rendered very apparent, by pouring a ſolution of it into a ſolution of indigo, which is generally of a yellowiſh green, or when viewed by tranſmitted light, of the colour of ſmall beer. The inſtant the two ſolutions are mixed, the indigo is revived, and precipitated in its original blue ſtate, having acquired from the copper that principle of which it had been deprived by the ſolution of ſulphate of iron. Every paſte, or reſerve, therefore, for dark blue grounds, muſt neceſſarily contain oxyd of copper; we give the following formulæ as moſt approved of any in uſe.

I. To 1 gallon of water add,
4 lbs. of ſulphate of copper,
12 lbs. of pipe clay.

Boil the whole up into a thick paſte, ſtrain through a cloth, and add to it half a pint of ſulphuric acid, and five pints of thick gum water. Mix all well together, and ſtrain again before printing.

II. To 1 gallon of vinegar add,
1½ lbs. of verdigreaſe,
3 lbs. of ſulphate of copper.

Diſſolve them over the fire, and thicken with 12 lbs. of pipe clay, finely ground.

If the paſte is not fine and ſmooth, run it through the mill, and add to it, whilſt hot, 8 ozs. of linſeed oil, and two quarts of thick gum water. Strain it carefully through a cloth before printing.

III. To 1 gallon of water add,
2 lbs. of verdigreaſe,
3 lbs. of ſulphate of copper,
3 lbs. of nitrous acid,
15 lbs. of pipe clay.

Boil them well in a copper pan, and, if neceſſary, grind them ſmooth, and add three quarts of thick gum water. Strain the whole very well before printing.

The firſt of theſe formulæ contains ſulphate of copper only, the ſolubility of which is increaſed by the addition of a little ſulphuric acid, which prevents the cryſtallization of the paſte. The ſecond, which is ſtronger, contains alſo acetate of copper, and the third, in addition to both theſe ſalts, contains a portion of nitrate of copper formed by the action of the nitrous acid on the verdigreaſe. This is a very powerful paſte, and capable of reſiſting the vat a long time, and forming a white upon a ground nearly black.

The pipe clay uſed in thickening, is not merely uſeful in giving due conſiſtence and body to the paſte, ſo as to render it eaſily workable, but is very efficacious in reſiſting the dye; the ſame ſolution, thickened with gum only, will ſcarcely bear three immerſions, but with the allowance of pipe clay here directed, will ſtand ten or twelve. No more gum, indeed, ſhould be added than is juſt ſufficient to break the adheſive nature of the pipe clay, and prevent it clogging up the print or block.

In working this paſte the mall, or mallet, ſhould be uſed very lightly, or not at all, if the pattern will admit of it. A gentle tap with the hand, ſo as to leave the paſte wholly on the ſurface of the cloth, will produce the beſt work.

The cloth may be dipped an hour or two after printing, if required, but the whites are ſeldom ſo good as when kept three or four days. The paſte gets hard and firm, part of the acid evaporates, and the ſolution of copper becomes more intimately incorporated with the cloth.

Dark blues, in general, require from five to ten dips, or immerſions, according to the ſhade of blue required, or the ſtrength of the vats employed.

If the vats are ſtrong, five, or at moſt ſix dips, will give a very

very dark blue, almoſt black, the intenſity of which will be little increaſed by further dipping; the labour is greatly abridged by employing ſtrong vats, but the whites are liable to great injury, as the ſolution of indigo, when concentrated, acts very powerfully on the paſte. On this account the firſt vat ſhould invariably be the weakeſt of the ſeries, and never ſtronger than is ſufficient to produce a full ſtrong blue at ſeven, or even eight immerſions. The ſecond and third vats may be ſtronger, and ſo on to the laſt, which may be the ſtrongeſt of all. Dark blues may be dipped and finiſhed in the ſame vat, but it is more convenient to paſs them in ſucceſſion through a ſeries diſpoſed in a line in the manner we have before deſcribed.

When the piece is well hooked, and the frame ready, the vat muſt be well ſkimmed before the piece is entered. The ſurface of a blue vat is always covered with a film of revived indigo, more or leſs thick, according to the ſtrength of the vat. This film it is neceſſary to remove before the frame is immerſed, otherwiſe the revived indigo, which is no longer in ſolution, attaches itſelf, and adheres to the cloth in patches, producing unevenneſs in the dye, eſpecially in the firſt vat. When ſkimmed, the ſurface of the vat is dark green, but the blue film re-appears in a few minutes; it ſhould not be removed, therefore, till the frame is ready for immerſion.

In five or ſix minutes the cloth has fully imbibed the dye, and little advantage is gained in general by keeping it longer in the vat. The frame is then lifted out, and placed ſlantwiſe in ſuch a manner, that all the liquor which drains from the piece falls down into the vat again. When taken out, the cloth appears of a pale yellowiſh green, if the vat is weak, but if ſtrong, more inclining to amber. This colour gradually changes, as the indigo, by abſorbing oxygen from the atmoſphere, becomes revived, and in five minutes the cloth appears uniformly blue; it is then ready for another immerſion. Six minutes *in*, and ſix minutes *out*, is a good general rule for dipping dark blues, as the cloth will in that time have acquired the full effect of the vat, and *the green will alſo go off* in little more than five minutes, though the vat be very ſtrong. The bottom edge of the piece retains the green hue the longeſt, becauſe it is longeſt in draining from the liquor; care muſt be taken, therefore, never to immerſe a piece till the bottom edge has been examined, and found perfectly ready for the dip. The conſequence of entering a piece into the vat whilſt the bottom edge is green, is, as might be ſuppoſed, that the edge will be the paleſt, the indigo not having been revived and precipitated upon it equally with the reſt of the piece.

In dipping dark blues, the firſt dip is the moſt important; and if it fails, the work is inevitably ruined. Firſt, if the vat be too ſtrong, the whites will never be clear and ſharp; ſecondly, if for want of due preparation the cloth does not uniformly receive the dye, the goods will ſcarcely ever be even when finiſhed. Thirdly, if either from the paſte being too ſtrong, or the vat too weak, or not in proper order, the impreſſion ſtarts, or runs at the firſt immerſion, the ground is ſure to be freckled and uneven, and the whites bad.

Againſt the firſt ſource of error, the knowledge of the fact ought to be a ſufficient guard; but if unavoidably it ſhould happen that the leading vat is too ſtrong, there is no other remedy than ſhortening the time of the dip, and keeping the frame in four or five minutes in lieu of ſix, till the vat becomes reduced in ſtrength.

Imperfect bleaching, accidental impurity in the cloth, and long and partial expoſure to heat and air, are amongſt the cauſes which contribute moſt to prevent the cloth from receiving the blue dye.

It is the practice with many printers to give the cloth intended for this purpoſe an extra preparation, either by boiling in a lye of potaſh, or a ſolution of common ſalt. If the regular bleaching has been perfect, the firſt is wholly unneceſſary, and the ſecond abſolutely uſeleſs.

Cloth that has been well bleached may, by long keeping, and partial expoſure to the air, duſt, and other accidental impurities, become ſo unfit for dipping, as to require ſome extra preparation. In this caſe the modes we have ſpoken of may be uſeful inaſmuch as waſhing, ſoaking in hot water, ſqueezing, and the other attendant operations are uſeful, but clean, well bleached, and recently bleached cloth has no need of any ſuch preparation.

If the paſte be too ſtrong, that is, if it contains too much ſulphate, acetate, or nitrate of copper, it is liable to ſtart or run in the firſt vat, eſpecially when laid on in large bodies. This evil, if not too great, may be remedied by gently moving the frame up and down during the firſt two or three minutes after it is entered. It may alſo ariſe from the vat being too weak, and conſequently containing too little lime in ſolution, and may ſometimes be remedied by the addition of more lime. If in ſpite, however, of the motion of the frame, the addition of more lime, or of greater ſtrength to the vat, the paſte ſtill continues to run, it is a ſign the ſolution of copper is too ſtrong, and the quantity muſt immediately be diminiſhed.

When the green is gone off after the firſt dip, the frame is then moved on, and dipped in the ſecond vat, taking care to ſkim it well before the piece is entered. In this way, after each immerſion, the frame is moved on to the next ſucceeding vat, till it has received the number of dips required. This, as we have before obſerved, depends on the ſtrength of the vat, and the ſhade of blue wanted; but as, during the proceſs of dipping, the vats continually get weaker, the goods, after a certain time, will require an additional immerſion, or even two or three, to get them up to the ſtrength of the firſt pieces that were entered.

The ſtrength of a blue vat is not exhauſted in the ſame manner as the weld or madder bath, by the abſtraction of the colouring matter from the ſolution, by the ſuperior affinity of the mordant on the ſtuff. When a piece of cloth is immerſed in the indigo vat, it becomes penetrated in five or ſix minutes compleatly with the dye, and will gain nothing, by being ſuffered to remain longer than is neceſſary for this purpoſe. When taken out, it carries with it no more indigo than is contained in that quantity of ſolution which it has imbibed, and carries out of the vat. But the inſtant the frame is lifted out, the liquor begins to drain from it back again into the vat, and pours down in ſmall ſtreams, thus expoſing the ſolution compleatly to the atmoſpheric air. The indigo is in conſequence revived and precipitated, ſo that the liquor which drains from the piece, and falls down into the vat, is for the purpoſe of dyeing, no better than ſo much water. Every frame that is entered thus effecting the precipitation of the colouring from matter two, three, or four gallons of the ſolution, the vat, eſpecially the leading one, ſoon becomes reduced in ſtrength. The ſecond, third, and ſucceſſive vats, are weakened in the ſame manner, and alſo by the exhauſted liquor of the pieces, which at every dip after the firſt, is exchanged, as it were, for the freſh and ſtrong ſolution of the vat it is immerſed in.

When the goods have received the laſt dip, and have acquired their full ſhade of colour, they are taken off the hooks, and well winched in clean water; they are then, by the ſucceſſive operations of waſhing and hot watering, repeated as occaſion may require, freed from the paſte, and rendered as clean as poſſible before going into the ſours.

Souring is neceſſary to free them from the laſt remains of the paſte, and give a brightneſs and finiſh to the whites. A ſolution of ſulphuric acid, weak enough to be borne in the mouth without inconvenience, is ſufficient to diſſolve what oxyd of copper is left in the cloth after good cleaning. The goods are immerſed in this ten or fifteen minutes, after which they are well waſhed and hot watered, and when dry are finiſhed, or ready for any ſucceeding operations. The excellence of this kind of work depends on the clearneſs and purity of the white, and on the fulneſs and evenneſs of the blue. The directions we have given are, with ordinary care and obſervation, ſufficient for the attainment of this.

When the vats have become exhauſted by working, they muſt be *refreſhed*. If a vat contains a tolerable charge of indigo, copperas, and lime, and has been worked only once, raking up alone will be ſufficient to put it in a ſtate for working again. When again exhauſted, copperas and lime muſt be added to diſſolve the revived indigo. The quantity muſt depend upon the ſize of the vat, and the ſuppoſed quantity of indigo which it contains. From 20 to 40 lbs. of copperas, and three-fourths of that quantity of quick lime, may be added at once to a vat of 1000 gallons, or thereabouts, and ſome idea may be formed of the effect which this ſhould produce, by recollecting that one pound of indigo requires for ſolution about two pounds of ſulphate of iron. It is proper always to have an exceſs of quick lime in the vat, but it is wholly unneceſſary to make thoſe frequent additions of lime without any thing elſe, which is the practice of many blue dyers. It ſerves no other purpoſe than to fill the vat ſpeedily with dregs, which ought to be avoided as much as poſſible, as when they are accumulated to a certain pitch, it is neceſſary either to take them out, or ſuffer the vat to repoſe from 36 to 48 hours before it is fit for work after raking.

If equal quantities of copperas and lime have been uſed when the vat was formed at firſt, and three parts lime added for every four of copperas afterwards, any other addition of lime is wholly uſeleſs. Some idea may be formed of the ſtate and condition of a vat, by obſerving its appearance when raked up. In general, if it looks dark green or black, it may be preſumed it contains a quantity of revived or undiſſolved indigo, and copperas and lime are therefore neceſſary; this blackiſh appearance may nevertheleſs be occaſioned by a very great exceſs of copperas, or ſulphate of iron, the oxyd of which, when recently precipitated by lime, is dark green; as this, however, could ariſe only through great ignorance, or accident, it is not often likely to be the caſe, as the quantity of copperas required to produce this effect muſt be very great indeed.

When a vat rakes up yellow, or very pale yellowiſh green, it is ſuppoſed by ſome to contain too much copperas, and muſt be corrected by the addition of more lime. It is hardly correct, as we have before obſerved, to ſay a vat contains an exceſs of copperas, ſince this ſalt cannot exiſt in ſolution with lime. A vat may want lime, and in this caſe it will be very weak, of a pale yellowiſh green, produce a very feeble blue, and the paſte will invariably *creep*, to uſe the dyers' phraſe, or in other words, will run, and loſe the ſharpneſs and ſmartneſs of the impreſſion, the moment it is entered in the vat. This may be the caſe at the time the vat contains a quantity of revived indigo alſo, and rakes up black, ſo that no certain concluſion can be drawn from the yellowiſh appearance aforeſaid.

If a vat be weak, the froth which forms at the top during raking, is pale ſky blue; the ſurface does not ſpeedily break into marble veins, nor is it ſoon covered with a blue film. A ſtrong well conditioned vat, on the contrary, when raked up, becomes covered directly with a permanent and copious froth, the colour of which varies from a deep blue, when the vat is of ordinary ſtrength, to a bright copper colour, which is always characteriſtic of a very ſtrong ſolution, and the ſurface, when ſkimmed, is in an inſtant covered with a thick film of revived indigo. This film, and the deep blue and copper coloured froth, is the beſt and pureſt of the indigo, and is called the *flower of the indigo* by the old dyers. In ſkimming, great care muſt be taken that this is carefully preſerved, and returned again into the vats at the time they are refreſhed.

When a vat becomes ſo exhauſted that further additions of lime and copperas have no effect in increaſing the ſtrength, freſh indigo muſt be added, with the proportions of lime and copperas before indicated.

If a vat remains ſeveral weeks unworked and without raking, it will abſorb oxygen enough from the air to precipitate the indigo from the ſolution, ſo that, to the depth of 10 or 12 inches from the ſurface, it will conſiſt of lime-water only, and muſt be well raked up before it is worked.

When the dregs have accumulated ſo much as to prevent the vat from clearing in 24, or at moſt 36 hours, and when the frame begins to touch the mud during work, it is time then to empty it out, taking care to doſe the vat well with lime and copperas, ſo as to get out all the indigo before the dregs are thrown away as exhauſted.

Of Pale Blue.

Pale blues are, in general, produced at a ſingle dip; they require leſs indigo and labour than the preceding ſtyle of work, but more care and management to do them well. They are liable to be uneven and ſpotted in the ground, and the proper tone and ſhade of colour is a matter of great importance, and alſo of no ſmall difficulty.

We ſhall ſpeak firſt of pale blues and white, intended to be finiſhed up with after-colours or not.—The paſte for pale blue is preciſely ſimilar to that for the dark blue we have been treating of, except that it need not be ſo ſtrong. Two pounds of ſulphate of copper, diſſolved in a gallon of water, and thickened with pipe-clay and gum, in the manner of the three paſtes we have already given, will form a very good reſerve for pale blue. Any other ſolution of copper will be equally efficacious, but the ſulphate, as being the cheapeſt, may be conſidered as the beſt.

The preparation, or rather the condition of the cloth, is a matter of the greateſt importance in pale blue dipping. If imperfectly bleached, or ſtained or impregnated with any earthy or metallic ſubſtance that will obſtruct the entrance of the dye, the blue will infallibly be uneven. A difference in the quality of the cotton, in the fineneſs of the weft, or in the hardneſs of the twiſt, of which the cloth is made, will occaſion conſiderable variation in the ſhade of blue, and defeat every attempt, on the part of the workman, to do juſtice to his work. To guard as much as poſſible againſt this, the cloth, in the firſt place, ſhould be ſelected purpoſely, rejecting all thoſe pieces which ſhew unevenneſs in weaving, or variation in the quality of the materials.

The goods ſhould be in the beſt poſſible ſtate for printing; freſh from the bleach-ground, carefully kept from duſt or dirt of any kind, and ſufficiently damp to make them take a ſtiff calendering. As ſoon after printing as convenient, they ſhould be removed from the warm ſhop to a cool ſituation, where they will not get parched and dry, and dipped at furtheſt the following day.

All theſe precautions, however, are inadequate to ſecure an even and level ground, without recourſe to the improved

method of dipping, for which we are indebted to the calico-printers of London.

This improvement, whether conſidered with reference to the particular ſtyle of work, of which we are now treating, or its application to other branches of blue dyeing, the moſt important that has lately been introduced, conſiſts in dipping the goods in clear lime-water before they are entered in the blue vat.

If the piece becomes uniformly wet throughout, and ſhews no ſtreaks or patches of white, it may ſafely be transferred to the blue vat as a piece that will take an even dye. If, however, after remaining five or ſix minutes in the lime-vat, there are parts which are not compleatly wet, it muſt be dipped five or ſix minutes longer, and again taken out and examined. All thoſe pieces which, after two, or, at moſt, three immerſions, ſtill refuſe admiſſion to the lime-water, are rejected as unfit for dipping, and the paſte being removed by ſouring, are appropriated to ſome other courſe of work to which they are better adapted.

The vat for pale blues is, in general, the ſame as for the dark grounds, care being taken to ſelect one that will give the ſhade of blue required. It is uſual to employ the old and nearly exhauſted vats for this purpoſe, but the blue is never ſo bright and lively as when freſh indigo, and that of the fineſt quality, is employed.

The hue is greatly improved by ſouring, a neceſſary operation, to free the goods from the paſte, and ſtill further, by winching them in a ſolution of white ſoap 10 or 15 minutes, at a heat of 120°.

Mr. Hauſman obſerves, that if the goods are plunged in a weak ſolution of ſulphuric acid immediately on coming out of the vat, the blue is more lively and full than when previouſly rinſed and waſhed.

Mr. Chaptal employs for pale blue grounds without white, and for green grounds alſo, a vat compoſed of indigo, potaſh, lime, and orpiment. This ſolution, which is the ſame preciſely as the pencil-blue of the calico-printers, affords a much more delicate colour than that with lime and copperas, the cauſe of which is not clearly underſtood, though it moſt probably ariſes from the different degrees of deoxydation produced by the two ſubſtances.

This vat is formed by boiling 10lbs. of fine Spaniſh indigo, 10lbs. of potaſh, 20lbs. of quick-lime, and 5lbs. of orange orpiment, in about 30 gallons of water, and pouring it, when the ſolution is compleat, into the vat containing about 800 gallons of water, and 20 or 30lbs. of lime. When worked, it muſt be raked up well the inſtant before the frame is entered, and when exhauſted, refreſhed with additions of the ſame ſolution.

If a piece of cloth, printed with the reſerve or paſte before deſcribed, be dipped in this vat, the copper becomes precipitated and fixed by the ſulphuretted hydrogen which it contains, and produces a brown ſtain inſtead of a white. It is poſſible, however, with extraordinary care and management, to ſucceed in obtaining good whites in this vat, and the following proceſs may be employed with ſucceſs, though it is ſtill capable of further improvement.

Prepare a paſte by diſſolving 2lbs. of ſulphate of copper in one gallon of acetate of alumine, or the common aluminous mordant of the calico-printers, add to it 1lb. of nitrous acid, and 8lbs. of pipe-clay; boil well and ſtrain it through a fine cloth, and when cold, add as much thick gum-water as is barely neceſſary to give it the due degree of conſiſtence for working. In printing this paſte the mallet ſhould never be uſed, a gentle tap with the hand, if the block is true and in good order, will leave the paſte, as it ſhould be, wholly on the ſurface of the cloth. Dip ſix or eight minutes in the lime-vat, and when taken out, ſuffer the piece to drain two or three minutes before entering in the blue vat. The vat ſhould be ſtrong enough to produce the ſhade required in two minutes, after which the frame ſhould be withdrawn and plunged inſtantly in a vat of clear water, and moved and agitated therein till the green goes off. When waſhed and ſoured, if the work has ſucceeded, the white will be clear and prominent, and the blue the fineſt that can be produced on cloth. It is remarkable, that a ſtrong vat produces better whites than a weak one, on this account care muſt be taken, that the ſolution be of a proper ſtrength. The utmoſt nicety is required in preſerving the cloth for this vat from duſt or dirt of any kind. Goods that have been long bleached, and not carefully ſecluded from the air, are wholly unfit. They ought, in fact, to be taken freſh from the ſours, for every, even the ſmalleſt particle of metallic ſubſtance that is in the cloth, when dipped in this vat, will produce a brown ſtain, and if the cloth is uniformly tainted with it, entirely ruin the blue.

In dipping pale blue grounds, it is ſometimes neceſſary to protect colours that have been previouſly applied, from the effect of the blue, as red or yellow flowers for example, which would otherwiſe become purple and green. The ſolutions of copper cannot be employed for this purpoſe, as they injure the colours, eſpecially madder reds, or purples, very much, and are not wholly removed without ſouring, an operation which goods of this deſcription cannot be ſubjected to.

The reſerve moſt commonly uſed, is ſimply a paſte of pipe-clay or Spaniſh white, boiled to a proper conſiſtence, and mixed with an equal quantity of thick gum-water. This does not affect the colours upon which it is applied, and is eaſily removed by hot water and waſhing; but as it oppoſes merely a mechanical reſiſtance to the dye, and fails the moment it becomes ſoftened, it will not bear a dip of more than one minute or two. This is an inconvenience of great magnitude, when the pale blue ground is much expoſed, and not covered with any kind of deſign calculated to hide unevenneſs in the dye. The following paſte is recommended and uſed, by ſome, as capable of reſiſting much longer than the former:—

One pound of finely ground pipe-clay,
Four ounces of gum-arabic,
Two ounces of ſuet,
Two ounces of wax, and
One ounce of reſin.

Boil all theſe ingredients together, in as much water as will form a paſte of ſufficient conſiſtence not to run. This paſte can only be applied with the pencil, and in large maſſes. It is removed with great eaſe by hot water and waſhing, without any injury to the reds, or other colours it has covered.

The ſolutions of lead poſſeſs the property, though in a much ſmaller degree than copper, of reſiſting the indigo vat, and may be uſed with advantage for paſting reds and other colours, which are but little injured by them. We have ſeen the following paſte uſed with great ſucceſs:—

Diſſolve two pounds of acetate of lead in a gallon of water, add two ounces of tallow, two of wax, and two of reſin, and as much pipe-clay and gum as will make it of a proper thickneſs for printing or pencilling. This paſte will reſiſt a dip of three or four minutes; it muſt, however, be laid on in good bodies, and ſucceeds better with the pencil than block.

In pale blue grounds, with black and white figures, &c. it is often neceſſary to print both the black and the paſte

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at the ſame time, to ſave the expence and trouble of after-grounding. The black for this purpoſe is generally chemical black, for an account of which we muſt refer to the article COLOUR-*making*. The ſulphate of copper paſte is generally uſed, but as the goods cannot, on account of the black, be paſſed through the ſours to free them from the oxyd of copper, which imparts a greeniſh hue to the white, it is better to employ the nitrate of copper, which is cleared by hot watering and waſhing much more compleatly.

If the patterns contain very large maſſes or bodies of black, the acetate of iron, or what the printers call black colour, muſt be uſed, increaſing the ſtrength to double that required for an ordinary black; ſo that when the goods are dipped, and as well cleaned as poſſible, by repeated waſhing, &c. they may be paſſed through water rendered ſlightly acidulous with nitrous, or what is ſtill better, acetous acid, without materially impairing the ſtrength of the mordant.

The white is compleatly freed from the oxyd of copper by this ſlight ſouring, and takes no ſtain in the dye copper, when the black is raiſed with ſumac and logwood.

It is proper to obſerve, that the goods, before ſouring, ſhould be compleatly freed from all ſuperfluous paſte, either of the black or white; and the iron, by repeated hot watering, at a temperature of 140°, oxygenated as highly as poſſible. In this ſtate it is ſcarcely ſoluble, either in nitrous or acetous acids, and will bear weak ſolutions of them 15 or 20 minutes.

Of Reſiſting Mordants.

When a pale blue is intended to exhibit other colours on the ground, as red, pink, yellow, orange, &c. the paſte or reſerve is often mixed with a mordant capable of producing theſe colours in the dye copper.

The common paſte alone will produce a yellow with weld, quercitron bark, fuſtic, &c. if the piece be ſimply rinſed and waſhed before dyeing.

In this caſe the oxyd of copper which remains in the cloth attracts the colouring matter, and though it is greatly inferior as a mordant, to the acetate of alumine, yet, with care and management, it is capable of producing, with weld, a pale and beautiful yellow. The only difficulty conſiſts in getting the colour even, and this is beſt attained by employing thoſe ſolutions of copper which are moſt ſoluble, and uſing them ſomewhat ſtronger than is merely neceſſary to reſiſt the vat.

When dipped, the goods ſhould be well rinſed in the river 15 or 20 minutes, and afterwards rinſed off in a copper of warm water, with a ſhovel full of cow-dung. Too much dung, or too great heat, will injure the yellow, the temperature ſhould not exceed 100°, and after winching again in the river, they ſhould be dyed at a heat conſiderably below this, if weld is uſed, and not exceeding 75 or 80 if dyed with bark.

Oxyd of copper, when dyed at a high temperature, invariably becomes dull, eſpecially when bark or ſumac are employed. With weld there is leſs riſk of injuring the brightneſs of the yellow, but long continued heat impairs it greatly.

This mordant does not at all anſwer for reds; with madder it affords a dull wine-coloured dye, and with brazil, peachwood, and cochineal, dull, heavy colours, more inclining to pompadour or chocolate than red. When mixed, even in ſmall proportions, with the common aluminous mordant, its effects are very viſible, when dyed with any of the above-mentioned drugs.

It is nevertheleſs employed for deep full reds, upon pale blue ground, according to the following formula, which is excellent for a yellow or orange:—

Diſſolve 2 lbs. of acetate of lead, and 2½ lbs. of alum, in a gallon of water; pour off the ſolution from the precipitate, and add 8 ozs. of ſulphate of copper; thicken with 1½ lb. of ſtarch, and 4 lbs. of fine pipe-clay. When cool, ſtrain the paſte through a cloth or ſieve, and give the goods ſix days age before dipping. Dip three minutes in a well-conditioned vat, and transfer the frame from thence inſtantly to the water-vat.—Rinſe off, and prepare for dyeing in the ſame manner as before directed.

The following formula is in uſe for reſiſting reds or yellows:—Diſſolve in one gallon of warm water 3½ lbs. of acetate of lead, and 5 lbs. of alum; thicken it (with the precipitate in) with the beſt Senegal gum, and add 2 ozs. of white arſenic, ground as fine as flour; 4 ozs. of common ſalt, and 4 ozs. of corroſive ſublimate. Give the goods two or three days age before dipping, and keep them from three to five minutes in a good vat, or leſs, if you can get the ſhade of blue required. Plunge them in the water-vat the inſtant they are taken up, and rinſe and finiſh as before.

Bark or weld drabs and olives, as they do not ſo ſoon ſhew any ſlight tinge of blue which may have penetrated the paſte, may be ſimply thickened with good ſtarch, and from 12 to 16 ozs. of ſuet per gallon, to enable them the better to reſiſt the vat. If this ſhould not ſuffice, from 2 to 4 ozs. of ſulphate of copper may be added, but it muſt be obſerved, that this will change the hue of the drab, and make it more an olive. A little pipe-clay, not more than 2 lbs. per gallon, may be employed alſo with advantage. It is very efficacious in keeping out the dye, and, in ſo ſmall a quantity, will not materially affect the fullneſs and evenneſs of the mordant.

Solutions of tin, more eſpecially the nitro-muriatic, are employed by ſome calico-printers, in conjunction with the aluminous mordant, for reſiſting reds and yellows. They are not very powerful in keeping out the blue, and, with madder, afford but feeble colours: the yellow they produce is bright, but pale.

In general, thoſe ſolutions which are moſt efficacious in reſiſting the vat, are the worſt mordants, as thoſe of copper for example; but as they will bear a long dip, and the evenneſs of the blue is thereby enſured, this advantage, in one colour, is conſidered as ſufficient compenſation for want of brilliancy in the other. The common aluminous mordant, thickened with gum and a little pipe-clay, or with ſtarch and pipe-clay, forms infinitely the beſt mordant, and will reſiſt the vat a few ſeconds, but not ſufficiently long to make the work ſecure. The recent improvement in this kind of dipping, however, by the uſe of warm vats, has removed a great many difficulties, and enabled ſome calico-printers to produce work of very ſuperior merit.

The great and the only advantage attending warm vats, is the celerity with which the dye penetrates the cloth; ſo that all the effect of a ſix minutes' dip in a cold vat, may, in a warm one, be obtained in the ſame number of ſeconds. The frame, in fact, is plunged in only for a moment, and inſtantly taken up; and, in this ſhort ſpace, the vat, however ſtrong, has not time to penetrate the paſte or mordant.

The vats may be variouſly heated, as beſt ſuits the nature of the eſtabliſhment. Steam affords the moſt eaſy and efficacious means, and may either be thrown into the vat through a pipe and valves, in which caſe the ſteam itſelf is condenſed in, and mingles with the ſolution of indigo, or the vat may be in part ſurrounded with a caſing, into which the ſteam may be admitted, and give out its heat, without filling the vat with condenſed water.

The firſt is the ſimpleſt and moſt economical mode; but it requires certain precautions which the other does not. In the firſt place, before the ſteam is admitted into it, the boiler ſhould be *blown*, that is, compleatly emptied of air; for if it paſſes along with the ſteam into a vat, the indigo will be revived, and precipitated from the ſolution, and the vat rendered unfit for dipping. In the ſecond place, if the vat, when cold, is only of the proper ſtrength, the admiſſion of ſo much ſteam, and conſequently of condenſed water, as will be neceſſary to raiſe it to the temperature required, will weaken it conſiderably; and laſtly, ſome inconvenience may ariſe from this great accumulation of condenſed water, unleſs due allowance be made before it is admitted, and care be taken never to turn it in when the vat is full.

The ſecond mode is ſubject to none of theſe inconveniences. The vat can neither be weakened by air from the boiler, nor by condenſed water, ſince the heat is tranſmitted wholly through the caſing. The expence, however, is very conſiderable; ſtill it is greatly preferable to the plan which ſome printers have adopted, of conſtructing caſt iron vats, and heating them by furnaces built underneath.

The temperature at which they can be employed, varies according to the kind of work, and the power which the paſte poſſeſſes of reſiſting a hot vat.

From 60 to 80° will be ſufficient for moſt purpoſes, and a vat of tolerable ſtrength will, at the latter temperature, produce a good blue in ten or fifteen ſeconds.

Of coloured Paſte.

By mixing both colouring matter and mordant with the reſerve, we obtain paſtes which at the ſame time communicate colour to the cloth, and reſiſt the blue; not only ſaving the neceſſity of dyeing, but enabling us to form combinations of colours, incompatible by any other proceſs. This branch of blue dipping is ſtill in its infancy, and little has yet been done towards its perfection. We ſhall therefore have little elſe to do in treating of this part of our ſubject, but to ſtate the few facts on which it is founded, and ſuggeſt ſome hints for its future improvement.

If a ſolution of ſulphate or acetate of iron be mixed with the reſerve or paſte for white, it will, when dipped and rinſed off, leave a buff or orange ſtain, not very ſtrong, indeed, nor always very even; but applicable and uſeful in ſome caſes. This paſte has been long known and employed.

If inſtead of acetate of iron a ſtrong decoction of bark, or French or Turkey berries, be mixed with the reſerve, a yellow will be obtained, full, but leſs bright, than when raiſed in the weld copper.

Thus by combining different colouring matters with the mordants proper for fixing them on cloth, and alſo with ſubſtances which have the property of reſiſting the blue dye, various coloured paſtes will be obtained.

The ſolutions of tin, from their forming combinations with moſt colouring ſubſtances which are but little affected by acids, ſeem likely to be of conſiderable uſe in the compoſition of paſtes of this deſcription. The muriate of tin deſtroys the reſiſting power of ſolutions of copper by de-oxygenating them; but the nitro-muriate, or highly oxygenated ſolutions, produce rather a contrary effect; they are theſe which ſhould therefore be tried.

Of China Blue.

The proceſs for China blue dipping conſiſts in applying finely ground indigo, in its crude and undiſſolved ſtate, upon the cloth, and fixing it by alternate immerſions in ſolutions of ſulphate of iron and lime.

The ſame thing takes place upon the cloth, that is effected in the ordinary blue vat when indigo is diſſolved; in both caſes the indigo is de-oxygenated, and prepared for ſolution by the copperas, and afterwards diſſolved by the lime.

The different ſhades of colour in China blue dipping are produced by reducing, more or leſs, the ſtandard colour, which is prepared in the following manner.

1ſt. Grind in a metal pot with balls, or by any other contrivance, 10 lbs. of good indigo, 8 lbs. of good copperas, and 5 lbs. of orpiment, with 2 gallons of water; when the whole is nearly ground, add two quarts of very thick ſolution of gum ſenegal, and grind a few hours longer.

2d. Prepare a ſolution of ſulphate of iron by diſſolving 2 lbs. in a gallon of water, adding a quarter of an ounce of pot-aſhes, and ſuffering the precipitate, if there is any, to ſubſide. Reduce the ground blue (No. 1) with as much of this clear ſolution (No. 2) as will bring it to a proper conſiſtence for working, and print with this for the dark full blue. When dipped, this colour will have nearly the effect of black, eſpecially in ſmall bodies.

For pale blue, reduce the ſtandard with 10, 15, or 20 meaſures of the ſolution of copperas, and an equal quantity of acetate of iron, or common iron liquor thickened with gum. With 50, 60, or even 90 meaſures of ſulphate and acetate of iron, one meaſure of the ſtandard blue will give very good ſhades of pale blue. When the pattern, whether block or plate, will not work in gum, a portion of the acetate of iron muſt be thickened with ſtarch, or flour, and ground up in the mill with its due proportion of the ſtandard. When worked on plates, wooden doctors, eſpecially lime tree, are preferred to ſteel ones; they clean the plate much better, and give a fine neat impreſſion.

The vats are of the ſame form, and generally of the ſame dimenſions, as thoſe before deſcribed; they are, however, never lined with lead; wood, or ſtone, being conſidered ſufficiently ſecure for ſolutions of little value, compared with thoſe of indigo. They are diſpoſed in a line, a copperas vat, and a lime vat alternately; or when the mode of dipping allows it, a lime vat between two copperas vats, forming a ſyſtem in which two frames are worked; the lime vat being thus kept conſtantly employed, the copperas vats only alternately. The copperas vats are made up of different ſtrengths, according to the work intended to be done; ſtrong thick goods, ſuch as Marſeilles quilting, &c. require ſtronger vats than calicoes and muſlins. The firſt require the ſolution to be of ſpe. gravity 1040, the latter about 1030. Theſe are the moſt economical points, but good work may be done at any point between 1025 and 1050. Lower than 1025, the colour will be pale and faint, though even; and higher than 1050, it is liable to be uneven, ſome parts being very deep and full, and others meally and ſpoiled.

The lime vats are ſet with fine ſifted quick lime, recently ſlaked, in the proportion of 150 lbs. to 1000 gallons of water.

When the pieces are hooked, and properly arranged on the frame, they are entered firſt into the lime, and the dipping proceeds as follows.

1.	Entry in the lime vat	5	minutes.
2.	in copperas vat	30	
3.	in lime vat	10	
4.	in copperas vat	30	
5.	in lime vat	20	
6.	in copperas vat	45	
7.	in lime vat	45	

During the firſt five minutes in the lime, the frame muſt be gently rocked, or moved up and down, then drawn up and tightened. The vat, both now, and at every ſubſequent dip, is well raked up before the frame is entered. When entered

in the copperas vat, rock five or ſix times, to detach the looſe lime from the piece.

At the ſecond entry in the lime, rock the whole time.

At the ſecond, and every ſucceeding entry in the copperas vat, rock five or ſix times as before, to detach the lime.

At the third and fourth entry in the lime, rock five or ſix minutes, and now and then.

The reaſon for finiſhing out of the lime, is to keep the frames and hooks free from the ruſt and incruſtation of the copperas, which it looſens, and renders more eaſy to detach and clean; with reſpect to raiſing the colour, it makes no difference whatever.

When the piece comes from the copperas vat the ſecond time into the lime, it will appear a graſs green colour, if there be a proper quantity of lime in the vat. If too little, the piece will appear yelloviſh, and more lime muſt be added.

Take off the pieces quickly after the laſt dip, and winch them briſkly in the water-pit a minute or two at the moſt. Get them into the ſours, and after winching over twice or thrice, let them lie an hour or two, after which winch again four or five times, and waſh well in the wheel. Hot water them, and wheel again before hot ſouring, which is done in a ſour of ſpec. gravity 1015, heated to 180°. Winch the goods four or five minutes in this, after which waſh, hot water, &c. and finiſh for drying.

If the goods are kept too long out of the cold ſour after the laſt dip, the oxyd of iron, with which they are coated, oxygenates very rapidly, and the cloth becomes buff or orange. It is with difficulty that the iron is diſengaged, and not without long and very ſtrong hot ſouring.

The cold ſours ſoon become foul with the looſe ſuperfluous indigo, which is detached, and unfits them for light goods, long before the acid is ſaturated.

In this caſe it is economical to add two or three ſhovels full of fine well-beaten clay, previouſly mixed up with water; when this is well incorporated with the ſours, and ſuffered to ſubſide, it carries down with it great part of the floating indigo, and renders them fit for uſe again.

After every day's work the lime and copperas vats muſt be refreſhed.

From 25 to 35 lbs. of ſifted lime, according to the ſize of the vat, and the number of pieces that have been paſſed through it, muſt be added every night.

No harm can ariſe from exceſs of lime, excepting the unneceſſary expence of more than is required, and the accumulation of ſediment or mud in the vat which will ſoon require removing.

Ten pounds of copperas are generally added for every piece of calico that is dipped. This is ſuſpended at the ſurface in a wicker baſket, and ſuffered to remain till all is diſſolved. It is quite unneceſſary to rake up the vat, as the freſh additions of copperas will incorporate uniformly without ſtirring, which, by muddying the vat, may do miſchief. Care muſt be taken to uſe the hydrometer frequently to correct any deficiency or exceſs which may ariſe in the ſp. gr. of the ſolution of ſulphate of iron.

In making new or freſh copperas vats, after having brought them to the ſtandard on the hydrometer, add to every 1000 gallons four or five gallons of the lime vat (raked up) and one pound of potaſh. This is to neutralize the ſuperabundant acid of the copperas.

The graſs green Yorkſhire copperas is the beſt for this purpoſe, it contains the leaſt free acid; the pale whitiſh green is the worſt, and when ſuch is uſed it will be proper occaſionally to throw into the vat about one pound of potaſh, and four or five gallons of muddy lime water.

When daily worked the lime vats ſhould be emptied out, and wholly renewed once a month at leaſt.

The copperas vats are never wholly emptied, but when the mud accumulates ſo as to be troubleſome and endanger the ſafety of the work by reſting on the lower edge of the piece, it muſt be taken out with a ſcoop or ſhovel proper for the purpoſe.

The ground of thoſe goods which ſhew much white will in general be ſufficiently clear when finiſhed according to the preceding directions, the white is however greatly improved by a gentle ſoaping, and one or two days expoſure on the graſs.

In general, better work may be produced in the winter months than in ſummer: in hot weather, the colour is liable to be uneven, patched and meally, the cauſe of this has not been well aſcertained, though, in all probability, it ariſes from the increaſed action of the ſulphate of iron and lime at an increaſed temperature: it is not unlikely that weaker copperas vats would be found to act better in ſummer than ſtrong ones, as the effect of temperature would thereby in ſome degree be counteracted.

From the nature of the proceſs of China blue dipping, it muſt be evident that it muſt precede any other application of colours to which the cloth is intended to be ſubjected. If, for inſtance, reds or yellows are to be introduced, theſe muſt follow the operation of dipping; as they would inevitably be ruined by repeated immerſion in copperas and lime, or wholly diſcharged by cold and hot ſouring.

Dipping, in *Magnetics*, is a certain degree of inclination, which a magnet or magnetic body, be it natural or artificial, endeavours to attain in moſt parts of the world. Amongſt the properties of a magnet, this of its dipping undoubtedly is one of the moſt admirable; but with a magnet already poſſeſſed of its characteriſtic properties, this dipping is not eaſily diſcerned; it being difficult to ſay, whether the inclination of one of its extremities below the horizontal plane, and of courſe the elevation of its oppoſite extremity above that plane, is owing to the magnetic virtue, or to the want of mechanical balance, (*viz.* to its being heavier on one ſide of the fulciment than on the other,) and it was evidently on this account that the dipping of the magnet was not diſcovered ſo ſoon as its property of directing itſelf north and ſouth, or nearly ſo. See Magnetism.

The eaſieſt method of obſerving this magnetical property is as follows. Suſpend an oblong and *unmagnetic* piece of ſteel either upon a vertical pointed wire, after the manner of a common compaſs-needle, or by faſtening a fine thread to its middle; ſo that the oblong piece of ſteel may remain perfectly balanced, and of courſe horizontal. (A common oblong ſewing-needle, having a thread faſtened to its middle, will anſwer ſufficiently well.) Then let this piece of ſteel or needle be rendered magnetic by the mere application of two powerful magnetic bars to its extremities; taking particular care not to diſturb its point of ſuſpenſion; and when this has been done, and the magnets have been removed, the piece of ſteel or needle will no longer remain in an horizontal ſituation, but one of its extremities will dip; that is, will incline itſelf below the horizontal plane, and its oppoſite extremity will raiſe itſelf above that plane, making an angle with it which is different in different parts of the world, and in ſome places it vaniſhes; that is, the needle will remain horizontal. This angle is alſo various in the ſame fixed place at different times; this latter variation however is but trifling. In England, the north end of the magnet tends downwards. A clearer idea of the different inclinations of the magnet, or magnetized ſteel, in different parts of the world, as well as

of the cauſe upon which that phenomenon depends, may be derived from the following experiment. Take a globular magnet, N S, *Plate* IV. *Magnetiſm, fig.* 22, commonly called a *terrella*, or a magnetic ſteel bar, N S, *fig.* 23. (for by drawing a circle round the latter, one may eaſily figure to himſelf the form of a globular magnet.) The extremity N of this terrella, or ſteel bar, is its north pole, and the extremity S its ſouth pole; and A is its middle or equator. Place it upon a table as C D; then take another ſmall and oblong magnet, or a common ſewing-needle rendered magnetic; ſuſpend it by faſtening a fine thread to its middle, in ſuch a manner as to remain in an horizontal poſition when not influenced by any other magnet. Now, if the ſaid ſmall magnet, being held by the upper part of the thread, be brought juſt over the middle of the large magnet, within two or three inches of it; you will find that it will turn itſelf ſo as to direct its ſouth pole *s* towards the north pole N of the large magnet, and its north pole *n* towards the ſouth pole S of the large one; it being a well-known law in magnetics, that poles of different denominations attract each other. It will be farther obſerved, that the ſmall magnet, whilſt kept juſt over the middle A of the large magnet, will remain parallel to it or to its magnetic axis; for in that caſe the poles of the ſmall magnet are equally attracted by the contrary poles of the large magnet, which are equidiſtant from the former. But if the ſmall magnet be moved a little nearer to one end than to the other of the large magnet, then one of the poles of the former, namely, that which is neareſt to the contrary pole of the latter, will incline itſelf towards it; and of courſe the other extremity will be elevated above the horizon. This inclination of the ſmall magnet will be found to increaſe in proportion as it is brought nearer and nearer to one of the poles N or S; and, at laſt, if it be brought directly oppoſite to one of thoſe poles, it will turn its contrary pole towards it, and will place itſelf in the ſame ſtraight line with the axis of the large magnet, as is indicated by the figures 22 and 23, wherein the like parts are denoted by the ſame letters.

It muſt now be obſerved, that all the facts that have hitherto been noticed relative to the ſubject of magnetiſm, tend to prove, that the whole earth is, or muſt be conſidered as a large magnet; having its magnetic poles, magnetic equator, &c.: hence a magnetic needle, or any other magnet whatever, ſituated on different parts of the earth's ſurface, inclines, or tends to incline, the one or the other of its extremities, towards the horizon, or towards the axis of the earth, in the ſame manner and for the ſame reaſons that compelled the ſmall magnet *n s* of the preceding experiment to aſſume its various directions when placed in the vicinity of the large magnet N S. For, admitting that the north pole of the earth is poſſeſſed of a ſouth magnetic polarity, and that the oppoſite pole is poſſeſſed of a north magnetic polarity, it follows, as is confirmed by actual experience, that when a magnet, properly ſhaped and properly ſuſpended, is kept near the equator of the earth, it muſt remain in an horizontal ſituation; that if it be moved nearer to one of the poles of the earth, it muſt incline one of its extremities; namely, that which is poſſeſſed of the contrary magnetic polarity; that the ſaid inclination muſt increaſe in proportion as the magnet, or magnetic needle, recedes from the equator of the earth; and, laſtly, that when brought juſt over either of the magnetic poles of the earth, it muſt ſtand perpendicular to the ground; *viz.* in the ſame ſtraight line with the axis of the earth.

The reader muſt not be ſurpriſed to hear that a ſouth magnetiſm is attributed to the north pole of the earth; it being only meant, that it has a magnetic polarity contrary to that end of the magnetic needle which is directed towards it; and as we call the ſame end of the needle a north magnetic pole, we muſt of neceſſity attribute a contrary power, that is, a ſouth magnetic polarity, to the northern part of the earth.—With a proper change of names, the ſame remark muſt be applied to the ſouthern part of the earth; *viz.* it muſt be conſidered as being poſſeſſed of a north magnetic polarity.

By a little attentive conſideration it will be eaſily comprehended, that the true and natural ſituation of a magnet, or magnetic needle, is a combination of its horizontal and vertical direction; *viz.* the magnetic needle endeavours to place itſelf in the plane of the magnetic meridian, and in a direction more or leſs inclined to the horizon, according as it happens to be ſituated, nearer to or farther from any of the magnetic poles of the earth. And this natural direction of the magnet is called the *magnetical line*. Therefore, in order to obſerve the true dipping of the magnet, the magnetic needle, or oblong magnet, muſt be placed in the magnetic meridian; *viz.* in the uſual direction of the compaſs at the place of obſervation; otherwiſe the inclination of the magnet will be greater than it ought to be, as may be eaſily derived from a due conſideration of the combined forces which act upon it. Hitherto we have conſidered the earth as an uniform and regular magnet, having the magnetic poles in its real poles, and its magnetic equator in its true or aſtronomical equator. And if ſuch were the caſe, the dipping angle, which the magnetic needle makes with the horizon, would bear a certain determined ratio to the latitude of the place; ſo that by obſerving that angle, the latitude of the place might be deduced from it, without the need of any aſtronomical obſervation, which would prove of the utmoſt advantage to navigators; the caſe, however, is far different, as will be more particularly noticed in the ſequel. For the preſent it will be worth while to mention, that after the diſcovery of the dipping property of the magnet, ſanguine expectations were entertained reſpecting the advantages which might be derived from it, and it was imagined, that not only the latitude, but the longitude alſo of the place of obſervation, might be indicated by the dipping angle of the magnetic needle; for though it ſoon appeared, that neither the magnetic poles, nor the magnetic equator, of the earth, coincided with its true poles and true equator; yet that very ſame circumſtance ſeemed to furniſh the method of determining the longitude; which method was grounded upon the following principle; *viz.* that if the magnetic poles, though different from the real poles of the earth, be either fixed in other places, or do move with any regularity, it follows that the magnetic equator muſt likewiſe differ from the real equator; and muſt cut it at a certain angle; therefore, in the ſame parallel of latitude, but in different longitudes, the dipping angle of the magnet muſt be different; hence, by obſerving the dipping angle of the magnet at any particular place, the longitude of the place would thereby be indicated. Impreſſed with this idea, during a long period, ſubſequent to the diſcovery of the dipping of the magnet, the ſcientific world made various and ſtrenuous exertions for the purpoſe of rendering that magnetic property ſubſervient to navigation. Innumerable calculations were made, and various inſtruments were contrived. Mr. Henry Bond, a diſtinguiſhed teacher of the art of navigation in London, calculated a table of latitudes correſponding to every five minutes of the inclination of the magnetic needle, and it was given out, that with this Mr. Bond's table, a good dipping needle, and the latitude of the place of obſervation, one might determine the longitude of any place in the world. Phil. Trans. v. viii. p. 6065. Mr. Bond was not the only projector of the kind. Meſſrs. Ditton, Whiſton, and many others followed his example. Some were poſitive, others doubtful, and a few

cautious perſons patiently awaited the reſult of experience; but the reſult of actual experiments ſoon proved the impracticability, or the inſufficiency, of the projects, which were of courſe gradually neglected, and were laſtly even ridiculed by the facetious Dean Swift. The principal object of calculation is to determine the nature of a curve which might paſs through the poles of a large magnet, and to which curve a ſmall magnetic needle may be a tangent at any point of its courſe. Or, in caſe of the earth, to calculate the inclination which the needle muſt have in any particular point of its ſurface. The data, however, upon which theſe calculations muſt be grounded, are uncertain. The magnetic needle is acted upon by both poles of the earth, and the law of that action is by no means well known; though it appears, both from experiments and calculation, that, moſt probably, the force of each pole varies in the inverſe duplicate ratio of the diſtance. See Mr. Lambert's experiments and calculations in the Memoirs of the Academy of Berlin for 1756, and his ſecond diſſertation in the 22d volume of the ſame. We might refer our readers to other works, and we might alſo inſert proper ſpecimens of the calculations that have been propoſed and actually made; but ſince the projects are neither eſtabliſhed upon unqueſtionable principles, nor are they at all ſatisfactory, we ſhall not ſwell this article by the introduction of intricate inveſtigations.

In ſhort, it appears, from the concurrence of all the moſt accurate experiments and obſervations that have been made upon land as well as at ſea, 1ſt, that the earth is not an uniform or regular magnet, but a very irregular one; for the ferruginous parts of it, (from the joint action of which the magnetiſm of the whole ariſes,) are irregularly diſpoſed through it; whence it ariſes, that according as the magnetic needle is nearer to or farther from any ferruginous matter, ſo it is more or leſs influenced by it. 2dly, the magnetic poles of the earth are neither diametrically oppoſite to each other, nor indeed have philoſophers as yet been able to determine their preciſe ſituations. Profeſſor Krufft, in the 17th vol. of the Peterſburgh Commentaries, places the north magnetic pole of the earth in lat. 70° North, and longitude 23° Weſt of London; and the ſouth magnetic pole in latitude 50° South, and longitude 92° Eaſt. Wilcke of Stockholm, in his indication chart, in the 33d vol. of the Swediſh Memoirs, places the north magnetic pole in latitude 75° North, near Baffin's Bay, in the longitude of California, and the ſouth pole in the Pacific Ocean, latitude 70° S. Churchman places the north pole in latitude 59° N. and longitude 135° W. and the ſouth pole in lat. 59° S. long. 165° E. A planiſphere by the Academy of Sciences at Paris for 1786, places the magnetic equator ſo as to interſect the earth's equator in long. 75° and 155° from the Iſland of Ferro, with an inclination of 12° nearly, making it nearly a great circle. But we are not informed on what authority, nor does this ſtatement agree with the obſervations of the dipping made by Britiſh navigators. Mr. Churchman has given a ſketch of a planiſphere with lines which may be called parallels of the dip. Thoſe parts of each parallel that have been aſcertained by obſervation, are marked by dots, ſo that we can judge of his authority for the whole delineation. The magnetic equator cuts the earth's true equator in long. 15°, and 195° E. of Greenwich obſervatory, at an angle of 17° nearly. The circles of magnetic inclination are not parallel, being conſiderably nearer to each other on the ſhort meridian than on its oppoſite. 3dly, the magnetiſm of the earth, *viz.* the poſitions of its magnetic poles, magnetic equator, &c. are ſubject to a gradual, but uncertain variation, which, in all probability, ariſes from the irregular heating and cooling, from the formation and decompoſition of the different internal parts of the earth, and perhaps from other cauſes.

Notwithſtanding the failure of the advantages which were expected from the dipping property of the magnet, it muſt be acknowledged, that the dipping needle, which ſhews the above-mentioned property of the magnet, ſeems, upon conſideration, to be the principal inſtrument, from the indication of which we may expect to complete the magnetic theory of the terraqueous globe: it is therefore to be wiſhed, that accurate, and at the ſame time leaſt expenſive, inſtruments may be contrived for the purpoſe; and that numerous as well as accurate obſervations may be made with them in every part of the world.

DIPPING-*Needle*, is an inſtrument which ſhews the inclination of the magnet, or the natural direction of that admirable production of nature, at the place in which the inſtrument is ſituated. The obſervations of the dipping property of a magnet, or magnetized body, require much more accurate inſtruments, and much greater attention, than thoſe of the horizontal direction of the compaſs.

Mr. Norman, the firſt obſerver of the magnetical dipping, made a conſiderable number of original obſervations with inſtruments not much capable of accuracy; and, indeed, if the various circumſtances which are capable of rendering the dipping-needle imperfect be duly conſidered, the great difficulty of the conſtruction will be eaſily perceived. The principal parts of a dipping-needle are an oblong piece of ſteel called the *needle*, ſo nicely poiſed upon an horizontal axis, as to remain in any ſituation in which it may be placed when not magnetized: hence, when it is afterwards rendered magnetic, it may place itſelf in that direction which the magnetic virtue alone compels it to aſſume. The inſtrument muſt likewiſe be furniſhed with a divided circle, concentric with the needle's axis of motion, and ſituated ſo as to meaſure the angle which the needle makes with the horizon. But the difficulty of poiſing a needle, with ſuch a perfect coincidence of its centre of gravity with its axis of motion, is very great; and even when this object is accompliſhed, the introduction of dirt or duſt, either between the axis and ſurface upon which it reſts, or upon the needle itſelf, will eaſily derange the whole. It is likewiſe difficult to make the obſervations free from error; for inſtance, if the needle, moveable only in a vertical plane, be not ſet in the plane of the magnetic meridian, it will always dip too much. At London, where the magnetic dip makes an angle of about $72\frac{1}{2}°$ with the horizon, if the dipping-needle be ſituated in a plane 20° diſtant from the magnetic meridian, it will ſtand nearly perpendicular to the horizon; for in this caſe the needle, agreeably to the mechanical reſolution of forces, will place itſelf in the ſituation which brings it neareſt to the true magnetic meridian. It is probably owing to this kind of inaccuracy, that the obſervations of the dip, made by Norman and other contemporary obſervers, ſeem to give the dip much greater than they ought to do.

The general mode of conſtructing the dipping-needle, or the ſimpleſt conſtruction of the inſtrument, conſiſts of an oblong piece of flat ſteel, called the needle, broader in the middle, and tapering towards the extremities. An axis paſſes through the middle of it, and its extremities move in two holes, ſo that the needle can move edgeways, upwards and downwards, like the beam of a pair of ſcales. Two lateral bars, in which the holes for the extremities of the axis are made, are faſtened to a divided circle, which is to indicate the angle which the needle makes with the horizon. The divided circle, with the lateral bars and needle, are fixed

fixed upon a pedeſtal, which may be placed duly horizontal by means of ſcrews and a level or two.

Fig. 24. (*Plate* IV. *Magnetiſm*) repreſents this inſtrument in its ſimpleſt ſtate. A B is the needle, the axis of which, E F, reſts upon the middle of the two lateral bars C D, C D, which are made faſt to the divided circle, E F. G is the ſtand which ſupports the whole, and which is furniſhed with three ſcrews and a ſpiral level. With ſuch a ſtand the inſtrument is to be uſed upon land; but at ſea the inſtrument, without the ſtand, is ſuſpended by a ring H, to a proper frame, ſo as to hang perpendicularly in the plane of the magnetic meridian, the ſituation of which is ſhewn by a common compaſs.

The beſt method of obſerving the dip, is to place the needle in the magnetic meridian by means of a common compaſs, taking care to place the two inſtruments ſufficiently diſtant from each other, leſt they ſhould influence each other's movements. Then obſerve the angle which the dipping-needle makes with the horizon. Sometimes the frame, which contains the dipping-needle, is furniſhed with two ſight vanes on an index, which moves horizontally on the top of the frame, and through thoſe ſights a diſtant object, the bearing of which is exactly known, may be kept in view, in order to ſituate the dipping-needle in the magnetic meridian.

With ſuch an inſtrument the error of obſervation, which may ariſe from the poſſible want of balance in the needle, is uſually removed in the following manner:—After having obſerved the dip, with one end of the needle downwards, the magnetiſm of it is reverſed by the application of magnetic ſteel bars (ſee MAGNETISM); ſo that the end which had the north polarity may now be poſſeſſed of the ſouth polarity, and *vice verſâ*. Then the dip is obſerved again with the other extremity of the needle downwards; and a mean of the two obſervations is taken as the true or correct dip. Beſides this, the needle may be turned with each of its two flat ſurfaces, alternately to the right and to the left, ſo as to make, altogether, four obſervations; a mean of which will come much nearer to the truth.

It is almoſt uſeleſs to remark, that in the conſtruction of ſuch inſtruments, as well as in making the obſervation, no iron, ſteel, or other ferruginous matter, muſt be ſuffered to be in the frame, or about it, ſince a very ſmall quantity of it is ſufficient to render the obſervation erroneous.

A great imperfection in the dipping needle ariſes from the different forces with which the magnetiſm of the earth acts upon its two extremities, in different degrees of inclination. This ſource of error will be illuſtrated by *fig.* 25. Let A B be the dipping-needle; the circle E F repreſents one end of its axis; the lower part, F, of which reſts upon the ſupport C D; and E F is the line which paſſes through the centre of the needle, and divides it into two equal parts. It is evident, that before the needle has acquired any magnetiſm, if it be of an uniform figure, and its axis be truly cylindrical, the needle muſt remain in any ſituation in which it happens to be ſituated, ſince the perpendicular, raiſed from the point where the axis E F touches the fulcimen C D, paſſes always through the centre of the needle, and divides it into two equal parts; whence the needle becomes perfectly balanced in any degree of inclination. But though the needle be perfectly balanced, yet it is manifeſt, that in an inclined ſituation, as ſhewn in *fig.* 26, the part of it, G A, which ſtands above the point of reſt G, is longer than the part B G, which ſtands below it; and this difference increaſes according as the inclination increaſes, becauſe the axis of the needle is not a mathematical line, but a body of a certain diameter; ſo that, when the needle ſtands in a perpendicular ſituation, that part of it, which lies above the ſupporting plane, exceeds the other part juſt by the diameter of the axis. Now when the needle is inclined, as in *fig.* 26, ſuppoſe that two equal and like forces be applied to its extremities A and B, it is evident, that the force applied to the extremity A, muſt have more power to move the needle than that which is applied to B, becauſe G A is the longer lever of the two. This inequality of effects muſt evidently increaſe according as the inclination increaſes, and is greateſt when the needle ſtands in a perpendicular ſituation. The application of theſe forces takes place when the needle has been rendered magnetic; for, as the greateſt attractive and repulſive powers, between the magnetic poles of the earth and the poles of the needle, act upon the extremities A and B, the above-mentioned irregularity muſt increaſe with the inclination of the needle, and with the degree of its magnetic power. No effectual method of removing this cauſe of error has, as yet, been deviſed.

Having premiſed a ſufficient idea of the general conſtruction, and the common imperfections of this delicate magnetical inſtrument, it is now neceſſary to deſcribe the beſt or moſt improved inſtruments of the kind, and to ſubjoin the moſt approved precautions, which ſhould be obſerved in the uſe and management of the ſame.

In the year 1772, Mr. Nairne completed two dipping needles for the Board of Longitude, agreeably to a plan of the Rev. Mr. Mitchell, a gentleman eminently diſtinguiſhed for his great knowledge in magnetics. Not long after, the ſame artiſt conſtructed a ſimilar inſtrument for the Royal Society; which, however, differed in ſome particulars from the former. They are all remarkably well made; but we ſhall firſt deſcribe one of the former; for it will afterwards be eaſy to point out the few particulars in which the dipping needle of the Royal Society differs from them. *Fig.* 27. is a delineation of one of the needles, made for the Board of Longitude. A A is the needle, whoſe length is twelve inches. B, B, are the ends of its axis, which reſt upon the four friction wheels, C, C, C, C. The ends of the axis of the needle, as well as thoſe of the axes of the friction wheels, are made of gold alloyed with copper, and they all bear againſt flat pieces of agate, D, D, D, finely poliſhed. The ends of the axes, of the wheels, move in holes made in bell metal. E E E is the circle of bell-metal, which is divided into degrees and half-degrees, for the purpoſe of ſhewing the angle which the needle makes with the horizon. It is hardly neceſſary to obſerve, that the centre of the needle coincides with the centre of the divided circle. In reading off the angle, &c. the meaſure of it was expreſſed in degrees and minutes; but the minutes were reckoned by eſtimation; for inſtance, the third part, or what appeared to be the third part of half a degree, was reckoned ten minutes; the half was reckoned fifteen minutes, and ſo forth. The needle was nearly balanced before it was rendered magnetic; but it may be adjuſted after impregnation, by means of a croſs of wires, F, F, F, F, which was the contrivance of the Rev. Mr. Mitchell, and is affixed to the axis of the needle. Each of the wires, which form the arms of this croſs, is cut with a fine ſcrew, to receive a ſmall weight, or button, which may be ſcrewed nearer to, or farther from, the axis of motion; whence the needle may be adjuſted both ways with great nicety, by reverſing the poles, and changing its ſides. G, G, are two levels, which ſerve to ſet the line of 0 degrees truly horizontal. H is the perpendicular axis, whereby the inſtrument may be turned ſo that the divided face of the inſtrument may front either the eaſt or the weſt. I is an index, fixed to the perpendicular axis H, and which points to an

oppoſite

oppoſite line on the horizontal plate K, when the inſtrument is turned half round. L, L, L, L, are four adjuſting ſcrews, to ſet the inſtrument properly. One of theſe ſcrews is hid behind the circle. M, M, M, M, are ſcrews which hold the glaſs-cover, to prevent the diſturbance of the needle by the wind.

The 66th volume of the Philoſophical Tranſactions contains an account of the meteorological inſtruments uſed at the Royal Society's houſe, by the Hon. Henry Cavendiſh; and in that part of this account, which treats of the conſtruction and management of the dipping needle, Mr. Cavendiſh expreſſes himſelf in the following manner:

"In this inſtrument, the ends of the axis of the needle roll on horizontal agate planes, a contrivance being applied, by which the needle is at pleaſure lifted off from the planes, and let down on them again, in ſuch a manner as to be ſupported always by the ſame points of the axis, reſting on the ſame parts of the agate planes; and the motion with which it is let down is very gradual and without ſhake. The general form of the inſtrument, the ſize and ſhape of the needle, and the croſs uſed for balancing it, are the ſame as in the dipping-needle deſcribed in the Phil. Tranſ. vol. 62. It is alſo made by the ſame artiſt, Mr. Nairne.

"It may be ſeen in the Meteorological Journal, that the dip was obſerved firſt with the front of the inſtrument to the weſt, and then to the eaſt; after which the poles of the needle were reverſed, and the dip obſerved both ways as before. The reaſon of this is, that the mean of the obſerved dips, in theſe four ſituations, differs very little from the truth, though the needle is not well balanced, and even though a great many other errors are committed in the conſtruction of the inſtrument; provided the needle is made equally magnetical after the poles are reverſed as before; (it is eaſy to ſee whether the needle is made equally magnetical after the poles are reverſed as before, by counting the number of vibrations which it makes in a minute;) and that the difference of the obſerved dip, in theſe four ſituations, is not very great, as will appear from the following conſiderations."

"Firſt, let *fig.* 28. be a front view of the needle; AB a line parallel to the direction of magnetiſm therein; and CD a perpendicular thereto, meeting it in the line joining the centres of the cylindrical ends of the axis, or in the axis of motion, as we may call it. If the needle was truly balanced, its centre of gravity would be in *d*, the interſection of A B and C D. Suppoſe now, that the needle is not truly balanced, but that its centre of gravity is in *g*; draw *g n* perpendicular to A B, cutting it in *m*; and let the parts *m n* and *m g* be equal. When the inſtrument is turned half way round, ſo that the contrary face of the needle is preſented towards us, the edge, ADB, which is now loweſt, will become uppermoſt, and the centre of gravity will be in that ſituation in which the point *n* now is; therefore, the mean between the forces with which the needle is drawn out of its true poſition in theſe two ſituations, in conſequence of its not being truly balanced, is accurately the ſame; and the mean between the two obſerved dips is very nearly the ſame, as if the centre of gravity was at *m*. But if the centre of gravity is at *m*, the dip will be very nearly as much too great in the preſent ſtate of the needle, as it will be too little when the poles are reverſed. Therefore, the mean of the obſerved dips in theſe four ſituations will be very nearly the ſame as if the needle was truly balanced.

"Secondly, if the planes on which the axis rolls are not horizontal, the dip will be very nearly as much greater than it would otherwiſe be, when one face is turned to the weſt, as it is leſs when the other is; for if theſe planes dip towards the ſouth in one caſe, they will dip as much towards the north in the other, ſuppoſing the levels by which the inſtrument is ſet, to remain unaltered. Conſequently, the mean of the two obſervations will be very nearly the ſame as if they were placed truly horizontal.

"Thirdly, by the ſame method of reaſoning it appears, that the mean of the two abovementioned obſervations will be not at all altered, though the line, joining the mark on that end of the needle by which we obſerve, with the axis of motion, is not parallel to the direction of magnetiſm in the needle; that is, though the mark does not coincide with the point A or B, or though the line joining the two diviſions of 90° is not perpendicular to the horizon, or though the axis of motion does not paſs through the centre of the divided circle, provided it is in the ſame horizontal plane with it. If, indeed, the axis of motion is not in the ſame horizontal plane with the centre of the divided circle, the error proceeding from thence will not be compenſated by this method of obſerving, unleſs both ends of the needle are made uſe of. This, however, is of no conſequence, as it is eaſy to examine whether they are in the ſame horizontal plane or not.

"But the error which is moſt difficult to be avoided is, that which proceeds from the ends of the axis being not truly cylindrical. I before ſaid, that the parts of them which reſt on the agate planes are always exactly the ſame. The inſtrument is ſo contrived, however, that we may on occaſion, by giving the axis a little liberty in the notches by which it is lifted up and down, make thoſe planes bear againſt a part of the axis diſtant about $\frac{1}{100}$th or $\frac{1}{50}$th of an inch from their uſual point of bearing. Now, I find, that when the axis is confined ſo as to have none of this liberty, and when care is taken, by previouſly making the needle ſtand at nearly the right dip, that it ſhall vibrate in very ſmall arches when let down on the planes; that then, if the needle is lifted up and down any number of times, it will commonly ſettle exactly at the ſame point each time, at leaſt the difference is ſo ſmall as to be ſcarcely ſenſible; but if it is not ſo confined, there will often be a difference of 20′ in the dip, according as different parts of the axis reſt on the planes; and that, though care is taken to free the axis and planes from duſt as perfectly as poſſible, which can be owing only to ſome irregularity in the axis. Moreover, if the needle vibrates in arches of five or more degrees, when let down on the planes, there will frequently be as great an error in the dip. It is true, that the part of the agate planes, which the axis reſts on when the vibrations are ſtopped, will be a little different according to the point which the needle ſtood at before it was let down; which will make a ſmall difference in the dip as ſhewn by the divided circles, when only one end of the needle is obſerved, though the real dip or inclination of the needle to the horizon is not altered; but this difference is by much too ſmall to be perceived; ſo that the abovementioned error cannot be owing to this cauſe. Neither does it ſeem owing to any irregularity in the ſurface of the agate planes, for they were ground and poliſhed with great accuracy; but it moſt likely proceeds from the axis ſlipping in the large vibrations, ſo as to make the agate planes bear againſt a different part of it from what they would otherwiſe do. I have great reaſon to think, that this irregularity is not owing either to want of care or ſkill in execution; but to the unavoidable imperfection of this kind of work. I imagine too, that this inſtrument is at leaſt as exact, if not more ſo, than any which has been yet made."

We ſhall now ſubjoin a ſtatement of experiments carefully made

made with one of the abovementioned needles, conſtructed by Nairne for the Board of Longitude, whence the reader will be enabled to judge of the accuracy which may be expected from theſe obſervations, and of the particulars which muſt be attended to in making thoſe obſervations.

Firſt ſet of experiments made by Mr. Nairne. In theſe experiments the needle being placed, as nearly as poſſible, in the magnetic meridian, was raiſed to an horizontal poſition, and left to vibrate. It was between eight and nine minutes before the vibration ceaſed. In ſix experiments the dipping needle conſtantly ſhewed an angle of 72° 20′, with the horizon.

Second ſet of experiments, with that ſide of the inſtrument to the eaſt, which was to the weſt in the firſt obſervations. The needle made an angle of

72° 10′
72 15
72 45 } Here the ends of the axis
72 45 } touched the agates.
72 5
72 0

Third ſet of experiments, in which the poles of the needle were reverſed, but the ſame ſide of the inſtrument to the eaſt, as in the ſecond ſet of experiments, and the needle rather more magnetical, being touched with a larger ſet of magnets. In ſix experiments the dip was conſtantly 72° 30′.

Fourth ſet of experiments; *viz.* the ſame ſide of the inſtrument to the eaſt, as in the firſt ſet of experiments. The dipping angle made by the needle with the horizon was

72° 10′
72 10
72 15
72 10
72 10
72 10

Fifthly, the ſame end of the needle being made north, as in the firſt ſet of experiments, and alſo the ſame ſide of the inſtrument to the weſt, as in the firſt ſet of experiments, the dipping angle was 72° 20′.

The reſults of the above experiments undoubtedly coincide with each other in a remarkable degree; but ſeveral other experiments of a ſimilar nature, made with the ſame or with ſimilar inſtruments, have by no means been attended with the ſame remarkable coincidence; and this is particularly to be remarked in the account of Mr. Hutchins's obſervations on the dipping-needle, made at Albany Fort, in 1775, as is ſtated in the 66th vol. of the Phil. Tranſ. page 179, where the obſervations, made on the very ſame day, differ by four degrees and upwards.

Mr. Daniel Bernoulli has ſhewn the method of conſtructing a pretty ſimple dipping-needle, which is capable of conſiderable accuracy on ſhore. The conſtruction is as follows: "Let a dipping-needle be made in the beſt manner that can be done by a workman of the place, and balanced with ſome accuracy before impregnation, ſo that we may be certain that when rendered magnetic it will take nearly the true dip. Touch it (*viz.* magnetize it) and obſerve the dip. Deſtroy its magnetiſm, and then alter its balance in ſuch a manner as to render it capable of arranging itſelf in the magnetical line, or in the direction of the obſerved dip, though it be not poſſeſſed of magnetiſm. Now touch it again, giving it the ſame poles as before. It is plain that it will now approach exceedingly near to the true dip, becauſe its want of perfect equilibrium deranged it but a few degrees from the proper direction. Should this ſecond obſervation of the dip differ ſeveral degrees from the firſt, by the inaccurate formation of the needle, it will be proper to repeat the operation, which, however, will ſeldom be neceſſary. Mr. Bernoulli makes this ſimple contrivance anſwer the purpoſe of an univerſal inſtrument in the following ingenious manner. A very light braſs graduated circle E F G, (*Plate* IV. *Magnetiſm, fig.* 29.) is fixed to one ſide of the needle concentric with its axis, and the whole is balanced as nicely as poſſible before impregnation. A very light index C D is then fitted on the axis, ſo as to turn rather ſtiffly on it. This will deſtroy the equilibrium of the needle. If the needle has been made with perfect accuracy, and perfectly balanced, the addition of this index would cauſe it always to ſettle with the index perpendicular to the horizon, whatever degree of the circle it may chance to point at. But as this is ſcarcely to be expected, ſet the index at various degrees of the circle, and note what inclination the magnetic needle takes for each place of the index, and record them all in a table. Suppoſe, for example, that when the index is at 50°, the needle inclines 46°, from the horizon. If in any place we obſerve that the needle (rendered magnetic by lying between two ſtrong magnets) having the index at 50, inclines 46°, we may be certain that this is the dip at that place; for the needle is not deranged by the magnetiſm from the poſition which gravity alone would give it. As we generally know ſomething of the dip that is to be expected in any place, we muſt ſet the index accordingly. If the needle does not ſhew the expected dip, alter the poſition of the index, and again obſerve the dip. See whether this ſecond poſition of the index and this dip form a pair which is in the table. If they do, we have got the true dip. If not, we muſt try another poſition of the index. Noticing whether the agreement of this laſt pair be greater or ſmaller than that of the former pair, we learn whether we are to change the poſition of the index in the ſame direction as before, or in the oppoſite.

A needle of this kind in the hands of an experienced philoſopher was found to anſwer remarkably well. It is a contrivance worthy of its ingenious author, and deſerves to be recommended, becauſe it may be made for a moderate price, and of courſe it may afford the means of multiplying the obſervations of the dip, which are of the utmoſt conſequence in the theory of magnetiſm.

We have now deſcribed the beſt and moſt approved conſtructions of an inſtrument, to which too much attention cannot be paid either by the artiſt who conſtructs it, or by the obſerver who uſes it; and we have pointed out the difficulties which muſt be overcome, as well as the precautions which muſt be attended to by both. But moſt of theſe obſervations relate to the uſe of the dipping-needle upon land. At ſea the difficulty of making accurate obſervations with the dipping-needle, is obviouſly much greater, conſidering the unſteadineſs of the ſituation. The beſt contrivance for the purpoſe of rendering the dipping-needle more manageable at ſea, was made by Dr. J. Lorimer, and the deſcription of it, which we ſhall now ſubjoin, is publiſhed in the 65th volume of the Phil. Tranſ. In this conſtruction the needle ſhews, at the ſame time and by itſelf, the horizontal and vertical direction of the magnet, or, more properly ſpeaking, places itſelf in the magnetical line: whereas the dipping-needles, which we have deſcribed in the preceding pages, require to be ſituated in the magnetic meridian. In ſhort, this needle of Dr. Lorimer anſwers at once the purpoſes of a dipping-needle, and of a common compaſs. *Fig.* 30. is a repreſentation of this dipping-needle. "Whenever," Dr. Lorimer ſays, "any one meets with a terrella, or ſpherical load-ſtone, the firſt thing he does is to find out its poles; and having once diſcovered them, he knows immediately how any ſmall bits of needle will

will be affected, if it is placed upon any part of the ſurface of that terrella. The poles are moſt readily diſcovered by trying where the filings of iron, or a ſmall bit of needle, will ſtand erect upon the terrella; and this is generally found to be upon two points which are diametrically oppoſite to one another. But the magnetic poles of the earth ſeem to be placed obliquely to one another (ſee the Berlin Memoirs, 1757); though where they are actually ſituated is hitherto unknown; whether they are upon land or water; or, in either caſe, whether we can come nigh to them. Yet, be theſe things as they may, it appears evident to me, that accurate obſervations, made as near to thoſe magnetic poles as poſſible, with a good dipping needle, is the ſureſt way to complete the magnetic theory of this globe, analogous to the method we purſue in examining the terrella. But, as all the dipping needles which I have ſeen, appeared to me to be very ill calculated for the ſea ſervice at leaſt, I contrived one upon a different plan in 1764, and had it executed before I left England by Mr. Siſſon. I have called it an *univerſal magnetic needle*, or *obſervation compaſs*, becauſe I can by it take the dip and amplitude, and even the azimuth, with only one aſſiſtant to take the altitude for me. The needle is of the ſame ſhape and ſize nearly as thoſe uſed now for the compaſſes of the royal navy, and plays vertically upon its own axis, which has two conical points, ſlightly ſupported in two correſponding ſockets, which are inſerted into the oppoſite ſides of a ſmall upright braſs parallelogram, about one inch and a half broad, and ſix inches high. Into this parallelogram is fixed, at right angles, a ſlender braſs circle, about ſix inches diameter, ſilvered, and graduated to every half degree, upon which the needle ſhews the dip, by a vernier, if you chooſe; and this, for the ſake of diſtinction, I ſhall call the *circle of magnetic inclination*. This braſs parallelogram, and, conſequently, the circle of inclination, alſo turns horizontally upon two other pivots, the one above and the other below, with correſponding ſockets in the parallelogram. Theſe pivots are fixed in a vertical braſs circle, of the breadth and thickneſs of two-tenths of an inch, and of ſuch a diameter, as to allow the circle of inclination and the parallelogram to move freely round within it. This ſecond circle I ſhall call the *general meridian*. It is not graduated, but has a ſmall braſs weight fixed to the lower part of it, to keep it upright; and the circle itſelf is ſcrewed, at right angles, into another circle, of equal internal diameter, of the ſame thickneſs, and twice the breadth, which is ſilvered, and graduated on the upper ſide to every half degree. It repreſents the horizon as it ſwings freely upon gimbalds, and is always nearly parallel to it. The whole is contained in a neat mahogany box, of an octagon figure, with a glaſs plate at top, and one on each ſide, for about two thirds down. That part of the frame which contains the glaſs lifts off occaſionally. The whole box turns round upon a ſtrong braſs centre, fixed in a double plate of mahogany, glewed together croſs-wiſe, to prevent its warping or ſplitting; and this again is ſupported by three braſs feet, ſuch as are uſed for caſes of table knives, froſted, that they may not eaſily ſlip, if the veſſel ſhould have any conſiderable motion. It has another ſquare deal box to lock it up in, to preſerve the glaſs, &c. when it is not wanted for uſe.

"The uſe of this inſtrument is very plain, as the inclination, or dip, is at any time apparent from inſpection only; and alſo the variation, if the frame is turned round till the great vertical circle lies exactly in the plane of the true meridian: for, the circle of inclination being always in the needle's vertical plane, the edge of it will evidently point out upon the horizon the variation eaſt or weſt. But at ſea, when there is not too much motion, you turn the frame round till the vertical circle is in the plane of the ſun's rays; that is, till the ſhadow of the one ſide of it juſt covers the other, and the edge of the circle of inclination will then give the magnetic amplitude, if the ſun is riſing or ſetting; but the azimuth at all other times of the day; and, the true amplitude or azimuth being found, in the uſual way, the difference is the variation. If the motion is conſiderable, obſerve the extremes of the vibration, and take the mean for your magnetic amplitude, or azimuth. When the ſun does not ſhine ſo bright as to give a ſhadow, you can ſet the braſs circle in a line with his body, if he is at all viſible, by your eye. The principal advantage at firſt aimed at in this compaſs was, to contrive a dipping-needle, which ſhould be ſufficient for making obſervations at ſea; as thoſe needles, to be of uſe, muſt be placed, by ſome means or other, in ſuch a manner, as that all their vibrations ſhall be made in the true magnetic meridian, north and ſouth, otherwiſe they are good for nothing. For, if one of them is placed, at right angles, acroſs the magnetic line, it will ſtand perpendicularly up and down, in any part of the world; the leaſt dip, therefore, is always in this magnetic line. But the only method of ſetting a dipping-needle at ſea, has hitherto been to place it in a line with the common compaſs-needle; and this muſt be very inaccurate, if they are at any conſiderable diſtance one from the other; or, if they were near, the two needles would influence one another, and neither of them could be true: nay, ſuppoſing them for once to be properly placed in this line, the leaſt motion of the ſhip throws them out again. But this inſtrument has a conſtant power in itſelf, not only of ſetting itſelf in the proper poſition, but alſo of keeping itſelf ſo; or of reſtoring itſelf to the ſame ſituation, if at any time it had loſt it; and it is curious to ſee how, by its double motion, it counteracts, as it were, the rolling motion of the veſſel. I have only one thing farther to obſerve, that, as it is impoſſible for human hands to make any inſtrument mathematically true, ſo, when we have two graduations to look to, as in the preſent caſe, one on the north, and the other on the ſouth end of the needle, we ought to attend to both, and take the medium for the true dip or variation, pretty nearly. But in this compaſs, there is another method of examining the obſervations. Take a good artificial magnet, and on the outſide of the compaſs-box point one end of it towards the needle, and, by moving your magnet, you may thus guide the north end of the needle round the ſouth, or *vice verſâ*, without opening your compaſs-box. The magnet being then laid aſide, the needle will come to its true poſition, after a few vibrations: but, as both the needle and the circle of inclination are now reverſed, (Dr. Lorimer means that the magnet ſhould be applied in ſuch manner as to turn the parallelogram and circle of inclination half way round horizontally; ſo that, that end of the axis of the needle, which before pointed to the weſt, ſhall now point to the eaſt,) it will not point exactly to the ſame diviſion as before; yet, a mean of the two will be the truth, as nearly, I believe, as it is poſſible for any inſtrument to give it.

"Query 1ſt. May not a part of this ſmall difference be attributed to the direction of the magnetic influence, whatever that be, in the ſteel bar? and, if ſuch an experiment could be tried upon the preſent azimuth compaſſes, is it not probable, that the variation in them would be at leaſt as ſenſible? Query 2d. May not this be the cauſe that two of the beſt of them will differ a ſmall matter from one another? Query 3d. Would the ends of the needle being made angular, inſtead of the ſquare form, be, in ſome meaſure, a remedy for this ſmall variation? I am, &c."

N. B. This inſtrument requires a moſt exquiſite workmanſhip;

manſhip; and the ſockets wherein the pivots move ought to be made of agate.

The only thing which remains to be added for the completion of this article, is a ſtatement of ſome of the beſt obſervations that have been made with the dipping needle; reſpecting this, however, our ſtatement will be very ſhort, conſidering that little dependence can be placed upon moſt of theſe obſervations, eſpecially thoſe that have been made at ſea. In general it may be obſerved with reſpect to the dipping needle in different parts of the world; 1ſt. that its inclination does not alter regularly in going from north to ſouth, or *vice verſâ*, along any meridian; and 2dly, that the variation of the dip at the ſame place, but at different times, is very ſmall.

In London, the dip, as obſerved by Norman, (the inventor of the dipping needle,) in 1576, was 71° 50′. In 1676 it it was 73° 47′ according to Mr. Bond. In 1720 Mr. Whiſton made it 75° 10′. In 1723 Mr. Graham found it to be 73½° or 75°. In 1775 Mr. Cavendiſh made it 72° 30′.

TABLE *of Dips.*

Latitude North.		Longitude Eaſt.		The north end of the needle below the horizon.		Years in which the Obſervations were made.
°	′	°	′	°	′	
53	55	193	39	69	10	1778
49	36	233	10	72	29	
		Weſt.				
52	24	83	30	79	17	1775
44	5	8	10	71	34	1776
38	53	12	1	70	30	
34	57	14	8	66	12	
29	18	16	7	62	17	
24	24	18	11	59	0	
20	47	19	36	56	15	
15	8	23	38	51	0	
12	1	23	35	48	26	
10	0	22	52	44	12	
5	2	20	10	37	25	
South.						
0	3	27	38	30	3	
4	40	30	34	22	15	
7	3	33	21	17	57	
11	25	34	24	9	15	
		Eaſt.		South and below.		
16	45	208	12	29	28	
19	28	204	11	41	0	
21	8	185	0	39	1	1777
35	55	18	20	45	37	1774
41	5	174	13	63	49	1777
45	47	166	18	70	5	1773

A great many other obſervations made with the dipping needle may be found in the accounts of voyages, tranſactions of learned ſocieties, &c.

DIPPO, in *Ancient Geography*, a town of Spain, marked in Antonine's Itinerary, between Cordoua and Merida.

DIPPOLDISWALDA, in *Geography*, a ſmall town of Saxony, in the circle of Miſnia, ſituated 10 miles ſouth of Dreſden, towards Bohemia, with a population of 1200 individuals, whoſe principal trade conſiſts in hewing excellent

mill and whet-ſtones, out of the neighbouring quarries. Their cutlery and potters' ware is alſo much praiſed.

Near Dippoldiſwalda is the tomb of a Tartar, called Muſtapha Sulkiwicz, who, in the ſeven years war, fell as the firſt lieutenant in a Saxon regiment of Coſſacks. It was erected in the year 1762, but time had conſiderably injured it, when the Pruſſians, againſt whom he had fought, but who honoured his valour, reſtored it in 1778.

DIPSACEÆ, in *Botany*, the 56th natural order in Juſſieu's ſyſtem, or the firſt of his eleventh claſs. The definition of this claſs is, *cotyledons*. 2 *Flowers* monopetalous, ſuperior. *Anthers* diſtinct. Proper *calyx*, or *perianth* ſuperior, of one leaf. *Corolla* of one petal, very rarely of many petals cohering by a broad baſe, ſuperior, or placed upon the piſtil, often regular. *Stamens* of a definite number, their filaments inſerted into the corolla, their anthers ſeparate. *Germen* ſimple, inferior; ſtyle often ſingle, ſometimes manifold, or elſe wanting; ſtigma ſimple or divided. *Seed* inferior, or rather, for the moſt part, the fruit is capſular or pulpy, of one or many cells, and containing one or many ſeeds.

The characters of the order of *Dipſaceæ* are, *Calyx* ſimple or double. *Corolla* tubular, with a divided limb. *Stamens* of a definite number. *Style* one; ſtigma ſimple. *Capſule* for the moſt part containing a ſingle ſeed, and not burſting, having the aſpect of a naked ſeed; very rarely it has two or three cells, with a ſeed in each. *Embryo* without a ſeparate albumen, its radicle ſuperior. *Stem* in general herbaceous. *Leaves* oppoſite, rarely whorled. *Flowers* in a few inſtances diſtinct, in general aggregate upon a common chaffy receptacle, within a common calyx of many leaves. The firſt ſection compoſed of aggregate flowers, contains *Morina*, *Dipſacus*, *Scabioſa*, *Knautia*, and *Allionia*; the ſecond ſection, deſtined for diſtinct flowers, only *Valeriana*. Juſſieu, in a learned paper, on the New Holland genus, *Opercularia*, in the 4th vol. of the Annales du Muſeum, 418, conſiders it as forming a new natural order between the *Dipſaceæ* and *Rubiaceæ*, to which the *Valeriana*, and Adanſon's *Fedia*, (*Valeriana Locuſta*, &c. of Linn.) ſhould be removed. Ventenat remarks, Tabl. du regne végétal, v. 2, 556, that Adanſon was the firſt botaniſt who detected the eſſential diſtinctions of the order *Dipſaceæ*. We are at a loſs to account for Juſſieu's referring the *Morina* to the ſection of aggregate flowers, with which it accords in no other reſpect than having a double calyx. See Flora Græca Sibthorpiana, t. 28. The inflorescence is truly whorled, and each flower has its ſeparate ſtalk.

DIPSACUS, ſo called by Pliny after Theophraſtus, from διψαω, to be thirſty, (alluding to the baſins formed by its leaves for holding water, in which birds and other ſmall animals may ſlake their thirſt,) Teaſel, or Venus's Baſin. Linn. Gen. 48. Schreb. 64. Willd. Sp. Pl. v. 1. 543. Juſſ. 194. Gærtn. t. 86. Claſs and order, *Tetrandria Monogynia*. Nat. Ord. *Aggregatæ*, Linn. *Dipſaceæ*, Juſſ.

Gen. Ch. *Cal.* Common Perianth of many leaves, containing many flowers; its leaflets longer than the flowers, lax, permanent; Proper Perianth ſmall, ſuperior, of one leaf. *Cor.* the univerſal one regular; proper one monopetalous, tubular; its limb four-cleft, erect, the outer ſegment largeſt and ſharpeſt. *Stam.* Filaments four, capillary, longer than the corolla, and inſerted into its tube; anthers incumbent. *Piſt.* Germen inferior; ſtyle thread-ſhaped, the length of the corolla; ſtigma ſimple. *Peric.* none. *Seeds* ſolitary, columnar, crowned with the partial calyx. *Common receptacle* conical, beſet with long chaffy ſcales between the flowers.

Eſſ. Ch. Common calyx of many leaves; perianth ſuperior,

rior, of one leaf. Receptacle chaffy. Seed-crown cup-ſhaped.

D. *fullonum*, the Manured Teaſel, is the moſt important ſpecies, on account of its uſe in dreſſing woollen cloth. Hence it is called *Carduus fullonum*, or Fuller's Thiſtle. See Lobel's Icones v. 2. 17, and Gerarde's Herbal 1167. (Dipſacus ſativus.) The leaves are united at the baſe, and ſerrated. Scales of the receptacle reflexed or hooked, whence its uſe in preference to *D. ſylveſtris*, *Engl. Bot.* t. 1032, whoſe ſcales are ſtraight and much ſofter. This laſt grows wild in many parts of England, the former is ſcarcely found but in a cultivated ſtate. For its culture and uſe, ſee TEASEL.

DIPSACUS, in *Medicine*, according to ſome, is the ſame with a diabetes.

DIPSAS, in *Zoology*, a ſort of ſerpent, the biting of which has been ſaid to produce ſuch a thirſt as proves mortal; whence it is called *dipſas*, which in Greek ſignifies *thirſty*. In Latin it is called *ſitula*, a pail. Moſes ſpeaks of it in Deut. viii. 15.

The Hebrew word *tzimaon* anſwers very well to the Greek dipſas, and expreſſes the thirſt occaſioned by the biting of this ſerpent. Some by the Hebrew *tzimaon* underſtand a deſart or dry place. The dipſas in the Linnæan Syſtem is a ſpecies of *Coluber*; the green coluber, with ten white lines of Boddaert, and the cærulean Surinam ſerpent of Seba. See COLUBER.

DIPTERA, in *Entomology*, the ſixth order in the Linnæan Syſtem. The inſects of this order are known by having two wings, with a clavated poiſer under each, as in the common houſe fly (muſca domeſtica) which is of this kind. See article ENTOMOLOGY.

DIPTERE, or DIPTERON, in the *Ancient Architecture*, a temple ſurrounded with a double row of columns, which form a ſort of porticos, called wings, or iſles.

The word is Greek, formed from δις, *twice;* and πτερον, *ala*, *wing*.

DIPTERYX, in *Botany*, (from δις, double, and πτερον, a wing, becauſe the two upper ſegments of the calyx reſemble a pair of wings,) Schreb. 485. Willd. Sp. Pl. v. 3. 910. Mart. Mill. Dict. v. 2. (Coumarouna; Aubl. Guian. t. 296. Juſſ. 364. Baryoſma; Gærtn. t. 93.) See COUMAROUNA. To this is juſtly added, by Schreber, Taralea of Aublet, t. 298, under the following characters. Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch.. *Cal.* Perianth top-ſhaped, of one leaf; its two upper ſegments oblong, concave, ſpreading like wings; the lower one ſmall, entire or three-toothed. *Cor.* Papilionaceous. Standard longeſt, obovate, erect, with inflexed ſides. Wings two, oblong, ſhorter. Keel ſtill ſhorter, of two petals. *Stam.* Filaments eight or ten, united into a tube cloven at the upper ſide; anthers ſmall, roundiſh. *Piſt.* Germen ſtalked, oblong; ſtyle awl-ſhaped, aſcending; ſtigma acute. *Peric.* Legume large, ovate, compreſſed, thick, of one cell. *Seed* one, ovate.

Obſ. Coumarouna of Aublet has eight ſtamens, and the lower lip of the calyx undivided; Taralea ten ſtamens, and the lower lip of the calyx three-toothed. The two plants are ſo much alike in habit and fructification, that it is truly wonderful any botaniſt could ſeparate them, and yet by ſome ſtrange accident they have fallen aſunder even into two different ſections of Juſſieu's *Leguminoſæ*, p. 450 and 364.

Eſſ. Ch. Calyx with its two upper ſegments dilated, ſpreading like wings. Stamens all connected. Legume coriaceous, of two valves and one cell. Seed ſolitary.

1. D. *odorata*. Willd. Sp. Pl. v 3 910. "Leaves alternate. Cluſter terminal." Of this an account has already been given under the article COUMAROUNA. The ſeeds are now frequently ſold in the tobacconiſts' ſhops of London, by the name of Tongo Beans, and are uſed to give a flavour to ſnuff. Their ſcent is like that of new hay, or the dried herb Woodruff, *Aſperula odorata*. Gærtner having only ſeen a half ripe fruit, in which ſtate it appears uſually to be gathered for a perfume, miſtook it for a *drupa*, but Aublet, who ſaw it growing, expreſsly deſcribes it as a legume of two valves.

2. D. *oppoſitifolia*. Willd. Sp. Pl. v. 3. 910. Mart. Mill. Dict. v. 2. (Taralea oppoſitifolia; Aubl. Guian. v. 2. 745. t. 298.) "Leaves oppoſite. Flowers panicled." A native of the vaſt foreſts of Guiana, about large rivers, flowering in October, and ripening fruit in March. This is a tree 60 feet high, and 2½ in diameter. The outer bark ſcales off in large membranous flakes. The wood is white, hard, compact, and heavy. *Branches* long and widely ſpreading. *Leaves* oppoſite, croſſing each other in pairs, pinnate, of four or five pairs of ſmooth, oval, pointed, large leaflets. *Panicles* terminal, large, ſubdivided in an oppoſite manner. *Flowers* violet-coloured, exhaling a pleaſant ſcent, which is perceptible at a conſiderable diſtance.

DIPTOTES, from δις, and πτωτος, of πιπτω, *cado*, in *Grammar*, a kind of irregular nouns, having only two caſes; as *fors*, *forte*.

DIPTYCHA, in *Antiquity*, a public regiſter, wherein were written the names of the conſuls, and other magiſtrates, among the heathens; and of biſhops, and defunct as well as ſurviving brethren, among the Chriſtians.

The word diptycha is formed from the Greek διπτυχον, of διπτυχα, and that from διπτυξ, a maſculine noun, derived from πτυσσω, *I fold*, or *plait*. From its future πτυξω, is formed πτυξ, a *fold*, or *plait*. to which adding δις, *twice*, we have διπτυξ, in the genitive διπτυχος, whence the nominative neuter, διπτυχον, q. d. *a book folded in two leaves*; though there were ſome in three, and others in four or five leaves. An ingenious author imagines this name to have been firſt given them to diſtinguiſh them from the books that were rolled, called volumina. See VOLUME and BOOK.

It is certain there were profane diptycha in the Greek empire, as well as ſacred ones in the Greek church. The former were the matricula, or regiſter, wherein the names of the magiſtrates were entered; in which ſenſe diptycha is a term in the Greek chancery.

DIPTYCHA, *ſacred*. The word is plural; diptycha being a double catalogue, in one whereof were written the names of the living, and in the other thoſe of the dead, which were to be rehearſed during the office. We meet with ſomething not unlike the ſacred diptychs of the Greeks, in the canon of the maſs, according to the Latin uſage; where the people are enjoined to pray once for the living, and once for the dead; ſeveral ſaints are invoked in different times, &c.

In theſe diptycha were entered the names of biſhops, who had governed their flocks aright; and theſe were never expunged out of the ſame, unleſs they were convicted of hereſy, or ſome other groſs crime. In the diptycha were likewiſe entered the names of ſuch as had done any ſignal ſervice to the church, whether they were living or dead, and mention was made of them in the celebration of the liturgy.

There were two ſorts of theſe diptycha; the firſt contained the names of the patriarchs, popes, and biſhops, who preſided over the largeſt churches, and were ſtill alive: in the other were written the names of thoſe who died in the peace and communion of the church. The deacon uſed to

read thoſe names at the altar during divine ſervice. As the admiſſion of any biſhop's name into theſe public tables was a token and pledge of communion, ſo the eraſure of any one's name out of them was a denial of communion with him, and a kind of excommunication. The uſe of theſe diptychs is very ancient, and can be traced up to the fourth century at leaſt, if not higher. They contained, ſometimes, beſides the names of biſhops, thoſe alſo of other men, famous for their holineſs and piety, and eſpecially thoſe of the orthodox emperors, nay, even of general councils; as appears by the emperor Juſtinian's letter to Epiphanius, patriarch of Conſtantinople. Theſe diptychs are often mentioned by the fathers, councils, and eccleſiaſtical hiſtorians.

Caſaubon, in his obſervations on Athenæus, lib. vi. cap. 14, ſuppoſes the Chriſtians to have borrowed the cuſtom of writing names in a book, and rehearſing them at maſs, from the heathens, who entered the names of perſons they would do any ſignal honour to, in the verſes of the Salii; as was done Germanicus and Verus, ſons of the emperor Marcus Aurelius, and a long time before, during the age of the republic, to Mamurcus Veturius, and Lucia Volumnia, as we are told by Tacitus, lib. ii. Spartian, Ovid, Feſtus, Plutarch, &c. But Fa. Roſweyd does not approve this notion of Caſaubon. The pretended St. Dionyſius, a very ancient author, ſays the contrary, and aſſerts the firſt eſtabliſhment of this uſage to have been founded on ſcripture, 2 Tim. ii. 19. Pſalm cxvi. 15. Roſweyd adds Eccleſiaſtic. xliv. 1. and takes theſe to have been the paſſages the ancient church had a view to, rather than the Salian verſes.

The profane diptycha were frequently ſent as preſents to princes, &c. on which occaſion they were finely gilt, and embelliſhed; as appears from Symmachus, lib. ii. ep. 81. Thoſe preſented were uſually of ivory. The firſt law, De Expenſ. Ludor. C. Theod. forbids all magiſtrates below conſuls to make preſents of diptycha of ivory in the public ceremonies.

DIPUS, in *Zoology*, a genus of quadrupeds, much reſembling the dormouſe: their hind feet are long, and enable them to make prodigious bounds, and with their fore paws they carry food to their mouths like the ſquirrel. They are generically diſtinguiſhed by having two fore teeth in each jaw: the fore legs very ſhort, the poſterior ones long, and the tail long and tufted at the tip.

Species.

Sagitta. Hind feet three-toed: no thumb claw. Schreber. *Mus Sagitta: cauda longiſſima apice ſubpennata nigro-alba, pedibus poſticis longiſſimis tridactylis*, Pallas.

There appears to be two varieties of this animal; or at leaſt two ſpecies ſo cloſely allied, as to leave us in conſiderable doubt whether they ought to be conſidered as varieties, or ſpecies. The firſt, called by Schreber *ſagitta*, as abovementioned, has three toes on the poſterior feet, and no thumb claw. The head of this is rounded, the ears longer than the head, the toes hairy, and the tail terminating in a tuft. The other, *Ægyptius*, has alſo the poſterior feet three-toed, but has a claw on the fore thumb: the body of this kind is thin, and flattened at the ſides; the hair on the head and upper parts of the body long, and ſoft, and of a tawny colour; the breaſt and belly whitiſh, with a duſky band acroſs the upper parts of the thighs. Both inhabit the eaſt, and have the ſame manners, living in ſandy plains; but the firſt is ſaid to extend towards Siberia, the other to be confined to Egypt and Barbary.

The ſpecies *ſagitta* is ſuppoſed to be the μυς δίπους, or *two-footed mouſe*, of the ancients, an animal repreſented on the coins of Cyrene, where it was anciently found in great abundance; and which place it ſtill inhabits. In the Journal de Phyſique for November 1789, Sonnini laid before the public an intereſting account of this jerboa, which animal he had full opportunity of examining during his travels in that part of the globe. "It is in the burning climate of Africa principally (ſays this writer) that nature ſeems to have taken pleaſure in varying, in a manner altogether ſingular, the forms of the beings which ſhe has placed there, and in deviating from the rules and the proportions which ſhe ſeemed to have adopted, if, however, that can be called a deviation which is a proof of her boundleſs and inexhauſtible fecundity. On that fiery ſoil it is we find the giraffe, or cameleopard, remarkable for the diſproportionate height of his fore legs. We likewiſe find an extreme diſproportion between the legs of the jerboa; but the hinder legs are, in this animal, exceſſively long, while the fore legs ſcarcely appear. Theſe long limbs, or to expreſs myſelf with greater preciſion, theſe long feet, for it is the tarſus which is ſo immoderately lengthened, are of uſe to the jerboa only in his progreſſive movement: thoſe before, which may be conſidered as little hands, are uſeleſs to him in removing from place to place. He hops after the manner of birds, and this kind of motion, which would be very conſtrained to any other quadruped, is ſo much adapted to him, that his running, or rather his leaping, is very nimble, and very ſpeedy."

"The ſize of the jerboa is nearly that of a large rat; the head is broad, large in proportion to the body, flattened above, and of a clear pale red, with a blackiſh ſhade; the upper jaw projecting beyond the lower, and both furniſhed with two inciſive teeth; thoſe above are broad, cut in right angles, flat, and divided lengthwiſe, by a groove paſſing through the middle; thoſe of the under jaw are longer, convex externally, pointed at their extremity, and bent back inwardly. It is evident that theſe teeth are diſpoſed nearly as thoſe in the hare, the rabbit, and field mouſe, and this reſemblance has procured all theſe names to the jerboa. It would have been juſt as reaſonable to take him for a beaver or porcupine. The ſnout is ſhort, broad, and obtuſe; a number of ſtiff hairs extend from ſide to ſide, and form long whiſkers. The noſe is naked, wide, and cartilaginous; the eyes large, and prominent, with brown irides; the ears long, large, and covered with ſhort hair; externally theſe are white in the lower part, and grey upwards; the middle, as well as the ſides of the head, is of a very light fawn colour, mixed with grey and black; they entirely ſurround the meatus auditorius for about a third of their length, ſo that they exactly reſemble the larger end of a cone, a conformation that muſt increaſe the animal's faculty of hearing, and which is particularly well calculated to defend the inner part of the organ from the extraneous ſubſtances that might otherwiſe find admiſſion.

"The body is broader behind than before, and well covered with long, ſoft, and ſilky hair; that on the back and ſides aſh-colour, almoſt the whole length through, and of a clear fawn-colour, where it approaches the points, which are black; but as the aſhy part is not apparent, it may be ſaid the fur is fawn-coloured, with blackiſh zig-zag ſtripes. Theſe tints, which are ſomewhat duſky, form an agreeable contraſt with the fine white of the belly. The fore legs are ſo ſhort, that they ſcarcely extend beyond the hair; they are white, and have five toes, the greateſt of which, or interior toe, is very ſhort, rounded at the extremity, and has no nail; the other four, the ſecond whereof, outwardly, is the longeſt, are of conſiderable length, and armed with great hooked-nails. The heel is very much raiſed, and the inſide, or ſole of the feet, is fleſh-coloured. The hind legs are covered with long hair, of a fawn colour, and white; its

long

long feet are almoſt entirely bare, eſpecially on the outſide, which muſt neceſſarily be the caſe, ſince the animal, whether in motion or at reſt, conſtantly leans on that part. Theſe feet, ſo exceedingly long, have each three toes, the middle one of which is rather longer than the other two; they are all provided with nails, which are ſhort, but broad and obtuſe, and they have alſo a kind of ſpur, or rather a very ſmall rudiment of a fourth toe, which conſtitutes a point of reſemblance between the jerboa of Egypt, and the alagtaga of Tartary." According to Haſſelquitz, the tail of the jerboa is three times the length of the body; but Sonnini obſerves, that he never ſaw the tail above half this length. Its circumference is not much exceeding that of a large gooſe-quill, and is of a quadrangular form; its colour grey, deepeſt above, and covered with ſleek hair down to the extremity, which terminates in a tuft of long ſilky hair, half black and half grey.

On comparing this deſcription with that which Gmelin has given of the alagtaga, in the new commentaries of the academy of Peterſburgh, ſays Sonnini, it will appear that the jerboa has a ſtrong reſemblance to it: they have both the ſame number of toes on the fore-feet, the ſpur on the hinder, and the ſame length of tail, which is a proof of two things; firſt, that the jerboa and the alagtaga are one and the ſame animal; and, ſecondly, that the deſcriptions which have been given of the jerboa are not very accurate. What chiefly ſuggeſted doubts to Buffon's mind reſpecting the identity of the jerboa and alagtaga, was the diſparity of the climates which each inhabited, the former being reſident in Africa, and the alagtaga being found in the cold regions of Siberia. But this is not the only inſtance which might be adduced to the ſame effect. Many ſpecies of animals are equally ſcattered over the icy countries of the north, and over the ſultry diſtricts of the ſouth. Rats take pleaſure to reſide in very hot climates, and they live very comfortably in the north of Sweden. Hares inhabit with equal convenience, the ſnows of Lapland, of Siberia, and Greenland. It is certain that the gerboiſe of Cyrenaïs, or the deſerts of Barca, deſcribed by Mr. Bruce, in his Travels in Nubia and Abyſſinia, is only a variety in the tribe of the jerboa. The ſlight differences remarked not being, by far, ſufficient to conſtitute two diſtinct ſpecies. To the researches of Mr. Bruce we are further indebted for the exact knowledge of another animal, which had, very improperly, been confounded with the jerboa, and to which he has given the name of *daman-iſraël*, or lamb of Iſraël. So far from having the diſtinctive character of the jerboa, this daman has all his legs equal, or nearly ſo, and he has no tail; whereas, that of the jerboa is very long. Dr. Shaw, the traveller through Barbary, was the firſt who fell into the miſtake of confounding two animals ſo very unlike; and this error was ſucceſſively copied till Mr. Bruce detected it, whoſe obſervations have thrown much light on a ſubject formerly involved in doubt and darkneſs. By taking the jerboa for the daman-iſraël, the ſame which the Hebrews call ſchaſan, all that Arabian authors have ſaid of the ſecond has been aſcribed to the firſt.

The jerboa meaſures from the tip of the noſe to the origin of the tail five inches and a half, the tail itſelf eight inches and a half, and the total length of the poſterior legs about ſix inches. There is ſcarcely any difference in the ſize of the two ſexes. The females have eight nipples, the poſition of which is remarkable; they are ſituated more externally than in other quadrupeds; the firſt pair is beyond the bend of the ſhoulders, and the laſt is rather under the thigh than the belly; the two other pairs, being on the ſame line, are conſequently placed rather under the flanks than under the body.

The jerboa is commonly found in Lower Egypt, principally in the Bahiré, or weſtern part. The denomination of rats or mice of the mountain has been improperly applied to them, for all the lower part of Egypt is a plain. The ſands and rubbiſh which ſurround modern Alexandria are very much frequented by the jerboa. They live there in troops, and with their nails and teeth dig a habitation for themſelves in the ground, and can even penetrate through the ſoftiſh ſtone which is under the layer of ſand. Without being actually wild, they are exceedingly reſtleſs; the ſlighteſt noiſe, or any new object whatever, makes them retire to their holes with the utmoſt precipitation. It is impoſſible to kill them, except by ſurprize. The Arabs contrive to take them alive, by ſtopping up all the avenues to their burrows except one, by which they force them to come out. Their fleſh is not eſteemed a delicacy, though it is eaten; their ſkin, which is ſoft and ſhining, is uſed as a common fur.

M. Sonnini fed for ſome time, while in Egypt, ſix of theſe animals in a large cage of iron wire. The firſt night they had entirely gnawed aſunder the upright and croſs ſticks of their priſon, and he was under the neceſſity of having the inſide of the cage lined with tin. They lived on wheat, rice, nuts, and every ſpecies of fruit. They were very fond of baſking in the ſun, and the moment they were put into the ſhade they clung cloſe to each other, and ſeemed to ſuffer from the privation of warmth. It has been affirmed that the jerboa ſleeps by day, and never in the night time; M. Sonnini obſerved preciſely the contrary. In a ſtate of liberty they are met with in broad day light gathering round their ſubterraneous habitations, and thoſe which he fed himſelf were never more lively, nor more awake, than when expoſed to the full blaze of the ſun. Though they have much agility in their movements, gentleneſs and tranquillity ſeem to form their character. They ſuffered themſelves to be ſtroked with great compoſure; and there was among them neither noiſe nor quarrel, even when food was ſcattered among them. They teſtified no ſymptoms of joy, or fear, or gratitude; their gentleneſs was by no means amiable, or intereſting; it appeared to be the effect of a cold and complete indifference approaching to ſtupidity.

According to the remarks of M. Berthout-van-Berchem, (ſecretary to the Society of Phyſics,) publiſhed in 1788, the jerboa and alagtaga are two diſtinct ſpecies. The jerboa, he obſerves, of which Mr. Pennant ſpeaks, under the name of alagtaga, and which ought to have been written alak-daaga, has five toes on the hinder feet; the ſecond has only three, and differs from it likewiſe in ſeveral other characters. "In order to diſtinguiſh," ſays he, "this firſt ſpecies, which M. Pallas denominates *mus jaculus*, I ſhall call it *jalma*, from the name given to it by the Calmucks, and ſhall preſerve to the ſecond ſpecies the name of jerbo or jerboa. M. Pallas has obſerved three varieties in the jalma, which appear to differ principally in the ſize. The moſt common, which is of the middle ſize between the other two, is the jalma or alak-daaga. It is often found in eaſtern Tartary, in the deſerts of Siberia, and in the regions beyond the Baïkal. It is likewiſe found in Syria, nay even ſo far as India. Mr. Pennant ſays, it is met with in Barbary: but there is no authentic evidence that the jalma is an inhabitant of Africa. He even remarks that it prefers colder countries than what ſuit the jerboa, an inhabitant of warm climates. The ſecond variety is the largeſt of either; it is more rare than the firſt; they give it the name of marine

jalma,

jalma, and it is to be found in the graſſy hills of the Tanaïs, of the Volga, of the Rhymnus, and the Irtis. It is to this variety that we are to refer the animal which Dr. Shaw has erroneouſly deſcribed under the name of *daman iſraël*, and which is the ſize of the rabbit. The third variety is found, with the large one, towards ſalt meridional marſhes of the Caſpian ſea, and with the middle ſized one, in the vicinity of the Volga, and of the Rhymnus. They give it the name of choin-jalma; it is the ſmalleſt of the three. The largeſt, or marine jalma, is the ſize of a ſquirrel; the middle-ſized, or jalma, is about as big as a rat, and the ſmalleſt ſcarcely ſo large as a field-mouſe. All theſe families have five toes on the hinder foot; and in the great number which M. Pallas examined, he never ſaw a ſingle variation as to the number of toes. But what has led Buffon and Sonnini into an error, is the faulty deſcription given by Gmelin, who never ſaw but a ſingle ſpecimen, probably disfigured, and which preſented to him only three toes, and a ſpur, or four toes. He is likewiſe miſtaken with reſpect to the manners of this animal, in aſcribing to it thoſe of the *lepus ogotona*; an error which has been ſince copied by the younger Gmelin. Meſſer-Chmidt, who had left a good deſcription of this animal, does not pretend to ſay that it had only four toes. It muſt be admitted then, that this ſpecies is entirely diſtinct from the other, which has three toes on the hiuder foot."

The Egyptian jerboa appears to be well diſtinguiſhed from the Siberian kind, by having only three toes on the poſterior feet inſtead of five. Both ſpecies are ſubject to varieties, both in ſize and colour, and alſo in their general habits of life.

Jaculus. Tail, very long, with ſubpennated black and white tip: poſterior legs large and five clawed. Pallas. *Alagtaga*, Schreber. *Siberian Jerboa*, Penn.

This agrees in appearance with the Egyptian Jerboa, but grows to a larger ſize: it is diſtinguiſhed principally by the remarkable character of the hind feet, each of which has a pair of very conſpicuous ſpurs, or additional toes ſituated at ſome diſtance above the front toes, and which are furniſhed with ſharp claws.

The colour of the Siberian jerboa or alagtaga is nearly the ſame as that of the Egyptian, but has no appearance of a duſky band acroſs the lower part of the back, or any tranſverſe undulations, the whole upper parts being of a pale yellowiſh fawn colour, and the under parts white. The length of the body is about eight inches, and of the tail ten. According to Dr. Pallas it is found from the Caſpian ſea to the Irtiſh, but is no where very frequent. It inhabits dry and ſandy ſoils. There are apparently two varieties of this ſpecies differing a little in ſize and colour, but not ſufficiently to conſtitute two ſpecies. The firſt is the middle Siberian jerboa which is the ſize of a rat, and has the thigh croſſed by a white line, and a whitiſh zone or circle ſurrounding the noſe; the other is the pigmy Siberian jerboa which reſembles the former but has no white circle round the noſe, and has a ſmaller tuft to the tail, and is tipped with white; its ſize is much inferior. Both inhabit the ſame countries, and agree in their habits of life, burrowing in hard clayey ground, not only in high and dry ſpots, but even in low and ſalt places. They dig holes with their fore feet and teeth forming oblique and winding burrows of ſome yards in length, and ending in a large hole or neſt, in which a ſtore of proviſion, conſiſting of herbs, is preſerved. They are ſaid to wander about chiefly by night, and to ſleep rolled up with the head between the thighs: they are extremely nimble, and on the approach of danger ſpring forward ſo ſwiftly that a man well mounted can ſcarcely overtake them. Theſe animals are ſaid to be particularly fond of the roots of tulips and other bulbous plants, and that during the winter, they ſleep in the manner of dormice.

Mr. Bruce is believed to allude to this ſpecies, when ſpeaking of the Arabs of the kingdom of Tripoli making good diverſion with the jerboa, in training their grey-hounds which they employ in hunting the gazel or antelope. The prince of Tunis, ſon of Sidi Youngis, and grandſon of Ali Bey, who had been ſtrangled by the Algerines, when that capital was taken, being then an exile at Algiers, made a preſent to Mr. Bruce of a ſmall grey-hound, which often gave him excellent ſport. "It may perhaps be imagined (ſays Mr. Bruce) that a chaſe between theſe two creatures could not be long: yet I have often ſeen, in a large incloſure or court-yard, the grey-hound employ a quarter of an hour before he could maſter his nimble adverſary: the ſmall ſize of the creature aſſiſted him much; and had not the grey-hound been a practiſed one, and made uſe of his feet as well as teeth, he might have killed two antelopes in the time he could have killed one jerboa."

Cafer. Ferruginous above, beneath pale-aſh: anterior feet five-toed, poſterior four: tail villoſe with black tip. *Palmis pentadactylis, plantis tetradactylis*, Schreber. *Jerboa capenſis*, Forſter. *Cape Jerboa*, Pennant.

The largeſt of the genus, and inhabits the mountainous country to the north of the Cape of Good Hope. Its length from the noſe to the tip of the tail near fifteen inches. The head is broad; the muzzle ſomewhat ſharp; and the upper jaw longer than the lower. The general colour of the animal is pale ferruginous above and pale aſh-colour beneath. The noſe is black, and bare to ſome little diſtance up the front; the ears large; whiſkers long and black; the tail is of the ſame colour with the body for half its length; the remainder blackiſh, and extremely hairy. It is an animal of great ſtrength and activity, and will ſpring to the diſtance of twenty or thirty feet at once. It burrows in the ground like the ſmaller kinds of jerboas with great care and expedition by means of its fore feet which are armed with ſtrong claws. It feeds like the ſquirrel ſeated on its haunches, and alſo ſleeps in that poſture; it makes a grunting noiſe; and is eaten by the natives. This animal is figured in the ſixth ſupplemental volume of Buffon's work. At the Cape it is known among the Dutch coloniſts by the name of *Springen Haas*, Jumping Hare.

Meridianus. Yellowiſh, beneath white: fore feet three-toed with the rudiment of another: poſterior feet five-toed: tail colour of the body. *Dipus meridianus*, Schreber. *Mus meridianus*, Pallas. *Jaculus palmis tetradactylis, plantis pentadactylis*, Erxleben. *Torrid Jerboa.*

According to profeſſor Pallas, this ſpecies was firſt figured by Seba, whoſe ſpecimen had not attained to full maturity. In 1770, Pallas received ſpecimens that were taken on the borders of the ſandy deſert of Naryn, between 46 and 47 degrees north latitude. The burrows which theſe animals formed in the dry ſoil had a triple entrance, and were about an ell deep in the ground. The ſize of the animal is between that of the common rat and field mouſe; and notwithſtanding the great length of the hind legs, it does not leap like the reſt of the jerboas, but runs in the manner of the rat tribe; and on this account Mr. Pennant places it in his diviſion of jerboid rats. The length, from the noſe to the origin of the tail, is rather more than four inches, and the tail itſelf exceeds three. The noſe is blunt, the mouth placed far beneath; the upper lip bifid; the ears large and rounded; the fore legs ſhort, with four toes, and a tubercle in place of a thumb; the hind legs long and ſlender; the exterior one

ſhorter

ſhorter than the reſt. The colour of the animal is brown above, and white beneath; the colours ſeparated along the ſides by a yellowiſh line.

TAMARICINUS. Fore feet three-toed; hind feet five-toed; tail tapering, and obſcurely annulated with brown, Schreber. Saeugth. *Mus tamaricinus*, Pallas. *Tamariſk rat*, Penn.

The length of this elegant animal is about ſix inches, meaſuring from the noſe to the tail, and the tail is nearly the ſame length; the head is oblong, with large whiſkers; the noſe blunt, with the noſtrils covered by a flap; the eyes large; ears large, oval, and naked; the ſpace round the noſe and eyes, and alſo beyond the ears, white; the ſides of the head and neck cinereous; back and ſides yellowiſh grey; breaſt and belly white; tail aſh-colour, and tinged more than half-way from the baſe with brown; the poſterior legs long in proportion to the fore legs, and the feet longitudinally black beneath; fore feet deſtitute of the thumb, but furniſhed inſtead with a warty tubercle.

This ſpecies inhabits the ſouthern parts of the Caſpian deſerts, and probably the warmer parts of Aſia; it delights in low grounds and ſalt marſhes, and burrows under the roots of the tamariſk buſhes, the fruit of which, together with the ſucculent maritime plants which it finds on the coaſts, conſtitute its principal food. Each burrow has two entrances, and is very deep; theſe animals are rarely ſeen, except in the night-time, when they quit their burrows in queſt of food.

CANADENSIS. Fore feet four-toed; poſterior five-toed; tail longer than the body, ringed, and briſtly. Jumping mouſe of Canada. Davies Mem. in Linn. Tranſ. *Canada rat*, Penn.

A ſmall ſpecies, apparently firſt deſcribed by general Davies, who had an opportunity of examining it during his reſidence in Quebec, and who has deſcribed it in the fourth volume of the Linnæan Tranſactions. The account is accompanied by drawings, repreſenting it both in its active and dormant ſtate, from two ſpecimens preſerved in the general's collection. With reſpect to the food, or mode of feeding of this animal, the general obſerves, it is not in his power to ſpeak with any degree of certainty; for though the firſt was taken alive, and lived a day and a half, it refuſed every kind of ſuſtenance, and the other was in a ſtate of torpidity when found, from which it never recovered. The firſt was taken in a large field near the falls of Montmorenci, and by its having ſtrayed too far from the ſkirts of the wood, allowed the writer, and three other gentlemen, to ſurround it, and after an hour's hard chaſe to capture it; the animal was much fatigued, and this, it is ſuppoſed, accelerated its death. During the time the animal remained in its uſual vigour, its agility was incredible for ſo ſmall a creature. It always took progreſſive leaps of from three to four, and ſometimes five yards, although ſeldom above twelve or fourteen inches from the ſurface of the graſs; but in ſhrubby places, and in woods among plants, where they chiefly reſide, they are obſerved to leap conſiderably higher. The example mentioned in a dormant ſtate was found by ſome workmen in digging the foundation for a ſummer-houſe in a gentleman's garden, within two miles of Quebec, the latter end of May. It was diſcovered incloſed in a ball of clay, about the ſize of a cricket ball, at the depth of twenty inches below the ſurface of the ground. This clayey covering was nearly an inch in thickneſs, and was broken by the ſtroke of a ſpade. It is preſumed theſe Canadian jerboas ſleep thus enveloped from the month of September till the end of May, or beginning of June following, and during that time take no ſuſtenance. The animal thus found, though preſerved in cotton, never revived; it is ſuppoſed that the heat of the apartment in which it was placed, and in which a ſtove fire was conſtantly kept burning, was too powerful for its reſpiration.

DIPYRE, in *Mineralogy*. The colour of this mineral is greyiſh or reddiſh-white, paſſing into roſe-red. It occurs either diſſeminated, or in ſmall faſcicular maſſes, or in minute priſmatic cryſtals. It has a brilliant vitreous luſtre, and a lamellar fracture parallel to the ſides of a regular hexahedron. It is moderately hard and brittle. Sp. gr. 2.63.

It is fuſible with ebullition before the blow-pipe, and is compoſed, according to Vauquelin's analyſis, of,

60	Silex.
24	Alumine.
10	Lime.
2	Water.
96	
4	Loſs.
100	

When pulverized and thrown on a hot coal, it gives a pale phoſphoric light. It occurs at Mauleon in the Pyrennées, imbedded in ſteatite.

DIPYRENON, from δὶς, and πυρὴν, a *berry*, in *Surgery*, the name of a probe, with a double button at the end, reſembling two ſmall berries growing together.

DIRACOUL, in *Geography*, a town of Aſiatic Turkey, in the Arabian Irak; 42 miles S. S. E. of Bagdad.

DIRÆ, called alſo *Deirea*, or *Deira*, a promontory and town on the ſouth-ſide of the ſtraits of Babelmandeb, in the Arabian gulf.

DIRÆ, in *Mythology*. See FURIES.

DIRCA, in *Botany*, Mouſe-wood or Leather-wood, (its derivation we are unable to explain.) Linn. Gen. 192. Schreb. 260. Willd. Sp. Pl. v. 2. 424. Mart. Mill. Dict. v. 2 Juſſ. 77. Claſs and order, *Octandria Monogynia*. Nat. Ord. *Vepreculæ*, Linn. *Thymelææ*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* monopetalous, club-ſhaped; tube ſwelling upwards; limb ſlight, with an unequal border. *Stam.* Filaments eight, capillary, unequal, inſerted into the middle of the tube, and extending beyond the border; anthers roundiſh, erect. *Piſt* Germen ſuperior, ovate, with an oblique point; ſtyle longer than the ſtamens, capillary; ſtigma ſimple. *Peric.* Drupa roundiſh. *Seed* roundiſh, ſolitary.

Eſſ. Ch. Calyx none. Corolla tubular, with a ſlight unequal limb. Stamens and ſtyle longer than the corolla. Drupa with one ſeed.

D. *paluſtris*. Linn. Amoen. Acad. v. 3. 12. t. 1. f. 7. Sp. Pl. 512. Kalm's Travels, v. 2. 148. Ait. H. Kew. v. 2. 27. Du Hamel Arb. v. 1. 211. t. 212. (Thymelæa floribus albis, primo vere erumpentibus: foliis oblongis acuminatis: viminibus et cortice valdè tenacibus, unde *Leather-wood* appellatur. Gron. Virg. ed. 1. 155.) Grows on hills bordering on ſwamps and rivers in North America, flowering in April, while the leaves are only budding. *Stem* five or ſix feet high, branched, very tough and pliant, with a ſmooth bark as tough as leather. Hence it is uſed for making ropes, baſkets, and ſimilar economical purpoſes. *Leaves* alternate, ſtalked, elliptical, entire, downy when young. *Flowers* three from each bud, pendent, on ſhort ſtalks. *Stamens* and *ſtyle* protruding far beyond the corolla.

DIRCE, in *Ancient Geography*, the name of a ſtream or fountain of Greece, in Boeotia, placed by Plutarch near Thebes,

Thebes, and ſaid by Pauſanias to diſcharge itſelf into the Hmenus. Pindar is ſaid to have had his houſe near the river Dirce.

DIRE, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 6 miles S. of Leipa.

DIREA, or DEIRA, a town of Greece, in Attica.

DIRECT, in *Arithmetic*. The rule of three direct is that oppoſite to the inverſe. See RULE *of proportion*.

DIRECT, in *Aſtronomy*. We conſider the planets in three ſtates; *viz.* direct, ſtationary, and retrograde. See PLANET.

They are ſaid to be direct, when they appear to move forward, according to the ſucceſſion of the ſigns; and retrograde, when they go the contrary way.

DIRECT, in *Matters of Genealogy*, is underſtood of the principal line, or the line of aſcendants and deſcendants; in contradiſtinction to the collateral line. See DESCENT.

A very good hiſtorian uſes the phraſe *direct* ſpeech, or harangue, when he introduces any one ſpeaking, or haranguing of himſelf: when the hiſtorian ſpeaks, and only rehearſes the chief points of what was delivered by the ſpeaker, it is called an *indirect* ſpeech.

DIRECT { *Erect* / *Eaſt* / *Weſt* } *dials*, are thoſe whoſe planes lie directly open to the eaſt, or weſt points of the heavens, or parallel to the meridian of the place. See DIAL.

DIRECT *ſouth*, or *north* { *Inclining* / *Reclining* } *dials*. See DIAL.

DIRECT, in *Muſic*, is a mark ſet at the end of a ſtaff, eſpecially at the foot of a page upon that line or ſpace where the firſt note of the next ſtaff is ſet.

DIRECT, in *Optics*. Direct viſion is that performed by direct rays; in contradiſtinction to viſion by refracted, or reflected rays. Direct viſion is the ſubject of optics, which preſcribes the laws and rules thereof. See VISION.

DIRECT *rays*, are thoſe which paſs in right lines from the luminary to the eye, without being turned out of their rectilinear direction by any intermediate body, either opaque or pellucid. See RAY.

DIRECT *ſphere*. See RIGHT *ſphere*.

DIRECTION, in *Aſtronomy*, the motion, and other phenomena, of a planet, when *direct*. See PLANET.

DIRECTION, in *Aſtrology*, is a kind of calculus, whereby they pretend to find the time wherein any notable accident ſhall befal the perſon whoſe horoſcope is drawn.

For inſtance, having eſtabliſhed the ſun, moon, or aſcendant, as maſters, or ſignificators of life; and Mars, or Saturn, as promiſers, or portenders, of death; the direction is a calculation of the time wherein the ſignificator ſhall meet the portender.

The ſignificator they likewiſe call apheta, or giver of life: and the promiſer, anereta, promiſſor, or giver of death.

They work the directions of all the principal points of the heavens, and ſtars, as the aſcendant, mid-heaven, ſun, moon, and part of fortune. The like is done for the planets, and fixed ſtars; but all differently, according to the different authors.

DIRECTION, *Iſlands of*, in *Geography*, four ſmall iſlands at the W. entrance of the ſtraits of Magellan, in the ſouth Pacific ocean. S. lat. 52° 27′. W. long. 77° 19′.—Alſo, a cluſter of iſlands on the eaſt coaſt of New Holland, three of which are within the paſſage or channel, through which Cook in 1770 paſſed into the open ſea beyond the reef, and which lies in S. lat. 14° 32′. They were ſo called, becauſe by theſe a ſtranger may find a free paſſage through the reef quite to the main. The largeſt, and the northernmoſt of the three, is called *Lizard* iſland, which ſee.

DIRECTION, *line of*, in *Gunnery*, was formerly marked on guns with a ſlit or cavity at the breech, and a button at the muzzle, ſo that they were directed in the ſame manner as fowling-pieces are; but as the platforms on which the cart carriages reſt are never laid ſo exactly level, but that one wheel is always higher than another, this line of direction muſt be falſe, and has, therefore, in modern practice, been laid aſide; and the centre-line of a piece is found every time it is fired, by a plummet, or inſtrument, which Mr. Muller complains of as a tedious and uncertain method; and he recommends reſuming the line of direction, as more expeditious, and more certain than the common practice. Syſtem of Math. vol. v. p. 90 and 230.

DIRECTION *of Motion*, in *Mechanics*, denotes the ſituation of the ſtraight line along which any particular motion is performed. Thus, let A B, (*Plate* XXII. *Mechanics*, *fig.* 3.) repreſent the two extreme points of a ſtraight line, and ſuppoſe that a body moves from A to B along that ſtraight line; then A B is ſaid to be the direction of the motion of that body. Should the body move from the point B to the point A; then B A is the direction of its motion, which is contrary to the former. The laws of motion, as explained by ſir Iſaac Newton, ſtate, that a body in motion will continue to move in a ſtraight line, unleſs it be compelled to change that direction, by a force or forces impreſſed, and independent of that which originally put it in motion. Therefore, when a body moves in a curve, it muſt be continually deflected from its ſtraight direction by the action of ſome other force, which conſtantly acts upon it; hence when a body moves in a curvilinear path, the direction of its motion is not ſaid to be that curve line; but it is ſaid that the body changes its direction at every point of its courſe, or continually. Conſequently the direction of a body ſo moving, at any particular point of its courſe, is the tangent at that particular point of the curvilinear path. In fact, if, when a body moves in a curve, the ſecondary force which acts upon it, beſides the original impulſe, ceaſes to act, then the body will fly off in the direction of the tangent at that particular point of the curve, at which the body ſtood when the ſecondary force ceaſed to act.

DIRECTION, *line of*, is a ſtraight line ſuppoſed to be drawn from the centre of gravity of that body to the centre of the earth; and if a body be left unſupported, it will fall, or move, downwards, in that direction; for ſince the momenta of all the particles of a body, that are on one ſide of its centre of gravity, are exactly equal to, or balanced by, the momenta of all the particles which are on the other ſide of that centre, it follows that the whole body muſt riſe or fall according as its centre of gravity riſes or falls: and when the body falls in conſequence of its own gravity, *viz.* in conſequence of its being attracted by the earth, the mutual forces of thoſe two bodies towards each other are concentrated in their centres of gravity; hence the body falls in the direction of the line which joins thoſe centres, or the line of direction. It will eaſily appear upon the leaſt conſideration, that the lines of direction of different bodies are not ſtrictly parallel; for they all converge towards the centre of the earth. Yet, with reſpect to any body, or ſyſtem of bodies, connected for mechanical purpoſes, the whole ſpace in which their particles are included and move is ſo very ſmall in proportion to the body of the earth, that their ſeveral lines of direction may, without any ſenſible error, be conſidered as perfectly parallel.

It is evident, from the preceding obſervations, that a body

may be ſupported by another body, when the latter is perpendicularly under the centre of gravity of the former; otherwiſe the former will fall off, or, in other words, a body will ſtand upon a baſe when its line of direction falls within that baſe, and not otherwiſe. This principle is generally and neceſſarily attended to in all movements either natural or artificial; as will be clearly illuſtrated by the following applications: A B E C, *fig.* 4, is an inclined body, ſay a block of ſtone, and H is its centre of gravity. H D is a perpendicular let fall from its centre of gravity, and of courſe is its line of direction; it being the ſtraight line which paſſes through the centre of gravity of the body and that of the earth. Now, ſince the line of direction H D falls within the baſe A C, the body will remain in that ſituation; but if an additional weight F B be laid upon it, the centre of gravity of the whole will be at I, and the line of direction I O will fall without the baſe, in conſequence of which the whole compound body A G will fall down. "Hence (Mr. Ferguſon obſerves) appears the abſurdity of people's riſing haſtily in a coach or boat when it is likely to overſet; for by that means they raiſe the centre of gravity ſo far as to endanger throwing it quite out of the baſe; and if they do, they overſet the whole effectually: whereas, had they clapt down to the bottom, they would have brought the line of direction, and conſequently the centre of gravity, farther within the baſe, and by that means might have ſaved themſelves."

This likewiſe ſhews the impropriety of building high carriages, like the very high phaetons that were in faſhion a few years ago.

If attentively conſidered, the whole motion of the body of an animal will be found to depend upon a proper regulation of the line of direction. When the line of direction falls within our feet; that is, within the baſe which is formed by our feet, we ſtand, and moſt firmly when that line falls in the very middle of that baſe; but we inſtantly begin to fall the moment in which the line of direction goes beyond that baſe. And it is curious to obſerve how nature, or our unſuſpected experience, inſtructs us in the uſe of thoſe methods and thoſe poſitions, which either maintain our neceſſary poſition, or reſtore it when loſt. When we riſe from a chair, we bend our bodies forward, by which means the line of direction falls forward beyond our feet, which obliges us to move a foot forward, in order to prevent the fall. For the ſame reaſon, a man leans forward when he carries a burthen on his back, but leans backward when he carries it on his breaſt; alſo he leans on one ſide when he carries a weight, as a pail of water, &c. on the oppoſite ſide. In walking, a man firſt extends his hindmoſt leg and foot nearly ſtraight, and at the ſame time bends the knee of his fore-leg a little; by this means his body is thruſt forward, and the line of direction from his centre of gravity falls beyond the fore-foot, on which account his fall would enſue, but he prevents it by immediately taking up the other foot, and putting it forward beyond the line of direction; after the ſame manner, he thruſts himſelf forward by extending the leg which is now the hindmoſt, till the line of direction be advanced beyond his fore-foot, when he again prevents his fall by advancing the other foot, and ſo forth.

In the ſituation of bodies of all ſorts this general principle muſt be attended to; namely, that the broader the baſe is, and the nearer the line of direction is to the middle of that baſe, the more ſteadily will a body ſtand upon it: and, on the other hand, the narrower the baſe is, and the nearer the line of direction is to the ſide of it, the more eaſily may a body be overthrown; for in this caſe the ſlighteſt change of poſition will throw the line of direction quite out of the baſe. Hence it follows, that a globular body is eaſily rolled upon a plain horizontal ſurface, and that it is extremely difficult to let an egg ſtand on one end, or any other pointed body ſtand upon its point.

We ſhall, laſtly, obſerve, that in caſe of bodies placed upon inclined planes, a body will ſlide down the plane, when its line of direction falls within its baſe, as in *fig.* 5; but the body will fall down, or roll, when its line of direction falls without its baſe, as in *fig.* 6.

DIRECTION, *Angle of*, is that comprehended between the lines of direction of two conſpiring powers.

DIRECTION, *Quantity of*, is uſed for the product of the velocity of the common centre of gravity in a ſyſtem of bodies, by the ſum of their maſſes.

In the colliſion of bodies, the quantity of direction is the ſame before and after the impulſe. Bernouilli, Diſcours ſur le Movement. Oper. tom. iii. p. 32, and 56.

DIRECTION *Chamber*, in *Commerce*. See CHAMBER.

DIRECTION, *Number of*, in *Chronology*. See NUMBER.

DIRECTING PLANE, in *Perſpective*. A plane paſſing through the eye (or point of ſight) parallel to the original plane, is called the directing plane; and the interſection of the original plane with the directing plane, is called the directing line.

There is a plane which is at the ſame time perpendicular to the original plane, to the plane of the picture, to the vaniſhing plane, and the directing plane; this is called the vertical plane, and its interſection with the directing plane is called by ſome writers the director of the eye. It is taken as the height of the eye above the original plane. The point in which the director interſects the directing line is called the ſtation point.

DIRECTIVE *Property of the Magnet*, is the power which the magnet or a magnetized body, has of placing itſelf in the magnetic line; provided it be left at liberty, or be ſo ſuſpended as to be able to move itſelf with freedom. The magnetic line in London is inclined by about 72° 30′ below the horizon, and the vertical plane of it, or through which it paſſes, cuts the horizon at an angle of about 24° from the north point of it towards the weſt. See MAGNETISM, COMPASS, and DIPPING *Needle*.

DIRECTLY, in *Geometry*; we ſay, two lines lie directly againſt each other, when they are parts of the ſame right line.

In *Mechanics*, a body is ſaid to ſtrike, or impinge directly againſt another, if it ſtrike in a right line perpendicular to the point of contact.

A ſphere, particularly, ſtrikes directly againſt another when the line of direction paſſes through both their centres. See PERCUSSION.

DIRECTOR, in *Commercial Polity*, a perſon who has the management of the affairs of a trading company: thus we ſay the directors of the India company, South-ſea company, &c. See BANK.

DIRECTORS *of Creditors*, in the *Commercial Policy of France*, are perſons of ability and property, choſen by votes of the creditors, to inſpect and examine the debtor's affairs, and to procure as far as poſſible, by common methods of juſtice, the payment of each perſon's debt. See ASSIGNEES.

DIRECTORS-*General* of the five great farms of the gabele and aids, &c. in France, are chief commiſſioners, who have the direction of theſe farms, each in the diſtricts appointed by the general farmers.

DIRECTOR, in *Surgery*, is a grooved inſtrument to conduct the ſurgeon's knife in ſeveral operations, which would otherwiſe endanger his cutting the ſubjacent parts. Directors are uſually made of ſteel or ſilver; and they vary

in ſhape, according to the form or ſtructure of the part to be operated upon. In ſome caſes the ſurgeon's finger is the beſt director. See CONDUCTOR.

DIRECTOR *Penis*, in *Anatomy*, a muſcle of the penis, called more uſually erector. See ERECTOR.

DIRECTORY *of Public Worſhip*, was drawn up by the aſſembly of divines at Weſtminſter, and eſtabliſhed by an ordinance of parliament, in 1644, repealing the ſtatutes of Edward VI. and of Elizabeth, for uniformity in the common prayer. The directory ſet aſide the uſe of the liturgy, and allowed of no church-muſic beſides that of ſinging the Pſalms.

Inſtead of one preſcribed form of prayer, the directory only points out certain topics, on which the miniſter might enlarge. The whole apocrypha was rejected; and both private baptiſm and lay baptiſm, with the uſe of god-fathers and god-mothers, and the ſign of the croſs, were diſcontinued. In the ſacrament of the Lord's ſupper, no mention is made of private communion or adminiſtering it to the ſick. The altar with rails was changed into a communion table, about which the people might ſtand or ſit; kneeling not being thought ſo proper a poſture. Lightfoot, Selden, and others were for open communion, to which the parliament alſo moſt inclined, in oppoſition to thoſe preſbyterians who were for granting powers of admiſſion or rejection to the miniſters and elders, and to the independents who were for committing them to the whole brotherhood; but it was agreed, that the miniſter, before the communion, ſhould warn, in the name of Chriſt, all ſuch as are ignorant, ſcandalous, prophane, or that live in any ſin or offence againſt their knowledge or conſcience, that they preſume not to come to that holy table, ſhewing them, that he that eateth and drinketh unworthily, eateth and drinketh judgment to himſelf. The prohibition of marriage in Lent, and the uſe of the ring, were laid aſide. In the viſitation of the ſick no mention is made of private confeſſion, or authoritative abſolution. No ſervice is appointed for the burial of the dead. All particular veſtments for prieſts or miniſters, and all ſaints-days were diſcarded. It has been remarked, as a conſiderable omiſſion, that the directory does not enjoin the reading of the apoſtles' creed, and the ten commandments. However, theſe were added to the aſſembly's confeſſion of faith, which was publiſhed a year or two afterwards. This directory continued in uſe till the reſtoration of king Charles II., when, the conſtitution being reſtored, the old liturgy took place again; the ordinance for its repeal having never obtained the royal aſſent. The revolution, thus occaſioned in the form of public worſhip, did not take place for a conſiderable time over the whole kingdom. In ſome parts of the country the church-wardens could not procure a directory; and in others they deſpiſed it, and continued the old common prayer book; ſome would read no form, and others uſed one of their own. In order to enforce the uſe of the directory, the parliament, by an ordinance, dated Auguſt 23, 1645, called in all common prayer books, and impoſed a fine upon thoſe miniſters who ſhould read any other form than that contained in the directory. Such, as Mr. Neale very juſtly obſerves, (Hiſt. of the Puritans, vol. ii. p. 109, 4to.) were the firſt fruits of preſbyterian uniformity, and they are equally to be condemned with the ſeverities and oppreſſions that had been the ſubjects of former complaints; for though it ſhould be admitted, that the parliament or legiſlature had a right to abrogate the uſe of the common prayer book in churches, was it not highly unreaſonable to forbid the reading of it in private families or cloſets? Surely the devotion of a private family could be no diſturbance to the public; nor is it any excuſe to ſay, that very few ſuffered by it, becauſe the law is ſtill the ſame, and equally injurious to the rights of mankind. By an ordinance, Auguſt 23, 1645, which continued till the reſtoration, to preach, write, or print any thing in derogation or depraving of the directory, ſubjected the offender, upon indictment, to a diſcretionary fine, not exceeding 50*l.* The king's proclamation at Oxford, dated November 13, 1645, forbidding the uſe of the new directory, and enjoining the continuance of the common prayer, was of no avail.

DIRECTORY *part of a Law*, ſtands much upon the ſame footing with the *declaratory* (which ſee); for this virtually includes the former; the declaration being uſually collected from the direction.

DIRECTRIX, in *Geometry*. See DIRIGENT.

DIRECTRIX *of the parabola*. See CONIC *Sections*.

DIRENKRUTT, in *Geography*, a town of Germany, in the archduchy of Auſtria, 5 miles S. E. of Ziſterſdorff.

DIRENOW, a river of Germany, in the circle of Upper Saxony, which runs from the Groſs Haff into the Baltic.

DIRIBITORES, among the Romans, officers appointed to diſtribute tablets to the people at the Comitia. See COMITIA.

DIRIBITORIUM, in *Roman Antiquity*, an immenſe building at Rome, which, according to Dion Caſſius, was the largeſt that was ever incloſed under one roof, and of ſuch ſize, that when it decayed by age, no perſon was able to repair it; and, therefore, it was quite open in the time of that hiſtorian. This building was begun by Agrippa, and finiſhed by Auguſtus. Its uſe has not been aſcertained; but it might probably have been intended for the accommodation of numerous aſſemblies of the people, when it would have been inconvenient, on account of heat, or cold, or rain, for them to have met together in places that were uncovered.

DIRIGENT, a term in *Geometry*, expreſſing the line of motion, along which a deſcribent line, or ſurface, is carried in the geneſis of any plane, or ſolid figure.

Thus, if the line A B (*Plate* VI. *Geometry*, *fig.* 80.) move parallel to itſelf, and along the line A C, ſo that the point A always keeps in the line A C, a parallelogram, as A B C D, will be formed, of which the ſide A B is the deſcribent, and the line A C the *dirigent*. So alſo if the ſurface A B C D be ſuppoſed to be carried along the line C E, in a poſition always parallel to itſelf in its firſt ſituation, the ſolid A D E H will be formed, where the ſurface A D is the deſcribent, and the line C E is the dirigent.

DIRIGOTHIA, in *Ancient Geography*, a town of Lower Mœſia, the ſame with Dirogetia, now *Drimago*.

DIRITTA, in the *Italian Muſic*, a term intimating that the piece is be played or ſung in conjoint degrees. Thus, contrapunto alla diritta, according to Angelo Berardi, is when one is obliged to raiſe or fall the voice by the ſame degrees, i. e. by an equal number aſcending or deſcending, without making a leap, even of the interval of a third. Broſs. Dict. Muſ. in voc.

DIRMSTEIN, in *Geography*, a town of Germany, in the circle of the Upper Rhine, and biſhopric of Worms; 7 miles S. S. W. of Worms.

DIRPHYS, in *Ancient Geography*, a mountain in the iſland of Eubœa.

DIRRITORF, in *Geography*, a town of Germany, in the archduchy of Auſtria; pillaged and deſtroyed in 1310; 3 miles N. of Steyr.

DIRSCHAU, a ſmall town of Pruſſia, on the Viſtula, ſituated in a very fertile country. It was built in 1209, and

had its own earls, when the knights of the Teutonic order invaded and conquered Pruſſia. Dirſchau is 15 miles S. of Dantzic, and ſince the peace of Tilſit forms a part of its dominions.

DIRSCHKEIM, a ſmall town of Pruſſia, in German Samland, in the diſtrict of Fiſchhauſen.

DIRT-BOAT, in *Canal-making*, &c. ſignifies a *Float*, or *flat-bottomed Boat*, generally with ſquare ends, and very ſhallow, uſed upon a canal for moving earth or other materials for the repair of the banks, &c. See CANAL.

DIRUTA, GIROLAMO, in *Biography*, organiſt of the cathedral at Chioggia in 1615, publiſhed in Italian at Venice, in fol. a book on muſic, entitled, "Il Tranſilvanſio," in dialogue between the author and his ſcholar, a prince of Tranſilvania. It contains inſtructions for playing the organ and other keyed inſtruments, with preludes by moſt of the celebrated organiſts of Italy at the time; but in theſe no keys are uſed but thoſe of the church, and all the paſſages conſiſt of running up and down the ſcale with both hands, alternately, without other intention than to exerciſe the fingers in the moſt obvious and vulgar diviſions then in uſe.

DIS, an inſeparable particle prefixed to divers words; the effect whereof is, either to give them a ſignification contrary to what the ſimple words had: as in diſgrace, diſparity, diſproportion, &c. or to intimate a ſeparation, detachment, diſtribution, &c. as in diſcerning, diſcourſing, diſtracting, diſpoſing, &c.

DISA, in *Botany*, (a name contrived by Bergius, poſſibly from Δις, *Jupiter*, to expreſs a female divinity, in alluſion to the magnificence and beauty of the flower, exceeding moſt of its tribe, and to preſerve an analogy with ſome others of that tribe, *Arethuſa*, *Cypripedium*, *Serapias*, &c.) Berg. Cap. 348. t. 4. f. 7. Linn. Suppl. 59. Schreb. 605. Willd. Sp. Pl. v. 4. 45. Juſſ. 65. Swartz. Orchid. 24. t. 1. f. B. Claſs and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

Gen. Ch. *Cal.* perianth of 3 leaves, generally reverſed; the two foremoſt nearly upright; the back one (which, from the uſual reverſe poſture of the flower, becomes foremoſt), nearly upright, concave or vaulted, producing from its central or bottom part, a poſterior ſpur. *Cor.* petals 2, ſmaller than the calyx-leaves, various in form, attached on each ſide to the columnar part of the ſtyle. Nectary or lip between the two foremoſt calyx-leaves, inſerted before the baſe of the ſtyle, deſtitute of a ſpur, and rarely divided. *Stam.* and *Piſt.* Germen inferior, oblong; ſtyle very ſhort; ſtigma in front, near the baſe of the ſtyle, globoſe; anther oblong, of two cells, parallel to the ſtyle, and connected with it lengthwiſe, erect or incumbent, bent back with the petals towards the ſpurred leaf of the calyx; pollen in two club-ſhaped glutinous maſſes, with a glandular baſe. *Peric.* Capſule oblong or obovate, triangular, of three valves and one cell, burſting at each angle, the top and bottom remaining entire. *Seeds* numerous, minute, roundiſh, each with a membranous tunic.

Eſſ. Ch. Calyx ſpreading, moſtly reverſed; one leaf ſpurred behind. Petals attached to the ſtyle. Lip without a ſpur. Anther parallel to the ſtyle.

Swartz enumerates 28 ſpecies of *Diſa*, all natives of the Cape of Good Hope, of which the firſt *D. grandiflora*, (*D. uniflora* of Bergius, who founded the genus,) is one of the fineſt of this natural order. Its flower is red, and elegantly veined. The maſſes of pollen are larger and more ſtriking than in any other of the *Orchideæ*. *Orchis draconis*, *biflora*, *flexuoſa*, *tenella*, *ſagittalis*, *barbata*, *tripetaloides*, *ſpatulata*, *bivalvata* and *patens* of Linnæus, are all removed by Swartz to this genus, as well as his *filicornis*, which ſeems to us ſcarcely diſtinct from the laſt.

DISABILITY, in *Law*, is when a man is made incapable to inherit lands, or take any benefit, which otherwiſe he might do, which may happen four ways; *viz.* by the act of the anceſtor; by the act of the party; by the act of law; and by the act of God.

DISABILITY *by the act of the anceſtor*, is where the man is attainted of treaſon, or felony; by which attainder his blood is corrupted, and thereby himſelf and his children are diſabled to inherit.

DISABILITY *by the act of the party himſelf*, is where a man binds himſelf by obligation, that upon the ſurrender of a leaſe, he will grant a new eſtate to the leſſee; and afterwards he grants the reverſion to another, which puts it out of his power to perform it.

DISABILITY *by the act of the law*, is when a man, by the ſole act of law, without any thing by him done, is rendered incapable of the benefit of the law: as, an alien born; ſo that if a man born out of the king's liegeance, will ſue an action, the tenant, or defendant, may ſay, he was born in ſuch a country out of the king's liegeance, and demand judgment, if he ſhall be anſwered: for the law is our birth-right, to which an alien is a ſtranger, and therefore diſabled from taking any benefit thereby.

DISABILITY *by the act of God*, is when the party is *non compos mentis*, or *non ſanæ memoriæ*, which ſo diſables him, that in all caſes where he gives, or paſſes any thing, or eſtate from him, after his death it may be annulled and avoided.

There are alſo other diſabilities by the common law, as of idiocy, infancy, and coverture, for making of grants, &c. and by ſtatute, as Papiſts are diſabled for making any preſentation to a church, &c. and officers not taking the oaths for holding offices.

DISABILITY *of the plaintiff, plea to.* See DILATORY *Pleas.*

DISABLED, in *Sea Language*, is applied to a ſhip, when, by the loſs of her maſts, yards, or rigging, or other damage, ſhe is rendered incapable of proſecuting her voyage, without great difficulty and danger.

DISABLING *a man's limbs or members*, in *Law*. See MAYHEM.

DISAFFORESTED. See DEAFFORESTED.

DISANDRA, in *Botany*, (of obſcure etymology, unleſs Linnæus meant *Dyſandra*, from δυς and ανηρ, alluding to the great uncertainty in the number of its ſtamens, and the conſequent difficulty of referring it to any of his claſſes, which induced him to place it in *Heptandria*, where it might moſt eaſily be ſeen; as was the caſe likewiſe with *Aponogeton*, Suppl. 33.) Linn. Syſt. Veg. ed. 13. 290. Suppl. 32. Schreb. 244. Willd. Sp. Pl. v. 2. 282. Mart. Mill. Dict. v. 2. Juſſ. 99. Claſs and order, *Heptandria Monogynia*. Nat. Ord. *Pedicularæ*, Juſſ.

Gen. Ch. *Cal.* Perianth bell-ſhaped, divided half-way down into from five to eight oblong, nearly ſtraight, ſegments, permanent. *Cor.* of one petal, wheel-ſhaped; tube very ſhort; limb in from five to eight deep, obovate, equal diviſions. *Stam.* Filaments five to eight, ſetaceous, ſomewhat ſpreading, equal, inſerted into the tube, ſhorter than the limb; anthers arrow-ſhaped. *Piſt.* Germen ſuperior, ovate; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma ſimple. *Peric.* Capſule ovate, the length of the calyx, of two cells. *Seeds* numerous, ovate.

Eſſ. Ch. Calyx in about ſeven diviſions. Corolla wheel-ſhaped, with about ſeven equal ſegments. Capſule ſuperior, of two cells, with many ſeeds.

D. *proſtrata*, Curt. Mag. v. 7. 218, (Sibthorpia peregrina; Linn. Sp. Pl. 880.) is the only ſpecies, a native of

Madeira, as well as of the Levant. The *ſtems* trail on the ground, or are pendent from rocks and ſtones in an elegant manner, clothed with alternate, ſtalked, kidney-ſhaped, crenate, downy *leaves*, and altogether reſembling the ſhoots of ground ivy. *Flower-ſtalks* axillary, cluſtered, ſingle-flowered, downy. *Bloſſoms* yellow. This plant is now become common in green-houſes, where it appears to advantage, as Curtis remarks, if placed on a pedeſtal, ſo that its branches may hang careleſsly down. It is eaſily propagated by cuttings, requires rich earth, and in dry weather plenty of water, bloſſoming throughout the ſummer, and indeed whenever the weather is favourable for any vegetation.

Shaw's *Chryſoſplenii foliis planta aquatica, flore flavo, pentapetalo*, Spec. Phyt. Afr. f. 149, on which Linnæus founded his *Sibthorpia africana*, Sp. Pl. 880, appears to be this very plant, not even a variety, except ſo far as the bad drawing of his figure makes it unlike nature.

DISAPPOINTMENT, in *Geography*, a bay on the N. W. coaſt of North America. N. lat. 52° 15′. W. long. 129°.

Disappointment *Iſland*, an iſland in the South ſea, ſo called by the Miſſionary voyagers in 1797, being one of the cluſter called by them "Duff's Group;" they are about 11 in number, lying in a direction S. E. and N. W. 14 or 15 miles: in the middle are two larger iſlands about ſix miles in circumference. On the N. W. ſide of the group are five or ſix more, ſome of which are high; and at the eaſt end of one of them is a remarkable rock in form of an obeliſk. The ſmall iſlands were apparently barren; but the two largeſt were entirely covered with wood, among which were ſeveral cocoa-nut trees; but, upon the whole, they exhibited no appearance of great fertility. The natives ſeemed to be ſtout and well made, with copper-coloured complexions: their houſes were built cloſe to each other, and not diſperſed, as in other places: a horde of their dwellings was ſituated on the S.W. ſide of Diſappointment iſland; in S. lat 9° 57′. E. long. 167°. Miſſ. Voyage, p. 296.

Disappointment, *Iſlands of*, a cluſter of iſlands in the South Pacific ocean, ſo called by commodore Byron in 1765, becauſe he found it impoſſible to procure at them any refreſhment for his ſick crew. The middle of this cluſter lies in S. lat. 14° 10′. W. long. 144° 52′. The variation of the compaſs was here 4° 30′ E.

DISARM, in the *Manege*. To diſarm the lips of a horſe, is to keep them ſubject, and out from above the bars, when they are ſo large as to cover them, and prevent the true preſſure or appui of the mouth, by bearing up the bit, and ſo rendering the horſe to feel the effects of it upon the bars.

Disarm. To diſarm a regiment is generally conſidered as a diſgrace, and uſually precedes its being diſembodied; becauſe, when the arms are only laid by for a while, they are ſaid to be depoſited; and when they are turned over to another corps, they are always ſuppoſed to be exchanged by the ſupply of new ones. We rarely hear of a regiment being diſarmed, except where mutiny has taken place, or that diſobedience is expected. In ſuch caſe the utmoſt precaution ſhould neceſſarily be taken; it being extremely difficult to induce ſoldiers to ſurrender their weapons; more particularly where they harbour miſchievous deſigns, or are under the influence of ſeditious perſons. Perhaps no mode is ſo efficacious as dividing them into ſmall parties, and diſarming them in detail.

When armies, or bodies of ſufficient force to entitle them to deference, are compelled to ſurrender, it is generally contended by them, that their arms, artillery, and baggage ſhould be allowed them. This admits of various modifications. In ſome inſtances, where prudence dictates to a conquering general not to make any difficulties, but to get rid of an enemy, at any rate, the foregoing terms have been allowed, and the vanquiſhed force has been allowed to march away with all the honours of war; that is, colours flying, drums beating, matches lighted, bayonets fixed, ſwords drawn, cannon untimbered, and, in fact, as though in a ſtate of defiance. In other inſtances, the honours of war are granted conditionally, and the proceſſion ceaſes after evacuating a fortreſs; when the garriſon march out, (but not away) in full diſplay, and at an appointed ſpot, ſurrender their artillery, and after grounding their arms, and taking off their pouches and belts, move from, and ſurrender them to the victors. But even here we have many varieties; it being ſometimes a condition that the officers ſhall retain their ſide arms; in others, that they ſhall retain them until embarked only, ſo as to ſave appearances for a while.

According to the modern mode of warfare, we ordinarily find but little ceremony uſed; for the moſt part the whole ſurrendering as priſoners of war, and all delivering up their arms without reſervation. It is, however, uſual, and no doubt proper, to grant ſome honourable diſtinctions to an enemy who has refrained from pillaging, and has carried on his operations with as little injury as poſſible towards the country in general. Formerly there were particular rules faſtidiouſly eſtabliſhed among the great commanders, not leſs formal than their court ceremonies; but ſince our enemies have laid aſide all feeling, generoſity, and humanity, it has become indiſpenſably neceſſary for our generals to diſarm their priſoners, and to be very circumſpect in granting any indulgence, or honourable type, to perſons who are inſenſible to the dignity and pride of the military profeſſion.

On the concluſion of a peace, it is uſual for both ſides to diſarm. We have divers laws for diſarming papiſts, and all recuſants. Under king George I. a law was made for diſarming the Highlanders; none of whom, except peers, or gentlemen of 400*l. per ann.* are to wear any arms in the field, on the road, or at market. 1 Geo. I. ſtat. 2. cap. 54.

The game law has, in effect, diſarmed all the common people of England, having under 100*l.* a year in landed eſtate, except the ſervants of lords of manors. Yet, by the ancient policy of England, the whole nation was obliged to bear arms. See Game *Laws*.

DISARRHENUM, in *Botany*, (from δις, *double*, and αρρην, a *male*, becauſe of the two lateral male florets,) a genus founded by La Billardiere, in his Novæ Hollandiæ Plantarum Specimen, of which he gives a plate and the following account. Claſs and order, *Polygamia Monoecia* (rather *Triandria Digynia*). Nat. Ord. *Gramina*.

Eſſ. Ch. *Cal.* Glume of two valves, containing three florets, the central one hermaphrodite, the two lateral ones male. The former has a *Corolla* of two valves, without awns; three ſtamens; two ſtyles; one ſeed: the latter have the outer valve of the corolla awned; and three ſtamens.

D. *antarcticum*. A graſs half a fathom and more in height, with a ſtriated *ſtem*, and ſquarroſe ſtriated *leaves*. *Stipula* torn. *Panicle* rather leaning to one ſide. The habit is that of a *Holcus*, and the author ſuſpects *H. latifolius* and *odoratus* of Linnæus may prove of this genus, and that *Ariſtida antarctica* of Forſter may be the very ſame plant.

DISBAND, in a *Military Senſe*, relates to the diſorganization of a body of men, by allowing the ſoldiers to retire from the ſervice; in contradiſtinction to *reducing* a battalion by draughting the men into other battalions. When a

corps

corps is disbanded, its colours are, in general, deposited in some public arsenal, and the drums, &c. are preserved in the state in which they are at the time of disbanding; especially if it be a regiment of the line; in order that the whole may be in readiness whenever the same number may be again brought upon the strength of effective regiments. In disbanded regiments the officers are put on half pay. In some services, when regiments have been disbanded, or rather *broke*, for bad behaviour, their colours have been burnt, and the numbers of those regiments kept vacant, no corps being allowed to supply the place of the disgraced regiments. But a regiment is not considered as disbanded until it has ceased in every case to be effective: then, when, in unfavourable climates a regiment may be so much reduced as to render it unfit for field service, it is usual to draught the privates, and to send the officers, serjeants, and corporals home with the colours, to recruit the corps to its former strength; in fact, to raise a new one. But if there should appear no further occasion for their services, the commissioned officers are placed on half pay, and the non-commissioned are removed to some other regiment. This is literally *disbanding*, and can only take place by order of his majesty; it not being within the authority of any other person to abrogate the king's commission; though generally, on foreign stations, discretionary power is vested in local commanders in chief to approve, and to carry into effect, the sentences of courts-martial, whereby those officers who trespass against the articles of war may be deprived of their commissions, or eventually suffer capital punishment.

The disbanding of a corps is attended with some form. The king's commission is usually read on the parade, by the governor, or deputy-governor, of the fortress, or by the commanding officer of the district, and the colours are marched away under a guard; the arms and the accoutrements, together with the stores, being all delivered up to persons appointed to receive them. The soldiers receive their written or printed discharges, and are, in some cases, forwarded to their respective homes at the public expence; the billets are cancelled, and the whole disperse. This scene cannot be witnessed without some emotion: men who have sustained their country's honour, and who are mutually indebted to each other's personal prowess, for succour in the hour of danger, associated too for probably many, many years, cannot but feel, intermingled with the joy of approaching their long estranged families, some reluctance at the separation from each other, and from officers who had gained their affections by kindness, and good example!

DISBOSCATION, Disboscatio, a turning wood-ground into arable or pasture, an assarting. See Assart.

DISBURDENING *of* Trees, in *Gardening*, the taking off leaves and fruits when too numerous, that those left may grow the larger.

DISC, or Disk, *Discus*, in *Antiquity*, a kind of round quoit, or a piece of stone, or metal, or wood, about a foot over, used by the ancients in their exercises.

The discus of the ancients was flat and round, resembling the apparent figure of the sun.

The exercise of the discus was one of those practised in the solemnities of their public games; it consisted in pitching, or throwing a discus either upward, or straight forward; and he who threw it highest, or farthest, bore away the prize.

Those who practised at this game were called *discoboli, i. e.* throwers of the discus.

The poets tell us, that Hyacinth, a favourite of Apollo, playing at the discus with that god, was killed by a blow of Apollo's discus, which his rival Zephyrus diverted from its course, and cast on the boy's head.

The discus was thrown by means of a little cord made of hair, as appears from Claudian, lib. ii. in Eutrop. carm. 20. ver. 359, et seq. Ovid describes this sport, Metam. lib. x. ver. 175. The Romans learnt the game of the discus of the Greeks, and practised it among themselves. Dempster, Paraleip. in Rosin. Antiq. Rom. lib. v. cap. 1. and Pet. Faber. Agonisticon, lib. ii. cap. 1. treat of the diversion of the discus.

Disc, or *Disk*, in *Astronomy*, the body or face of the sun, or moon; such as it appears to us. For, though they are really spherical bodies, they are apparently circular planes.

The disc is conceived to be divided into twelve equal parts, called digits; by means whereof it is that the magnitude of an eclipse is measured, or estimated. See Digit and Eclipse.

Disc, *illuminated, of the earth*. See Circle *of illumination*.

Disc, in *Optics*, the magnitude of a telescope glass; or the width of its aperture, whatever its figure be, whether a plain, convex, meniscus, or the like.

Disc, in the Greek *Liturgy*, is nearly the same thing with the patena in the Latin. See Patena.

In the Greek church, the consecrated bread is laid on a discus, as in the Latin church it is on a patena. The discus only differs from the patena, in that it is bigger and deeper, as resembling a plate, which was the proper signification of the word discus among the ancients.

DISCALCEATED, (Discalceati, unshod,) certain orders or reformations of friars and nuns, so called from their going bare-footed, or using sandals instead of shoes.

DISCANT, in *Music*, from *discantus*, Lat. sounding twice. The English verb, *to descant*, is derived from the Fr. *déchant*, which means the same thing. About the time that the organ was received in churches and convents, the Gregorian chant, or plain-song, began to be organized by voices, in the manner which was afterwards called discant, and the simultaneous correspondence of that harmonical series which constitutes concert, or music in different parts, has been variously expressed by writers on the subject, since it was first suggested. The most ancient names given to it by Hubald, Odo, and Guido, are diaphonia, and organum; and discantus, triplum, quadruplum, diatessaronare, quintoier, motetus, medius, and tenore, are all words that preceded the term counterpoint. As those implied singing upon a plain song, extempore; and contrapunctum, written harmony.

The most ancient authority which Du Cange gives for the use of the word discantus, discantare, is from Hugotio of Vercelli, bishop of Ferrara, and the first definer of decretals, who died 1212. This author says, "decantare est valde cantare, discantare et excantare, id est, discantare." It is called by Guido, in his Micrologus, organum, and organizare, according to Du Cange, is canere in modum organi; and among his authorities, he gives the following definition from the catholicon, or lexicon, of John de Janua, written in 1286; "Organizare organo cantare; jouer ou chanter en orgres, organisor, to play or sing like the organ."

The subject of the fifth chapter of Franco's tract in the Bodleian library, Oxon, in discant, and the agreement of different voices. Discant, in the infancy of what was afterwards called counterpoint, and, in old English, faburden, implied a double chant or melody.

There are several curious particulars concerning discant in the writings of the celebrated Gerson, chancellor of the church and university of Paris at the beginning of the 15th century.

century. According to him, the ground-work of all diſcant was the plain chant; and, in his treatiſe of the education of children for the choir of Notre Dame, he enjoins a particular attention to chanting, counterpoint, and diſcant, as the three moſt eſſential branches of their ſtudy.

Diſcant, by the Italians, is called contrappunto alla mente, or extemporaneous harmony. Padre Martini, "ſaggio di contrappunto," heard this kind of harmony, a quattro voci, in four parts, produced in great perfection in the church of St. John Lateran, in Rome, 1747. It is called by the French "Chant ſur le livre." To compoſe a part upon ſeeing only the chant upon which it is to be built is very difficult, and requires, ſays Rouſſeau, great knowledge, habit, and quickneſs of ear in thoſe who practiſe it; and the more ſo, as the key is not always ſo eaſily found as in modern muſic. However, there are muſicians in the church ſo well verſed in this kind of ſinging, that they lead off, and even carry on, fugues extempore, when the ſubject will allow it, without confounding or encroaching upon the other parts, or committing a ſingle fault in the harmony.

DISCEIT, in our *Old Writers*. See DECEIT and DECEPTIONE.

DISCERI, in *Ancient Geography*, a people inhabiting the interior of Africa, ſaid by Pliny to have been ſubdued by Cornelius Balbus.

DISCERNING, an act of the mind, whereby it diſtinguiſhes between ideas.

On this faculty of diſcerning depend the evidence and certainty of ſeveral, even general propoſitions, which paſs for innate truths; and which in reality flow from this clear diſcerning faculty of the mind, whereby it perceives two ideas to be the ſame, or to be different.

In being able nicely to diſtinguiſh one thing from another, where there is the leaſt difference, conſiſt in great meaſure that exactneſs of judgment, and clearneſs of reaſon, which are to be obſerved in one man above another; which are quite oppoſite to wit: this conſiſts moſt in the aſſemblage of ideas, and putting thoſe together with quickneſs and variety, which have the leaſt reſemblance to form agreeable viſions: whereas judgment ſeparates carefully thoſe ideas, wherein can be found the leaſt difference, to prevent error and deluſion. To the well diſtinguiſhing of our ideas it chiefly contributes, that they be clear and determinate; and when they are ſo, there will not ariſe any confuſion, or miſtake about them, though the ſenſes ſhould convey them from the ſame object differently on different occaſions. See JUDGMENT.

DISCEUS, or DISCIFORMIS *Cometa*. See DISCUS.

DISCHARGE, in *Electricity*. See CHARGE.

DISCHARGE, in *Law*, on writs and proceſs, &c. is, where a man is confined by ſome legal writ or authority, and doth that which by law he is required to do, he is releaſed or *diſcharged* from the matter for which he was confined. If one be arreſted by a *latitat* out of B. R., and the plaintiff do not file a declaration againſt the defendant in priſon in two terms, he ſhall be diſcharged on common bail. (1 Lil. Abr. 470.) Alſo where a defendant on arreſt is admitted to bail, if the bail bring in the principal before the return of the ſecond *ſcire facias*, iſſued out againſt them, they ſhall be diſcharged. If an obligee diſcharges one joint obligor when ſeveral are jointly bound, it diſcharges the others. (Merch. 129.) And a man may diſcharge a promiſe made to himſelf, &c. (Cro. Jac. 483.) See ACQUITTAL, CHARGE, HABEAS CORPUS, &c.

DISCHARGE, in *Military Language*, is the diſmiſſion of a ſoldier from the troop or company to which he belonged, either by his own requeſt, or when after long and faithful ſervice, he is entitled to his majeſty's bounty. See DISMISS.

DISCHARGE, *To*, in *Sea Language*, ſignifies to unload a ſhip, or take out her ſtores, ammunition, artillery, &c. When applied to the crew, it implies to diſband them from immediate ſervice.

DISCHARGE *of Fluids* through apertures, orifices, &c. The various important particulars which demand attentive conſideration relative to the diſcharge of fluids through apertures made in the ſides of veſſels in which thoſe fluids are contained; are the quantity of fluid diſcharged in a given time through a given aperture; the form, direction, impetus, and velocity of the ſtream; and the forms of apertures, pipes, &c. the moſt advantageous for anſwering particular purpoſes. The obvious extent and importance of the ſubject have induced the greateſt philoſophers and mathematicians of the laſt century or two, to exert themſelves in the inveſtigation of the above-mentioned particulars; and if our preſent knowledge of the ſubject has not as yet attained its ultimate degree of perfection; it muſt, however, be acknowledged, that the mathematical theory of hydraulics, aſſiſted by the known reſults of practical inveſtigations or experiments, is now capable of foretelling the reſult of any particular new conſtruction, in ſome caſes *exactly*, and in moſt others ſo very near the truth, as to differ from it by at moſt one-fifth of the whole. In this ſubject, the determinations of the theoretical propoſitions do not in general agree with the reſults of actual experiments; not on account of any defective demonſtration, but becauſe the demonſtrations cannot be eſtabliſhed upon all the concurring circumſtances; ſome of which are of a fluctuating nature, whilſt the extent of others is either not known or cannot be duly appreciated. Thoſe circumſtances are the peculiar qualities of fluids, which vary according to homogeneity, purity, temperature, &c; the attraction of aggregation, or corpuſcular attraction, which differs conſiderably in water, oil, mercury, &c; the friction againſt the ſides of the veſſels; the reſiſtance of the air; the ſize of the veſſel in proportion to the aperture through which the fluid iſſues; the ſhape of the aperture; the different directions in which the various parts, or (as they are otherwiſe called) the various *filaments*, of the fluid are obliged to run towards the aperture; and the vortices or irregular motions, that are communicated to the fluid by a variety of cauſes; even by an obſtacle preſented to the ſtream at ſome diſtance from the aperture. However, it muſt be acknowledged, that the conſtant attention which is paid to the reſults of experiments renders the theory daily more extended and more preciſe.

For the ſake of perſpicuity, we ſhall ſeparate the theoretical propoſitions from the experimental part; but conſidering the intricacy, and at the ſame time, the inſufficiency of the theory, we ſhall only ſtate the leading theoretical propoſitions; referring at the ſame time the inquiſitive reader to other works written expreſsly on the ſubject; and ſhall then add, in a more extenſive manner, an account of the moſt uſeful experimental inveſtigations, whence the reader may be enabled to adopt the moſt uſeful practical deductions, without his being perplexed by intricate, and in moſt caſes inſufficient calculations.

Propoſition I. When water, or other non-elaſtic fluid, runs through a pipe or tube of an uniform ſhape; equal quantities of it paſs through every parallel ſection of the tube; *viz.* the water runs with equal velocity through every one of thoſe ſections.

This is ſo very evident, conſidering that the ſame quantity of fluid muſt paſs through the ſame ſection in the ſame time, as to require no farther illuſtration; but it muſt be obſerved,

obſerved, that though the water runs with the ſame velocity through every ſection of the tube, yet it does not run with equal velocity through every part of the ſame ſection. Its motion is ſwifter towards the middle, and ſlower towards the ſides of the tube, where it is retarded by the friction againſt the ſides.

Propoſition II. When water, or other non-elaſtic fluid, runs through a pipe or tube, which is kept continually full by means of a proper ſupply; but which is not of an uniform ſhape; then the velocities of the fluid in different ſections will be inverſely as the areas of the ſections.

Since the tube is always full, the ſame quantity of water muſt paſs through every ſection of it in the ſame time; but if the area of one ſection be half as great as the area of another ſection, the ſame quantity of water cannot paſs through both ſections at the ſame time, unleſs it paſſes through the former ſection with double the velocity with which it paſſes through the latter. If the area of the former ſection be one-third or one-fifth, of the area of the latter, the ſame quantity of water muſt paſs through the former with a velocity which is three times or five times the velocity with which it paſſes through the latter. Hence, in general, the velocities muſt be inverſely as the areas of the ſections.

Propoſition III. If a fluid, as water, flowing through a very ſmall orifice in the bottom of a veſſel, be kept conſtantly at the ſame height in the veſſel, by being ſupplied as faſt above as it runs out below, the velocity of the effluent fluid will be equal to that, which a heavy body would acquire in falling freely through the height of the fluid above the orifice.

Let M N O P, *Plate* I. *Hydraulics*, *fig.* 6, repreſent a veſſel filled with a non-elaſtic fluid up to the level G H; M P the bottom in which is the aperture C D (very ſmall in compariſon with M P); C I K D the column of the fluid ſtanding directly above the aperture, and C A B D the loweſt plate of the fluid immediately contiguous to the aperture. Alſo let v denote the velocity which a heavy body would acquire in falling freely through B D, the height of the plate, and V the velocity acquired by the ſame plate during its deſcent through the ſame ſpace until it is diſcharged by the preſſure of the column C I K D. If we ſuppoſe the loweſt plate of fluid A C B D to fall as a heavy body through the height B D, its moving force will be its own weight. Again, ſuppoſe it to be accelerated by its own weight, together with the preſſure of the ambient fluid, about the column C I K D; *viz.* by the weight of the column C I K D, through the ſame ſpace; that is, while it is accelerated from quieſcence until it is actually diſcharged: then (agreeably to the eſtabliſhed laws of dynamics) the velocity in the former caſe will be to that in the latter, as the moving forces and the times in which they act directly, and the quantities of matter moved inverſely. See DYNAMICS. But the moving forces are to each other as the heights B D and K D; the times in which they act are inverſely as the velocities, the ſpace through which the body is accelerated, being given; and the quantities of matter moved are equal: therefore, $v : V :: \frac{BD}{v} : \frac{KD}{V}$; whence $v^2 : V^2 :: BD : KD$; or $v : V :: \sqrt{BD} : \sqrt{KD}$. Now v is the velocity which a heavy body would actually acquire in falling through the ſpace B D; conſequently V the velocity of the effluent fluid is that which a heavy body would acquire in falling through K D, the whole altitude of the fluid above the orifice.

Corollaries.

1. In the ſame manner it may be ſhewn, that if a pipe be inſerted horizontally in the veſſel M N O P, *fig.* 7, the plate of fluid A C B D will be diſcharged with the ſame velocity as before (if its centre of preſſure be of the ſame depth), whatever be the thickneſs of the plate; this velocity not depending upon a continual acceleration through the length of the tube, otherwiſe the effluent fluid could not attain its full velocity, until a column had been diſcharged whoſe baſe is equal to the orifice, and height equal to the length of the tube: whereas we find by experience, that this full velocity can be attained by the thinneſt plate which can be let eſcape from the aperture.

2. The velocities and quantities diſcharged at different depths, are as the ſquare roots of the depths.

3. The quantity run out in any time is equal to a cylinder, or priſm, whoſe baſe is the area of the orifice, and its altitude the ſpace deſcribed in that time by the velocity acquired by falling through the height of the fluid.

So that if h denote the height of the fluid,

a, the area of the aperture,

g, $32\frac{1}{6}$ feet, or 386 inches, and

t, the time of efflux; we ſhall have for the quantity diſcharged, $Q = at\sqrt{2gh}$;

Or, when a and h are expreſſed in feet, $Q = 8.0208\, at\sqrt{h}$, feet.

When a and h are expreſſed in inches, $Q = 27.7387\, at\sqrt{h}$, inch.

If the orifice is a circle whoſe diameter is d, then $0.785398\, d^2$ muſt be ſubſtituted for a;

And when d and h are expreſſed in feet, $Q = 6.29952\, d\sqrt{h}$, feet.

When d and h are expreſſed in inches, $Q = 21.78592\, dt^2\sqrt{h}$, inches.

And from either of theſe it will be eaſy to find either a, t, or h, when the other three quantities are given.

4. The force with which the effluent water impinges againſt any quieſcent body, is proportional to the altitude of the fluid above the orifice. For the force is as the velocity multiplied by the quantity of matter; but the quantity diſcharged in a given time is as the velocity; therefore the force is as the ſquare of the velocity; that is, by the demonſtration of the propoſition, as the height of the fluid.

5. The water ſpouts out with the ſame velocity whether it be downwards, or upwards, or ſideways; becauſe the preſſure of fluids is the ſame in all directions at the ſame depth.

6. Hence, if the *adjutage* (*viz.* the laſt appendage or termination affixed to the aperture) be turned upwards, the jet will aſcend to the height of the ſurface of the water in the veſſel. In practice, however, the jet is found to be ſhorter than the height of the fluid in the reſervoir; which is owing to the friction of the fluid againſt the ſides of the aperture, and againſt the ſurrounding air. The difference between the height of the jet and that of the fluid in the veſſel or reſervoir, will be ſhewn under the article JET.

It is now neceſſary to obſerve the ſame thing that has been already obſerved in propoſition I. *viz.* that the velocities of the effluent water, as mentioned in this propoſition and its corollaries, muſt be underſtood of thoſe filaments only of the fluid which paſs through the centre of the aperture, which are ſuppoſed to ſuffer no retardation; for thoſe filaments which paſs by the ſides of the aperture are conſiderably retarded by the friction againſt thoſe ſides, and other circumſtances, in conſequence of which they produce a remarkable configuration of the ſtream, which will be deſcribed hereafter.

Propoſition IV. When a veſſel is left to diſcharge itſelf gradually through an orifice in its bottom, if the area of the ſection

ſection parallel to the bottom be every where the ſame, the velocity of the ſurface of the fluid, and, conſequently, the velocity of the efflux, will be uniformly retarded.

For (by Prop. II.) the velocity of the deſcending ſurface is to the velocity at the ſurface, as the area of the orifice to the area of the ſurface, which is a conſtant ratio; conſequently, the velocity of the deſcending ſurface varies as the velocity at the orifice, or as the ſquare root of h; that is, the velocity of the deſcending ſurface varies as the ſquare root of the ſpace which it has to deſcribe: ſo that this exactly correſponds with the caſe of a body projected perpendicularly upwards, where the velocity is as the ſquare root of the ſpace to be deſcribed: whence, as the retarding force is conſtant in the inſtance referred to, it muſt alſo be conſtant in the caſe before us, and the retardation uniform. From this compariſon we deduce the following obvious corollaries.

1. The quantities of water in a priſmatic veſſel diſcharged through an aperture in the bottom, decreaſe in equal times as the ſeries of odd numbers 1, 3, 5, 7, 9, &c. taken in an inverted order.

2. The quantity of water contained in an upright priſmatic veſſel is half that which would be diſcharged in the time of the entire gradual evacuation of the veſſel, if the water be kept always at the ſame altitude.

Whoever wiſhes to examine the theoretical part of the preſent ſubject more at large, may conſult the following works. S'Graveſande, Nat. Phil. Jo. Bernouilli on the motion of water in pipes, C. Peter. IX. X. Euler on the motion of water in pipes, A. Ber. 1752. Alſo his Principles of Hydraulics, ibid. 1755. On the re-action of water in pipes, N. C. Peter. VI. Raccolta di autori che trattano del moto delle acque, Flor. 1725, which contains the inveſtigations of Archimedes, Albici, Galileo, Caſtelli, Michelini, Borelli, Montanari, Viviani, Caſſini, Guglielmi, Grandi, Manfredi, Picard, and Nanducci. Borda on the diſcharge of fluids. A. P. 1766. Lagrange on the motion of fluids, A. Berl. 1781. M. Young on ſpouting fluids, Iriſh Tranſ. 1788. Prony Archit. Hydraulique. Lorgna on ſpouting fluids, Soc. Ital. IV. Venturi ſur la communication laterale de mouvement dans les fluides. Par. 1798. Young on the diſcharge of a vertical pipe. Journ. R. J. Boſſut's Hydrodyn. Gregory's Mechanics. b. 4. c. 1.

We muſt now proceed to treat of the experimental part of the preſent ſubject; and with reſpect to this we ſhall only advert to the more important experiments and the moſt uſeful reſults.

The ſtream of water which iſſues out of a hole tends to carry away in its direction any other fluid, or any other body ſufficiently light, which may happen to be near it. This is what profeſſor Venturi calls *the lateral communication of motion in fluids*. But by this lateral communication of motion to contiguous bodies, the celerity of the fluid itſelf is checked more or leſs, and its courſe is partly diverted from that direction which it would otherwiſe follow. Thus, in *fig.* 8, which repreſents the upper ſurface of two veſſels contiguous to each other, and full of water, as high as the hole or aperture A. If by pouring more water into the veſſel B, a ſtream of water be cauſed to flow through A, into the veſſel C, this ſtream will carry away the water from the parts *e e*, towards C. But the depreſſion, or deficiency, of water at *e e*, is replaced by the water from the adjacent parts *d d*, which are repleniſhed from the next, and ſo on. This produces eddies at *e d*, *e d*. This phenomenon may be rendered more apparent by throwing a little milk into the veſſel B, or by letting ſmall light bodies float upon the ſurface of the water.

When a ſtream comes out of a hole, as at A, *fig.* 9, if a thread, a feather, or other light body be placed very near it, the tendency of the ſtream to carry it towards B may be clearly perceived. This tendency is ſtill more evidently ſhewn by the following experiments.

Let a veſſel, open at top, be made of the form of the lateral repreſentation A D B, *fig.* 10, having one ſlant ſide. Let a cylindrical pipe, of about half an inch in diameter, and upwards of a foot in length, proceeding from a veſſel C, come ſtraight down into the veſſel A D B, and there let its termination F S be bent in the direction of the ſlant ſide B D. This done, fill the veſſel A D B with water, then pour water into the veſſel C, ſo that the water running down the pipe E F S, may form the jet S K. It will be found that the water of the veſſel A D B is carried away by the ſtream S K, and this veſſel is thereby almoſt entirely emptied.

To an aperture on the ſide of the veſſel A B, *fig.* 11, a pipe 1.6 inch in diameter, and little more than five inches in length, was adapted in an horizontal direction by profeſſor Venturi. At E, diſtant 0.71 inch from the ſide of the veſſel, a bent glaſs tube, E F G, was joined, whoſe cavity was opened into that of the pipe, whilſt its other extremity was immerſed in coloured water, which was contained in a ſmall veſſel G.

When, by pouring water into the veſſel A B, a ſtream was made to flow out at D, the coloured water was ſeen to riſe conſiderably in the lower leg of the glaſs tube. The experiment being repeated when the deſcending leg F G of the glaſs tube was only 6.4 inches longer than the part E F; the coloured water of the veſſel G roſe through the glaſs tube, and mixing with the other water, flowed with it out of the pipe at D; and in a ſhort time the veſſel G was emptied.

This lateral communication of motion takes place whether the diſcharging pipe is directed horizontally, or upwards or downwards, or, in ſhort, in every direction, but it is more powerful when the ſtream is directed downwards, which is owing to the tendency that a deſcending ſtream has of dividing itſelf in conſequence of the acceleration of falling bodies; for that part of the ſtream which is juſt out of the aperture moves with leſs velocity than that which is farther off. When water runs out of an aperture in the thin ſide or bottom of a veſſel, as at A *fig.* 9. the ſize of the aperture being very ſmall in proportion to the ſide or bottom of the veſſel; the ſtream A B is not throughout of the ſhape of the aperture, nor is it of an uniform ſize. When the aperture is circular, the diſtance of the narroweſt part of the ſtream, from the inſide ſurface of the veſſel, is about equal to the diameter of the aperture. This narroweſt part of the ſtream has been called the contracted vein (*vena contracta* by Newton, who firſt took particular notice of it) from which place forwards the ſtream grows larger, and ſometimes divides itſelf into different parcels.

The diameter of the contracted vein, or of the narroweſt part of the ſtream, has been differently eſtimated by different obſervers: and probably the difference has been occaſioned by ſome unadverted variation in the ſize of the veſſel, thickneſs of the ſide in which the aperture was made, &c.—Newton found that at the diſtance of about a diameter of the orifice the ſection of the contracted vein was nearly in the ſubduplicate ratio of 2 to 1. Polenus makes the ratio of the diameters of the contraction and of the aperture to be as 11 to 13; Bernouilli, as 5 to 7; Du Buat, as 6 to 9; Boſſut, as 41 to 50; Eytelwein, as 16 to 25; Michelotti, as 4 to 5. Venturi nearly as 4 to 5. Venturi alſo obſerves that the contraction of the ſtream takes place at a greater diſtance

under

under ſtrong charges than in thoſe which have but little elevation. Michelotti alſo found that the ſtream was a little more contracted as the velocity was greater.

This contraction of the ſtream is undoubtedly owing to the various directions in which the fluid comes along the ſides and from every part of the veſſel, towards the aperture; and, in fact, when the aperture is very large in proportion to the ſize of the veſſel, the contraction of the ſtream is leſs apparent. Alſo, if the aperture be not in a plate ſufficiently thin, the vena contracta will not be perceived; for ſince the diſtance of that contraction from the inner ſurface of the veſſel is about equal to the diameter of the aperture, if the thickneſs, or rather the length of the aperture, exceed its diameter, as when a pipe is added to the aperture: then the contraction, or the tendency to form the contraction, takes place within the length of the aperture or pipe.

The various filaments of the fluid, which run from every part of the veſſel in oblique directions towards the aperture, partly croſs each other at the *vena contracta*; and this croſſing, or tendency to croſs, is one of the cauſes which enlarge the ſtream beyond that place.

The velocity of the water is not the ſame in every part of the ſtream; for ſince the ſame quantity of water muſt paſs through every tranſverſe ſection of it in a given time, the velocity (by prop. II.) muſt be inverſely as the area of each ſection. Therefore at the *vena contracta* the velocity is greater than at the aperture; and, indeed, in the different caſes this reduced area of the *vena contracta* ſhould be conſidered as the real area of the orifice through which the fluid iſſues, and its vertical diſtance from the upper ſurface of the fluid in the reſervoir as the height due to the velocity of the fluid iſſuing through this contraction, which, as has been already obſerved, is ſuch as a body would acquire by falling perpendicularly from the height of the fluid in the veſſel; whereas the velocity at the aperture itſelf is ſuch as a body would acquire by falling perpendicularly from the *half* of that height.

With reſpect to the quantity of fluid diſcharged, Mr. Boſſut's experiments, which were made with peculiar accuracy, demand particular notice. They are expreſſed in the following table, which exhibits the quantity of fluid diſcharged through orifices pierced in thin plates; in meaſures of the Paris foot royal, which is to the Engliſh foot, as 1066 to 1000. Boſſut's Hydrodyn. t. ii. p. 47.

Conſtant altitude of the Water in the Reſervoir above the Aperture, in Paris Feet.	Theoretical Diſcharges in one Minute, through a circular Aperture of Tin, Diameters expreſſed in cubic Inches.	Real Diſcharges in the ſame Time, through the ſame Orifice, expreſſed alſo in cubic Inches.
1	4381	2722
2	6196	3846
3	7589	4710
4	8763	5436
5	9797	6075
6	10732	6654
7	11592	7183
8	12392	7672
9	13144	8135
10	13855	8574
11	14530	8990
12	15180	9384
13	15797	9764
14	16393	10130
15	16968	10472

The following is another ſet of experiments made by the ſame author with different apertures, in which the water was kept conſtantly at the altitude of eleven feet, eight inches, ten lines, from the centre of each aperture.

Experiments.		Cubic Inches furniſhed in one Minute.
1.	With an horizontal circular aperture, 6 lines in diameter	2311.
2.	With a circular horizontal aperture, 1 inch in diameter	9281.
3.	With a circular horizontal aperture, 2 inches in diameter	37203.
4.	With a rectangular horizontal aperture, 1 inch by 3 lines	2933.
5.	With a ſquare horizontal aperture, the ſide 1 inch	11817.
6.	With a ſquare horizontal aperture, the ſide 2 inches	47361.
	Conſtant height of water 9 feet.	
7.	Lateral circular aperture, 6 lines in diameter	2018.
8.	Lateral circular aperture, 1 inch in diameter	8135.
	Conſtant height of water 4 feet.	
9.	Lateral circular aperture, 6 lines in diameter	1353.
10.	Lateral circular aperture, 1 inch in diameter	5436.
	Conſtant height of water, 7 lines.	
11.	Lateral and circular orifice, 1 inch in diameter	628.

From theſe experiments we may derive the following deductions, *viz.*

1. The quantities of fluid diſcharged in equal times from different ſized apertures, the altitude of the fluids being the ſame, are to each other nearly as the areas of the apertures.

2. The quantities of water diſcharged, in equal times, by the ſame aperture, with different altitudes of water in the reſervoir, are nearly as the ſquare roots of the correſponding altitudes of the water in the reſervoir above the centre of the aperture.

3. That, in general, the quantities of water diſcharged, in the ſame time, by different apertures, and under unequal altitudes of the water in the reſervoir, are to each other in a compound ratio of the areas of the apertures, and the ſquare roots of the altitudes.

4. That, on account of the friction, the ſmalleſt apertures diſcharge leſs water than thoſe that are larger and of a ſimilar figure, the water in the reſpective reſervoirs being at the ſame height.

5. That of ſeveral apertures whoſe areas are equal, that which has the ſmalleſt circumference will diſcharge more water than the others, the water in the reſervoirs being at the ſame altitude, and this becauſe there is leſs friction. Hence circular apertures are moſt advantageous, as they have leſs rubbing ſurface under the ſame area.

Thus far we have treated of ſimple apertures; but if to the circular aperture on the ſide of a veſſel, there be applied a cylindrical pipe of the ſame diameter, and whoſe length is equal to from two to four times that diameter, as A B, *fig.* 12, then a greater quantity of water will be diſcharged through it, than through the ſimple aperture in an equal portion of time, every other circumſtance remaining the ſame; the quantities of fluid diſcharged in theſe two caſes being as 133 to 100 nearly.

The pipe A B, or any other prolongation of any ſhape which is adapted to the aperture of a veſſel, has been called the *adjutage*, from its property of promoting the diſcharge of the fluid.

It has likewiſe been obſerved, that the diſcharge, in a given time, is the ſame, whether the aperture be furniſhed with the abovementioned cylindric pipe, or with the pipe repreſented

repreſented in *fig.* 13, which differs from the former only by its having, cloſe to the ſide of the veſſel, a contraction nearly of the ſhape of the contracted vein.

If the laſt mentioned pipe be cut off at the contraction, and the firſt conical part only be left affixed to the aperture, as in *fig.* 14, then the diſcharge of water is rather leſs than from a ſimple aperture; but it is probable, that it would be quite the ſame, were it poſſible to make the conical adjutage exactly of the ſhape of the natural contracted vein; excepting, however, the effect of friction.

If to this conical part a cylindrical tube of the diameter of the ſmall part of the conical pipe, be applied, as in *fig.* 15, the diſcharge of fluid will thereby be diminiſhed, and more ſo according as the length of the cylindrical part is increaſed.

If to the ſmall conical part of the adjutage, *fig.* 14, a diverging pipe, *viz.* another conical tube be applied, as in *fig.* 16, the diſcharge of water will thereby be increaſed within a certain limit; for it appears that when the divergency is greater than 16 degrees, the effect ceaſes entirely, and that the greateſt diſcharge takes place, when the divergency is equal to an angle of about three degrees. And if between thoſe two conical parts a cylindrical tube be interpoſed, as in *fig.* 17, then the diſcharge is again diminiſhed, but not nearly ſo much as if the outer conical part were removed. It appears from the obſervations of Venturi, that with any length of intermediate pipe, the diſcharge is always promoted by the abovementioned conical termination, which would be of infinite practical uſe; for the diſcharge might be promoted without the enlargement of the pipe; and in moſt caſes ſo it actually proves to be; but Mr. Eytelwein obſerves, that if the pipe, or tube, be very long, the advantage produced by the abovementioned conical termination, becomes inſenſible or nearly ſo. Profeſſor Venturi, in order to determine the preciſe quantity of the effect, which each of the abovementioned conformations of diſcharging pipes produced, inſtituted an accurate ſet of experiments, which we ſhall conciſely ſubjoin as being of conſiderable importance in practical hydraulics.

The ſame quantity of water, (*viz.* 4845 Engliſh cubic feet) flowed out of the ſame veſſel or reſervoir, which was kept conſtantly full, through the following adjutages, in the annexed times, which are expreſſed in ſeconds. The altitude of the water in the veſſels, above the level of the centre of the outer aperture of the adjutage, was always equal to 34,642 Engliſh inches.

Through a ſimple circular aperture in a thin plate, the diameter of the aperture being equal to 1.6 inches, in - - - - - 41″

Through a cylindrical tube of the ſame diameter as above, and 4.8 inches long, as in *fig.* 12, in - - 31″

Through the tube, *fig.* 13, which differs from the preceding, by having the contraction in the ſhape of the natural contracted vein, in - - - - 31″

Through the ſhort conical adjutage, *fig.* 14, which is only the firſt conical part of the preceding, in - 42″

Through the pipe, *fig.* 15, which conſiſts of a cylindrical tube, adapted to the ſmall conical end of *fig.* 14, and of the ſame diameter; A D being 3.2 inches long, in - - - - - 42″.5

Through the like adjutage, but longer, A D being 12.8 inches long, in - - - - - 45″

Through the like, ſtill longer, A D being 25.6 inches, in - - - - - - - - 48″

Through an adjutage conſiſting of the ſimple tube of *fig.* 12, placed over the conical part of *fig.* 14, in - 32.″5

Through the double cone, *fig.* 16, the dimenſions of which are, A B = E F = 1.6 inches, A C = 0.977 inches, C D = 1.376 inches, and the length of the outer cone = 4.351 inches, in - - 27″.5

Through the adjutage, *fig.* 17, conſiſting of a cylindrical tube 3.2 inches long, and 1.376 inches in diameter, interpoſed between the two conical parts of the preceding, in - - - - - 28″.5

The effect of the above-mentioned adjutages is the ſame, whether they be adapted to the ſide, or to the bottom of the veſſel, or in any other direction, (ſince fluids preſs equally in every direction at the ſame depth) provided every other circumſtance be the ſame; ſuch as the capacity and form of the reſervoir, the altitude of the water above the level of the centre of the outer aperture of the adjutage, &c.

All flexures, and all ſorts of internal contractions, enlargements, elongations, ſinuoſities, and projections, in the conducting pipe, diminiſh more or leſs the quantity of diſcharge. The cauſe of this retardation, or diminution of the diſcharge, is undoubtedly owing to the eddies, and to the croſſings of the various filaments of the fluid, which, according to what has been obſerved above, muſt neceſſarily take place at thoſe irregularities. This may be rendered ſufficiently evident, if an irregular glaſs pipe be applied to a pretty large veſſel full of water, in which ſome light bodies, as ſome powdered amber, be mixed; for amber being nearly of the ſame ſpecific gravity as water, by the motion of its particles it will clearly ſhew the various and irregular directions of the water within the tube.

All eddies and croſs directions muſt unavoidably tend to deſtroy part of the moving force. The diſcharges out of a ſtraight tube, a curved tube in a quadrantal arc, and an elbowed tube forming a right angle (when they are all ſituated horizontally and in ſimilar circumſtances) are nearly as 70, 50, and 45; whence it appears, that ſharp angular bendings hinder the paſſage of the fluid conſiderably more than thoſe of a regular curvature. The internal roughneſs of a pipe contributes likewiſe to diminiſh the diſcharge. Whenever an irregularity in the ſhape of the aperture, or ſome particular conformation of the veſſel, compels the particles of the fluid to run obliquely towards the aperture, a circular motion is thereby ſoon communicated to the fluid, and an hollow whirl is formed in the veſſel above the aperture. In conſequence of that circular motion, the particles of the fluid acquire a centrifugal force, which compels them to recede from the centre, or from the axis of motion, where of courſe a hollow is formed, which is larger or ſmaller, according as the rotatory motion of the fluid is more or leſs rapid. When this whirling motion is pretty conſiderable, if any light bodies, floating upon the water, happen to come within the whirl, they will be readily drawn downwards towards the aperture; for, ſince the ſpecific gravity of the fluid is greater than that of the bodies, the fluid will acquire a greater degree of centrifugal force, and will recede farther than thoſe bodies from the axis of the whirl.

We might now proceed to deſcribe the form and altitude of the ſtream of fluid, when its direction is either oblique, or perpendicularly upwards or downwards; but theſe particulars more properly belong to the articles JET and STREAM, which ſee. It is alſo neceſſary to obſerve, that in the courſe of the above-deſcribed experiments, remarks, &c. we have taken no notice of any other fluid beſides water; the reaſon of which is, firſt, that as water is the moſt general fluid, with whoſe action human affairs are naturally and artificially concerned, moſt of the experiments and inveſtigations have been made relatively to that fluid; and, ſecondly, when any uſeful reſults have been either theoretically or practically eſtabliſhed with reſpect to water, the application of the ſame

reſults to other non-elaſtic fluids may be eaſily made, by allowing for the peculiar ſpecific gravities, adheſive qualities, and other peculiar properties of thoſe other fluids.

Having thus far treated of the diſcharges of non-elaſtic fluids through apertures, &c. a ſimilar inveſtigation ought to follow with reſpect to the diſcharge, or tranſition, of aerial (*viz.* elaſtic) fluids through apertures, &c. Of this, however, we ſhall only ſubjoin a few of the more general particulars, without any theoretical demonſtration, or practical illuſtration; for, as thoſe tranſitions or diſcharges of elaſtic fluid, are entirely dependent upon that property by which they are diſtinguiſhed from water and other non-elaſtic fluids, they are much better explained, and much more eaſily underſtood, in conjunction with the explanation of that characteriſtic property, for which ſee the article PNEUMATICS, wherein the demonſtrations, together with practical remarks, reſpecting the following and other particulars, will be found. Air ruſhes from the atmoſphere into a vacuum, or into a veſſel exhauſted of air, with the velocity which a heavy body would acquire by falling from the top of an homogeneous atmoſphere; which height may be reckoned equal to 27818 feet.

Put D for the natural denſity of the air in the atmoſphere; δ the denſity of the air contained in a veſſel partly exhauſted; V for the velocity of air of the denſity D ruſhing into a void, and v for the velocity with which it will ruſh into the rarefied air of the denſity δ; then $v = V \times \sqrt{1 - \frac{\delta}{D}}$ is an expreſſion for the velocity with which the air of the atmoſphere will ruſh into a ſpace containing rarer air.

The diſcharge of elaſtic fluids through different apertures, or their paſſage through pipes of various ſhapes, lengths, curvatures, &c. is likewiſe variouſly affected by theſe circumſtances. It alſo differs according to the peculiar nature of the elaſtic fluid employed.

DISCHARGE *of charged electrics*. See the articles ELECTRICITY and LEYDEN PHIAL.

DISCHARGED WORK, in *Calico-Printing*. See PASTE-WORK.

DISCHARGER, in *Electricity*, is an inſtrument which, being interpoſed between the two coatings, or the two charged ſurfaces of a Leyden phial, electric jar, battery, &c. will enable the operator to diſcharge that jar, or battery, &c. without any danger to himſelf. For this purpoſe various inſtruments have been contrived; but the moſt eſſentially uſeful are of three ſpecies, the ſimpleſt of which has received the denomination of *ſimple diſcharger*, or *diſcharging rod*; the next has been called the *diſcharging electrometer*; and the third has been called the *univerſal diſcharger*, from its being capable of anſwering all the principal objects which may be deſired in diſcharging charged electrics. We ſhall now deſcribe thoſe inſtruments in the order of their ſimplicity.

The *Simple Diſcharger*, or *Diſcharging Rod*, is a metallic wire, about the ſize of a quill, ſometimes ſtraight, but more commonly bent, as in *Plate* III. *Electricity*, *fig.* 10, and generally having a metallic ball or knobbed termination at each end C, B. When a charged jar or battery is to be diſcharged, the operator holding the diſcharging rod by its middle A, firſt applies one end of it to the outſide coating of the jar, and then brings the other extremity of the rod in contact with the inſide coating, or with the wire, or knobbed wire, which communicates with the inſide coating of the jar, by which means the electric power will be conveyed from one ſide of the charged electric to the other, and thus the diſcharge is effected. With ſuch a diſcharging-rod, however, and when the jar or battery is very powerful, the operator is not quite ſafe; for, in the firſt place, he will feel ſome effect of the ſhock, in conſequence of what is called, in electricity, the *lateral ſhock*; and ſecondly, if he happens to touch, with any part of his body, any metallic communication to one ſide of the jar, he may run the riſque of having the whole ſhock through his body. In conſequence of this inconvenience, an inſulating handle has been added to the preceding diſcharging rod, as is ſhewn in *fig.* 11, where A B is a glaſs handle, having a braſs ferrule, B C, cemented upon its extremity, and the rod paſſes through a hole in the braſs ferrule at C. In uſing this diſcharging rod, the operator holds it by applying his hand at A, in which caſe he becomes perfectly ſeparated from the circuit of the diſcharge.

The principal defect of the preceding diſcharging rods is, that they cannot be conveniently adapted to electrics of various ſizes and various ſhapes; but this defect is entirely removed by the conſtruction repreſented in *fig.* 12, which conſiſts of a glaſs handle A, and two curved wires B, B, which are moveable, like a pair of compaſſes, by the joint C, which is fixed to the braſs cap of the handle A. The wires B, B, are pointed, and their pointed terminations enter the balls D, D, to which they are ſcrewed, and from which they may be unſcrewed at pleaſure. The advantages of this conſtruction are, that the operator has the opportunity of uſing either the knobbed, or the pointed terminations, according as the experiments may require. And as the wires are moveable, ſo that the extremities D, D, may be placed nearer to, or farther from, each other, the diſcharging rod may be adapted to ſmall as well as to large jars, or to a coated plate of glaſs, or, in ſhort, to all ſorts of charged electrics. Mr. Nairne contrived a diſcharger, which he uſed to put up in the boxes with his patent electrical machines, and to which he gave the name of the *luminous inſulated diſcharging rod*. It conſiſts of an arched glaſs tube A B, *fig.* 13. to the extremities of which two braſs balls are cemented, and the communication from one braſs ball to the other is formed by an iron chain which paſſes through the tube and almoſt fills the whole cavity of it. The glaſs tube paſſes through a hole in the wooden termination C of the handle. It is evident that ſuch a diſcharging rod cannot be adapted to jars of different ſizes. In making the diſcharge of a jar with it in a dark room, and even in the day light, luminous ſparks are ſeen between the links of the chain within the tube, in conſequence of which this diſcharging rod has obtained the epithet of *luminous*.

The *Diſcharging Electrometer* was originally contrived by Mr. Lane (ſee the Phil. Tranſ. for 1767), and its uſe is to enable an electrified conductor, or a charged electric, to diſcharge itſelf, when the intenſity of the electricity in it, or the height of the charge, has reached a certain particular degree, which degree the operator may vary at pleaſure. Since Mr. Lane's original invention, this inſtrument has undergone various alterations in the hands of different electricians; but the principle remains the ſame. *Fig.* 14, repreſents this inſtrument, A B C is all of braſs, *viz.* a braſs wire having two braſs balls A and B. To a hole in the braſs ball B the extremity of the bent glaſs arm, (which is a ſolid ſtick of glaſs,) is firmly cemented. To the extremity of the vertical part of this arm, a braſs ball F, having a proper ferrule, is cemented. E G is a braſs ſcrew that has a braſs ball at E, and a milled head at G. The female of this ſcrew is in the ball F, ſo that by turning the milled head G, the wire G E may be ſcrewed in or out, and, of courſe, the ball E may be ſituated within any required diſtance of the ball A. A divided ſcale D H is faſtened to the ferrule of the braſs ball F, and it contains the diviſions of inches and

tenths of inches, ſo diſpoſed, as to indicate the preciſe diſtance between the ſurfaces of the balls A and E, when the edge of the milled head is againſt any of thoſe diviſions.

Now ſuppoſe, that the wire C is fixed into a Leyden phial, or is connected with the inſide coatings of a battery, that the balls A and E are ſet at the diſtance of one inch from each other, and that a metallic wire, or chain, or other conducting communication, is formed between the outſide of the phial or battery, and the part F G of the diſcharging electrometer. Then let the electrical machine which charges the jar or battery be put in action, and it is evident, that when the charge is become ſo high as to be able to leap through the interval of one inch, *viz.* from the ball A to the ball E, the diſcharge will be made without the application of any diſcharging rod or any farther interference of the operator. Thus by leaving the apparatus undiſturbed, and continuing the motion of the electrical machine, ſhocks preciſely of the ſame ſtrength may be ſent through a human being or through any other ſubſtance, that may be interpoſed between the outſide coating of the jar or battery, and the part F G of the diſcharging electrometer.

If the wire C is fixed in a hole on the prime conductor of an electrical machine, and a communication be made between the part F G and the ground; then, on working the electrical machine, ſparks of the ſame ſtrength may be repeatedly obtained from the prime conductor. This equality of ſhocks or ſparks is of great uſe in a variety of experiments; but is particularly ſo in medical electricity.

In ſhort with the above Mr. Lane's electrometer, the magnitude of the diſcharge is indicated by the quantity of air through which it is forced to paſs between the two balls A, E, the diſtance of which may be varied at pleaſure. The power of an electrical machine may be eſtimated by the frequency of the ſparks which paſs at any given diſtance. Mr. Lane found that the quantity of electricity required for a diſcharge is ſimply as the diſtance of the ſurfaces of the balls A, E; the ſhocks being twice as frequent when this diſtance is only $\frac{1}{24}$th of an inch as when it is $\frac{1}{12}$th.

Mr. Nairne ſimplified this electrometer in the manner exhibited in *fig.* 15, which conſiſts of a crooked glaſs arm, having a wooden termination at each end: the termination at A is conical, and fits a hole in the prime conductor of the electrical machine. The dotted circle in the figure repreſents the conductor end-ways. Through the other wooden termination, B, of the electrometer, a wire paſſes, which has a braſs ball at each end: this wire may be moved backwards and forwards in a hole through the wooden end B, and thus the inner braſs ball may be ſet at any required diſtance from the prime conductor. The farther management of this electrometer is the ſame as the preceding.

Another ſort of diſcharging electrometer is repreſented in *fig.* 16, where B C is a wire knobbed at each extremity, and moveable, like the beam of a balance, upon the pillar P. A is another braſs ball fixed upon another pillar, and a third pillar, which is capable of adjuſtment, up or down, is at Q, and upon this pillar, which holds a little ſtage, the ſubſtance through which a ſhock is required to be paſſed, muſt be ſituated between the extremities of two wires, one of which has a knob D. Now, when the communication is made between the inſide coating of the Leyden phial and the ball A, alſo between the outſide of the phial and the wire S; then, on charging the jar, at a certain period of the charge, the repulſion which takes place between the balls A and B, will elevate B, and, of courſe, depreſs C, ſo as to bring this near D, and effect the diſcharge.

Other ſorts of diſcharging electrometers may alſo be ſeen in the Philoſophical Magazine, vol. xi. Cuthbertſon's Electricity, &c,

The *Univerſal Diſcharger* was invented by Mr. Henly, and is repreſented in *fig.* 17. It conſiſts of the following parts. A is a flat board, fifteen inches long, four inches broad, and one thick, or nearly of theſe dimenſions. This board forms the baſe of the inſtrument. B, B, are two glaſs pillars, cemented in two holes upon the board A; and furniſhed at their tops with braſs caps, each of which has a turning joint, and ſupports a ſpring tube, through which the wire D C ſlides: each of theſe caps is compoſed of three pieces of braſs, connected ſo, that the wire D C, beſides its ſliding through the ſocket, has two other motions; *viz.* an horizontal and a vertical one. Each of the wires D C, D C, is furniſhed with an open ring at one end, and at the other end has a braſs ball D, which, by a ſhort ſpring ſocket, is ſlipt upon its pointed extremity, and may be removed from it at pleaſure. E is a ſtrong circular piece of wood, five inches in diameter, having, on its ſurface, a ſlip of ivory inlaid, and furniſhed with a ſtrong cylindrical foot, which fits the cavity of the ſocket F, which is faſtened into the middle of the bottom board, and has a ſcrew G, which ſerves to faſten the foot of the circular board E at any required height. H is a ſmall preſs belonging to this inſtrument; it conſiſts of two oblong pieces of board, which may be preſſed againſt each other by means of two ſcrews *a*, *a*: the lower of theſe boards has a cylindrical foot equal to the foot of the circular board E. When this preſs is to be uſed (and its uſe is to hold any thing through which a ſhock is to be paſſed), it is fixed into the ſocket F, inſtead of the circular board E, which muſt, in that caſe, be removed.

From what has been ſaid above, reſpecting the other diſchargers, it will be eaſily underſtood, that this univerſal diſcharger may be adapted to anſwer every purpoſe, by connecting the ends C, C, of the wires with the ſides of the Leyden phial, and putting the ſubſtance through which the ſhock is to be paſſed between the braſs balls D, D, upon the board E, or between the boards of the preſs H. The balls D, D, may be unſcrewed, and the pointed extremities of the wires may be uncovered, which is of uſe in certain experiments.

DISCHARGING OF COLOUR, is frequently employed by dyers, to produce particular patterns upon the dyed ſtuffs. A manufacture of this kind has lately been introduced and proſecuted to great extent in the weſt of Scotland, for the purpoſe of manufacturing Bandana handkerchiefs, in imitation of thoſe imported from India. The material of which the fabric conſiſts is cotton, and the cloth is ſometimes tweeled, and ſometimes woven plain. The ground of the handkerchief is generally of the faſt dye, commonly known by the appellation of Turkey red, and this colour being afterwards diſcharged in particular places, a number of white ſpots are interſperſed upon the red ground. The proceſs is by no means complex, but as the manufacture is recent, has hitherto been chiefly, if not entirely, confined to the diſtrict where it originated, and has been much admired; an account of the engine employed, and of the proceſs, may perhaps deſerve ſome attention. In the Indian Bandanas, the white ſpots are generally placed in cluſters in the diagonal or diamond direction, and this diſtribution has been moſt frequently adhered to in the imitation handkerchiefs. The ſpots are ſometimes round, ſometimes ſquare, and ſometimes, though more rarely, triangular. Previous to the diſcovery and introduction of the diſcharging proceſs, as applied to this manufacture, many imitations of the Bandanas had been made by the common mode of calico-printing. But the colours of the printed handkerchiefs,

handkerchiefs, beſides being leſs brilliant at firſt, were found to fade ſo ſoon, that the diſcharged ones do already, in a great meaſure, and will probably very ſoon entirely, ſuperſede them.

The engine employed is a very ſtrong preſs, the whole framing of which is generally of caſt iron. In conſtructing this preſs, it is abſolutely neceſſary that every part ſhould be ſo ſtrong, as to bear a very great preſſure without yielding in any part. A ground plan, and tranſverſe elevated ſection of it, are given in *figs.* 3. and 4. *Plate* VIII. *Miſcellany.*

The pattern to be formed is cut upon two flat plates, which exactly correſpond. They are uſually of caſt iron, and the lower plate is faced with copper, or ſome metal which will both receive a fine poliſh, and reſiſt, to a great degree, the corroſive power of the diſcharging liquor, which is compoſed of a preparation of the oxy-muriate of lime diluted with water. In the under plate, which muſt be perfectly ſmooth and level, a hole is cut for every ſpot which is to be diſcharged. In the upper plate, or cover of the preſs, every ſpot is formed by a hollow tube of braſs or copper, which is tightly driven into a hole formed in the plate, and cemented with a compoſition of white lead and oil, or any other cement, which will prevent the diſcharging liquor from eſcaping by any other paſſage than thoſe through the perforated tubes.

In the ground plan *(fig* 3.), little more of the preſs will be ſeen than the upper ſurface of the cover, which is diſtinguiſhed by the letters A, A, A, A, placed at each corner. About the upper plate or cover is a rim to prevent the diſcharging liquor from running off, which is diſtinguiſhed by the letters B, B, B, B.

At each corner of the plate is a round hole, working upon a pin faſtened in the under plate or ſole of the preſs, to guide the bottoms of the perforated tubes perpendicularly over the holes in the lower plate. Beſides theſe guides, there are two notches C, C, which graſp the upright pillars D, D, and thus the upper plate, when riſing and ſinking, is guided in ſix different places. The elevation and depreſſion of the cover is effected by turning the ſcrew E. The form of the upper and under plates, and the pattern being repreſented by *fig.* 3, the remaining parts of the preſs will be more clearly ſeen by referring to *fig.* 4, which is a tranſverſe elevated ſection of the preſs, cut in the direction of the dotted line F F, *fig.* 3.

The letters of reference in *fig.* 4, are the ſame for each part, as in *fig.* 3, but ſome parts are diſtinctly ſeen in the latter, which do not appear in the former, and theſe are diſtinguiſhed by additional letters. As in *fig.* 3, A A repreſent the upper plate or cover of the preſs. The rims are ſhewn by the letters B, B. The notches which graſp the upright pillars are marked C, C, and the pillars D, D. The ſcrew which raiſes and ſinks the cover of the preſs is diſtinguiſhed by the letter E. Between the pillars D, D, is an arch of iron H H, in the centre of which is a box I, containing a female ſcrew for working the ſcrew E. The lower part of the ſcrew E revolves in the ſocket G fixed to the cover of the preſs, and thus raiſes or ſinks it as may be neceſſary. Upon the ſcrew E, is fixed a wheel K K, through the arms of which is put the lever uſed for ſcrewing down and raiſing the cover, as in other large preſſes. The ſole or bottom of the preſs is diſtinguiſhed by the letters L, L. It is placed exactly in a horizontal direction, and is ſupported by ſix ſtrong iron perpendicular legs, namely, one at each corner, and the lower parts of the pillars D, D, in the middle. Between the cover and bottom, the cloth to be diſcharged is placed at M M.

The mechanical part of this proceſs is, in almoſt every reſpect, entirely ſimilar to that uſed by cloth dreſſers, bookbinders, and many other tradeſmen who employ ſtrong ſcrew preſſes. To enſure the accuracy of its operation, correctneſs of workmanſhip, and ſtrength, are all that are neceſſary, and theſe are indiſpenſable. The preſs muſt be fixed, ſo that both the cover and bottom may be horizontal planes. The bottom muſt be perfectly level, and the perforated tubes in the cover muſt all exactly touch the bottom, with equal preſſure. The perforation of the tubes muſt alſo correſpond exactly with the holes or apertures in the bottom, and the guides muſt be fitted to work freely, but at the ſame time to prevent any aberration of the cover in riſing or ſinking. From the great preſſure neceſſary when the cover is ſcrewed down, great care ought to be taken that the whole of the ſupporters of the preſs be exactly perpendicular, and that the preſs, when properly placed, ſhould be ſtrongly ſecured.

The apparatus being well made and properly ſecured, the proceſs of manufacture is remarkably ſimple. The cloth is woven of the natural colour of the cotton wool, and in this particular the manufacture, beſides the beauty of its appearance, poſſeſſes a decided preference, in point of economy, over the Pullicate handkerchiefs, and other imitations of the Indian manufacture, where the pattern is produced in the loom, and the ſtuff previouſly dyed in the ſtate of yarn. Whatever care has been taken to prevent the tedious and repeated proceſſes, which are uſed in the dyeing of Turkey red, from injuring the yarn, every perſon, at all converſant with the manufacture of coloured yarn, will be ſenſible that all the ſubſequent ſtages of the operation of forming it into cloth are much impeded by the preparatory change which it has undergone in the dyers' hands; and from the nature of the proceſs this perhaps applies to no colour in ſo great a degree as to Turkey red. It follows that the wages given to winders, warpers, and weavers, muſt be raiſed in proportion to the impediments which they have to encounter, and to the ſmaller quantity of cloth which their exertions can of conſequence produce. Beſides this, all handkerchiefs ornamented in the loom, are confined to what is called *checking;* and all the various colours muſt be interwoven either parallel or at right angles to each other, unleſs very complicated and conſequently expenſive mounting be uſed. The time conſumed in changing the colours of the woof alſo impedes, in no ſmall degree, the ſpeed of the operation; and thus both the ſtate and nature of his materials, and the mechanical operation neceſſary to accompliſh his purpoſe, tend at the ſame time to enhance the wages of the weaver, in proportion to the quantity of cloth which is the product of his labour.

But as the imitation Bandanas are woven perfectly plain, the ſame as calicoes, cambrics, and other ſtout fabrics, no impediment of this kind occurs, and the whole labour and expence are in the ſubſequent proceſs, and the ſum ſunk in procuring the preſs.

After the cloth is woven, it is cleared from impurities, and dyed Turkey red, exactly in the ſame way as yarn is dyed. When the colour is to be diſcharged, the cloth is neatly folded in ſquares, of about 10 or 12 folds, and laid upon the ſole or under plate of the preſs, the cover being previouſly elevated by means of the ſcrew and wheel. When the cloth has been properly diſpoſed, as at M M, the cover is brought down in contact with its upper ſurface, and a lever being applied to the ſcrew and wheel, the upper and under plates are firmly ſcrewed together, the cloth being between them. The under part of each of the perforated tubes now preſſes hard upon the upper ſurface of the cloth, and being perpendicularly over the holes in the under plate, no part of the diſcharging liquor can eſcape, excepting through

through the apertures which form the pattern. Theſe apertures are diſtinguiſhed in the ſection, *fig.* 4, by the numbers 1 to 8. The preſs being ſcrewed down, the diſcharging liquor is poured upon the cover, and being confined by the rim paſſes through the apertures, and diſcharges the colour from thoſe parts of the cloth which it paſſes through, being prevented from ſpreading upon any other part by the power of the ſcrew. The diſcharging liquor is received into a trough placed under the lower plate of the preſs, and diſtinguiſhed by the letter N. From this trough it is conveyed, by a ſpout, into veſſels placed to receive it, and preſerved; for although it loſes much of its chemical quality in paſſing through the cloth and diſcharging the colour, it retains ſo much as ſtill to be of ſervice in many of the inferior operations of clearing and whitening of cloth. The diſcharge of the colour is effected by the action of the liquor in about eight or ten minutes. When the liquor has paſſed through, the cover of the preſs is raiſed, the cloth is taken out, and another piece being ſubſtituted, the operation goes on as before.

When two induſtrious perſons are employed, for the purpoſes of folding the cloth, working the preſs, and applying the liquor, it is calculated, that the operation, for one piece of 12 handkerchiefs, occupies about 15 minutes; conſequently, two perſons can diſcharge 48 or 50 dozens of handkerchiefs in one day of 12 working hours.

The operation requires only care and attention; for if the preſs be properly conſtructed, nothing more is required than to fold the handkerchiefs neatly, to lay them ſquare upon the under plate of the preſs, and to be careful that the cover is tightly ſcrewed down before the liquor is applied. When the handkerchiefs are taken from the preſs, the diſcharged ſpots do not appear white, but of a dull ſtraw colour. The common operation of clearing, however, very ſoon gives a pure white to the ſpots, and adds brilliancy to the Turkey red ground. Thoſe who have been longeſt in the habit of working theſe preſſes, conſider a moſt important point to be, attention to the cement which is put where the perforated tubes are connected with the cover of the preſs. This certainly requires frequent and careful examination; for if any of the liquor is allowed to eſcape here, the ground of the handkerchiefs will be materially injured by its operation upon the colour. As the invention is recent, and the ſtudy of practical chemiſtry rapidly advancing, it is not improbable that ſome compoſition of ſuperior efficacy, for this purpoſe, may ſoon be diſcovered. The cement uſed anſwers the purpoſe tolerably well, but requires great attention on the part of the perſon to whom the charge of the preſs is entruſted.

It has been already obſerved, that the chemical liquor generally employed is a ſolution of the oxymuriate of lime.

The method of preparing this liquor was diſcovered and firſt introduced into practice by Charles Tennant, eſq. St. Rollocks, near Glaſgow; and is, at preſent, univerſally uſed by thoſe engaged in the manufactory. The following remarks, upon its practical application, have been obligingly communicated to the writer of this article by that gentleman, which he will copy in his own words:—

"Agreeable to my experiments, a ſolution of the oxymuriate of lime, of 1.010 ſpecific gravity, decompoſed by $\frac{1}{100}$th part of its weight of ſulphuric acid, of 1.846 ſpecific gravity (the uſual quality of marketable ore), is the moſt advantageous preparation for diſcharging Turkey red; and what, I believe, is in pretty general uſe with the trade in this quarter.

"As the oxymuriatic acid is but little ſoluble in water, when diſengaged from its combination with the lime, the ſooner it is uſed, after its ſeparation by the ſulphuric acid, the better; and this is done by ſimply filling the types with the ſolution, and allowing it to remain in them for ſo many minutes as proper, until the diſcharge is effected.

"When the diſcharge is completed, the acid liquor muſt be carefully waſhed out of the types previous to their being removed from their hold of the cloth."

It is hardly neceſſary to obſerve, that the word types, uſed by Mr. Tennant, refers to the perforated tubes fixed in the cover of the preſs, and previouſly deſcribed in the mechanical part of this article.

Some alteration in the conſtruction of the preſſes has very recently been introduced into ſome of the manufactories. The chief difference from the preſs repreſented, conſiſts in preſſing down the cover by a great weight, inſtead of the action of the ſcrew. Water has been uſed to give this weight, and is raiſed into a trough upon the cover by means of a forcing pump, when the preſſure is to take place. This may certainly preſs more equally over the whole ſurface of the cover than a ſcrew, which acts only upon one point, and in this particular may be an improvement. Few of theſe preſſes have, as yet, been uſed; but thoſe which have, are ſaid to anſwer very well.

DISCIPLE, from *diſco*, I learn, one who learns any thing from another. Thus the followers of any teacher, philoſopher, &c. are called diſciples. In the Chriſtian ſenſe, they were the followers of Jeſus Chriſt, in general; but in a more reſtrained ſenſe, the diſciples denote thoſe alone who were the immediate followers and attendants on his perſon; of which there were ſeventy, or ſeventy-two. The names diſciple and apoſtle are often ſynonymouſly uſed in the goſpel hiſtory; but ſometimes the apoſtles are diſtinguiſhed from diſciples, as perſons ſelected from them, to be the principal miniſters of his religion; of theſe there were only twelve. (See APOSTLE.) The Latins keep the feſtival of the ſeventy, or ſeventy-two diſciples, on July 15; and the Greeks on January 4.

DISCIPLINE primarily ſignifies inſtruction and government; but the word is figuratively applied to a ſtated method of living, according to the rules of ſome profeſſion.

We ſay the military diſcipline, the eccleſiaſtic or church diſcipline, the regular or monaſtic diſcipline, &c.

We do not ſay civil diſcipline, but inſtead thereof policy.

DISCIPLINE is alſo uſed in a peculiar ſenſe for the chaſtiſement, or bodily puniſhment, inflicted on a religious, who has been caught delinquent; or even for that which the religious voluntarily undergo, or inflict on themſelves, by way of mortification.

Among all the auſterities practiſed by the ancient monks and ſolitaries, Dupin obſerves, there is no mention made of diſcipline; in effect, it does not appear to have been in uſe in antiquity, unleſs to puniſh the monks who had been taken tripping.

It is commonly ſaid that St. Dominic, and Peter Damian, firſt introduced the uſe of diſcipline; but F. Mabillon notes, that Guy, abbot of Pompoſa, and others, had practiſed it before them. It is pretty certain, the practice was firſt eſtabliſhed in the eleventh century, with deſign to redeem the penances the canons impoſed on divers offences; and at length they came not only to redeem for themſelves, but alſo for others. See F. MABILLON.

DISCIPLINE is alſo frequently uſed for the inſtrument wherewith a monk chaſtiſes, or mortifies himſelf; which is uſually made of ropes, knotted hair, or twiſted parchment; ſometimes of broken rods. St. Jerom is painted with diſciplines of iron chains, armed with ſpur-rowels, &c. See FLAGELLATION.

DISICPLINE,

DISCIPLINE, *Book of*, in the *History of the Church of Scotland*, is a common order, drawn up by the assembly of ministers in 1650, for the reformation and uniformity to be observed in the discipline and policy of the church. In this book the government of the church by prelates is set aside, church-sessions are established, the superstitious observation of fast-days and saints' days is condemned, and other regulations for the government of the church are determined. This book was approved by the privy-council, and is called the first book of discipline.

The puritans, in the reign of queen Elizabeth, who were zealous in their endeavours to effect a reformation of discipline in the national establishment, held in high estimation "a book of discipline," entitled "Disciplina ecclesiæ sacra ex Dei verbo descripta," *i.e.* the holy discipline of the church described in the word of God. This work was drawn up in Latin by Mr. Travers, a fellow of Trinity college, Cambridge; and printed at Geneva about the year 1574; and afterwards revised, corrected, and improved by Mr. Cartwright and other learned ministers at their synods. It was translated into English in the year 1584, and designed to be published for general use; but it was seized at the press, and all the copies were ordered to be burnt, as factious and seditious. A copy of it was found in Mr. Cartwright's study after his death, and reprinted in the year 1644, under a new title, *viz.* "A directory of government, &c. practised by the first non-conformists, in the days of queen Elizabeth, &c." This book contained those alterations in discipline, &c. for which the puritans contended. In the year 1586, more than 500 ministers, all beneficed in the church of England, useful preachers, of unblemished character, subscribed, with some exceptions, or declared their approbation of this book of discipline.

DISCIPLINE, *military*, denotes the exercise of those laws that are established for regulating the conduct of military men.

DISCIPLINE, *marine*, signifies the training up soldiers for sea-service, in such exercises and manœuvres as can be performed on board ships of war at sea.

DISCLAIMER, in *Law*, a plea, containing an express denial, renouncing, or disclaiming, of a thing alleged.

As if a tenant sue a replevin upon a distress taken by the lord, and the lord avow the taking, saying, that he holds of him as his lord, and that he distrained for rent not paid, or service not performed; then the tenant, denying to hold of such lord, is said to disclaim; and the lord proving the tenant to hold of him, on a writ of right *sur disclaimer* brought, the tenant loses his land. This disclaimer by a tenant is considered as a civil crime, and punished accordingly, by forfeiture of lands to the lord, on reasons most apparently feudal. (Finch. 270, 271.) Thus also, if in any court of record the particular tenant does any act which amounts to a virtual disclaimer: if he claims any greater estate than was granted him at the first infeodation, or takes upon himself those rights which belong only to tenants of a superior class (Co. Litt. 252.); if he affirms the reversion to be in a stranger, by accepting his fine, attorning as his tenant, collusive pleading and the like (ibid. 253); such a behaviour amounts to a forfeiture of his particular estate. (Blackst. Com. vol. ii. and iii.)

When a tenant hath disclaimed, upon action brought against him, he shall not have restitution on writ of error, &c. against his own act; but is barred of his right to the land disclaimed. (8 Rep. 62.) But a verbal disclaimer shall not take place against a deed of lands; nor shall the disclaimer of a wife during the coverture bar her entry on her lands. (3 Rep. 26.) Baron and feme may disclaim for the wife; though if the husband hath nothing but in right of his wife, he cannot disclaim. (2 Danv. Abr. 569.) A person who cannot lose the thing perpetually in which he disclaims, shall not be permitted to disclaim; a bishop, &c. may not disclaim, because he cannot divest the right out of the church; although in a *quo warranto*, at the suit of the king against a bishop or others for franchises and liberties, &c. if the bishop, &c. disclaims them, this shall bind the successors. (Co. Litt. 102, 103.) If a man be vouched because of a reversion on a lease made by himself, he cannot disclaim; but an heir may disclaim, being vouched upon a lease made by his ancestor. (2 Danv. 569.) It is said not to be necessary, that the writ of right, *sur disclaimer*, should be brought against the person that disclaims; for if it be only against him that is found tenant of the land, though he be a stranger, it is not material. (2 Danv. 570.)

By statute 21 Jac. I. c. 16. s. 5, in all actions of trespass *quare clausum fregit*, in which the defendant shall disclaim any title to the land, and the trespass be by negligence, or involuntary, the defendant shall be admitted to plead a disclaimer, and that the trespass was by negligence, or involuntary, and a tender of sufficient amends before the action brought; and if the issue be found for the defendant, or the plaintiff be non-suited, the plaintiff shall be barred from the said action, and all suits concerning the same. Besides these disclaimers by tenants of lands, there are other disclaimers; thus, a man, denying himself to be of the blood, or kindred of another, in his plea, is said to disclaim his blood (F. N. B. 102.) If a man arraigned of felony, disclaim goods; being cleared, he loses them. (Standf. P. C. 186.)

Thus, likewise, in chancery, if a defendant by his answer renounces having any interest in the thing in question, this is a disclaimer: to which may be added, a disclaimer by renouncing an executorship of a will, or the right to an administration.

DISCLAMATION, in *Scots Law*, is that casualty by which a vassal forfeits his whole feu to his superior, if he disowns, or disclaims him, without ground, as to any part of it.

DISCLOSED, a term used for chickens, or hawks, newly hatched; also for buds, or flowers, just blown.

DISCOBOLI, Δισκοβολοι, from δισκος, and βαλλω, *I throw*, among the *Ancients*, an appellation given to those who gained the victory at the discus. See DISCUS.

DISCOID FLOWERS, in *Botany*, are such compound flowers as, having no radius, consist of regular tubular florets, crowded and parallel, and all together forming a surface nearly flat, as in *Santolina*, or exactly conical, as in *Spilanthus*. The same term is used, even though marginal florets be present, provided they are small and inconspicuous, as in *Artemisia*, *Tanacetum*, &c.

DISCOIDES FIBULA, in *Natural History*, the name of a genus of the echinodermata, or sea hedge-hogs; the periphery of the base of these is exactly round, and the body of a convexo-concave figure. The principal species of this genus is the subuclus, which has sometimes a rosaceous top, the lines being very neat and elegant, sometimes a plain and smooth top; sometimes it is all over covered with extremely minute and fine striæ, and sometimes it is much flatter than at others. Klein's Echinoderm.

DISCONTINUANCE, an interruption, intermission, or cessation, of the course of a thing; as, discontinuance of possession, of a plea, process, &c.

Discontinuance, as to real property, is an injury, which consists in keeping out the true owner of an estate, by a

tenant

tenant whoſe entry was at firſt lawful, but who wrongfully detains the poſſeſſion afterwards. This happens, when he, who hath an eſtate-tail, maketh a larger eſtate of the land than the law allows him to do (Finch. L. 190.); in which caſe, the eſtate is good, ſo far as his power extends who made it, and no farther. As if tenant in tail makes a feoffment in fee-ſimple, or for the life of the feoffee, or in tail: all which are beyond his power to make, for that by the common law extends no farther than to make a leaſe for his own life; in ſuch caſes, the entry of the feoffee is lawful during the life of the feoffor; but if he retains the poſſeſſion after the death of the feoffor, it is an injury, which is termed a *diſcontinuance*:—the ancient legal eſtate, which ought to have ſurvived to the heir in tail, being gone, or, at leaſt, ſuſpended, and for a while diſcontinued. For, in this caſe, on the death of the alienors, neither the heir in tail, nor they in remainder, or reverſion, expectant on the determination of the eſtate-tail, can enter on and poſſeſs the lands ſo alienated. Alſo, by the common law, the alienation of an huſband who was ſeized in the right of his wife, worked a diſcontinuance of the wife's eſtate; till the ſtatute 32 Hen. VIII. c. 28. provided, that no act by the huſband alone ſhall work a diſcontinuance of, or prejudice, the inheritance or freeho'd of the wife: but that, after his death, ſhe or her heirs may enter on the lands in queſtion. Formerly alſo, if an alienation was made by a ſole corporation, as a biſhop or dean, without conſent of the chapter, this was a diſcontinuance, (F. N. B. 194.) But this is antiquated by the diſabling ſtatutes of 1 Eliz. c. 19, and 13 Eliz. c. 10; which declare all ſuch alienations abſolutely void, *ab initio*; and, therefore, at preſent no diſcontinuance can thereby be occaſioned. Blackſt. Comm. book iii. A diſcontinuance may be in five ways, *viz.* by feoffment, fine, recovery, releaſe, and confirmation with warranty. (1 Rep. 44.) A diſcontinuance may be defeated, where the eſtate that worked it is defeated; as if a huſband make a feoffment of the wife's land upon condition; and after his death, his heir enters on the feoffee for the condition broken; now the diſcontinuance is defeated, and the feme may enter upon the heir. Co. Litt. 336.

DISCONTINUANCE *of Plea*, is when divers things ſhould be pleaded to in a ſuit of action, and ſome are omitted, If a defendant's plea anſwers to part only, it is a diſcontinuance; and the plaintiff may take judgment by *nil dicit*, for that which is not anſwered: but if the plaintiff plead over, the whole action is diſcontinued. 1 Nelſ. Abr. 660, 661. 1 Salk. 139.

If a juſtice-ſeat be diſcontinued by the not coming of the juſtices, the king commonly renews the ſame by his writ, &c.

DISCONTINUANCE *of Proceſs* is ſomewhat ſimilar to a non-ſuit; for, when a plaintiff leaves a chaſm in the proceedings of his cauſe, as by not continuing the proceſs regularly from day to day, and time to time, as he ought to do, the ſuit is diſcontinued, and the defendant is no longer bound to attend; but the plaintiff muſt begin again, by ſuing out a new original, uſually paying coſts to his antagoniſt. Anciently, by demiſe of the king, all ſuits depending in his court were at once diſcontinued, and the plaintiff was obliged to renew the proceſs, by ſuing out a freſh writ from the ſucceſſor; the virtue of the former writ being totally gone, and the defendant no longer bound to attend in conſequence thereof; but, to prevent the expence, as well as the delay attending this rule of law, the ſtatute 1 Edw. VI. c. 7, enacts, that, by the death of the king, no action ſhall be diſcontinued; but all proceedings ſhall ſtand good, as if the ſame king had been living. The diſcontinuance of an action is not perfect till it is entered on the roll, when it is of record. (Cro. Car. 236.) The plaintiff cannot diſcontinue his action after a demurrer joined, and entered; or, after a verdict, or writ of inquiry, without leave of the court. (Cro. Jac. 35. 1 Lil. Abr. 473.) It has been ruled, upon a motion to diſcontinue, that the court may give leave after a ſpecial verdict, which is not complete and final; but never after a general verdict. (1 Salk. 178. Hardw. 200, 201.) After iſſue and a verdict, the plaintiff cannot diſcontinue without conſent of the defendant; for, if the plaintiff will not enter up judgment, the defendant may. (Salk. 178.) After demurrer argued and allowed, diſcontinuance may be allowed on payment of coſts. 3 Lev. 440.

Diſcontinuance of proceſs is helped at common law by appearance; and by ſtat. 32 Hen. VIII. c. 30. all diſcontinuances, miſcontinuances which continue the ſuit by improper proceſs, or by giving the party an illegal day and negligence therein, are cured after verdict. See AMENDMENT.

DISCORD, in *Muſic*, is a ſound which, when ſtruck with another in counterpoint, is diſagreable to the ear. See COUNTERPOINT.

What renders diſcords diſagreeable to the ear, is their always jarring, and we may ſay warring with each other, and arriving at the ſenſorium like two diſtinct ſounds, though ſtruck or ſounded at the ſame inſtant.

Sometimes the interval is called a diſcord, and ſometimes each of the ſounds that form the diſcordant interval. But though any ſounds that diſagree may be termed diſcords, that title more particularly belongs to that of the two which is foreign to the harmony of the baſe.

There is in nature an infinity of diſcords; but though in muſic none are admitted, except ſuch as belong to the genus and key in which the piece is compoſed, or into which it may modulate, and theſe are ſpecified in the rules of compoſition.—What then are theſe rules? Have they any foundation in nature, or are they purely arbitrary? Let us examine. The phyſical principle of harmony reſides in the common chord, or the harmonies of a ſingle ſound. All concords are derived from that ſource, and it is nature that furniſhes this chord. But that is not the caſe with diſcords, at leaſt with ſuch as are admitted in muſic. We perceive, indeed, how they are generated; by the progreſſion of conſonant intervals and their differences; but we perceive not the phyſical cauſe which warrants our uſe of them in the compoſition of harmony. Nature points out the origin of ſuch harmony as is grateful to our ears, and when it becomes otherwiſe, we ſtop.

There is a diſcord in the 7th diviſion of every ſtring. It is not indeed a true 7th; but it is more like that diſcord than any thing elſe, except the extreme ſharp 6th; and it is ſo equivocal, that it will ſerve for either: ſuppoſe C the fundamental, the 7th diviſion of the ſtring will ſerve for B ♭ or A ♯, for both which it ſerves on keyed-inſtruments.

Now, as nature gives this kind of 7th to every fundamental baſe, if we join the 7th with the 8th in practice, ſuppoſe the key to be G, we have the chord of the minor 7th to G, $\frac{6}{5}$ to B, and $\frac{4}{3}$ to D, diſcords which nature has pointed out, if not correctly produced. F and G are likewiſe the two 5ths, or 4th and 5th of the key of C; the perfect chords of which therefore furniſh, with that of the key note C, the eſſential harmony to that and every other key.

Rouſſeau, therefore, not being able to find the origin of diſcord in nature, or in Rameau's ſyſtem, has treated it as a

mechanical operation. But, are we never to uſe the minor modes which afford us ſuch exquiſite pleaſure in plaintive and pathetic ſtrains, becauſe its origin is out of our reach? Are we never to ſmell at a roſe, becauſe we cannot account for its being more fragrant than the taudry poppy? And, becauſe in comparing ſucceſſively the ſounds of the diatonic ſcale, major and minor, with the fundamental, Rouſſeau, and ſome other theoriſts, find only two diſcords, the 2d and the 7th, are we to uſe no others?

We were not quite ſatisfied with the article *Diſcord* in the laſt fol. from Graſſineau and Malcolm, and tried to make the matter more clear, pleaſant, and intelligible from the ingenuity and eloquence of Rouſſeau, who, in his Muſical Dictionary, has given us an article, or rather a diſſertation on the ſubject, of 10 or 12 pages; but it contains nothing but a dry confutation of Rameau's origin of the minor mode, which was never favourably received or adopted, even by his moſt zealous diſciples, and has now been long forgotten.

We ſhall therefore attempt no new phyſical or metaphyſical diſcoveries concerning diſcord; but ſhall conclude this article by informing young muſical ſtudents, that though Rouſſeau has reduced all diſcords to the 2d, or at moſt to that and the 7th, which is but the 2d inverted; we think it right to inform them, that the 4th and the 9th are ſtill regarded as diſcords by many who will expect them to be regularly prepared and reſolved, as well as the 5th when made a diſcord by the 6th, and the 3d by the 4th; ſo that it may be imprudent, and attended with ſome inconvenience, if they are not ſtudied and practiſed, whatever they may be called; and we ſhall only aſk reformers of the old ſyſtem of harmony, if the 3d made a diſcord by the 4th, the 4th by the 5th, the 5th by the 6th, and the 9th by the $\frac{5}{3}$, are *not* diſcords, what *are* they?

See the regular preparation of all practical diſcords. COUNTERPOINT, *Pl.* XIV. XV. XVI. and paſſing notes added to the latter.

Diſcords are of two kinds: thoſe that are regularly prepared and reſolved, and paſſing notes, in which no harmony is given.

In moving baſes, or diviſions in the treble, all the notes not to be found in the chord on which the paſſage is built, are paſſing notes.

Padre Martini has given in ſix bars (Saggio di contrap.) all the regular diſcords, with their preparations and reſolutions. See examples of Counterpoint in Types.

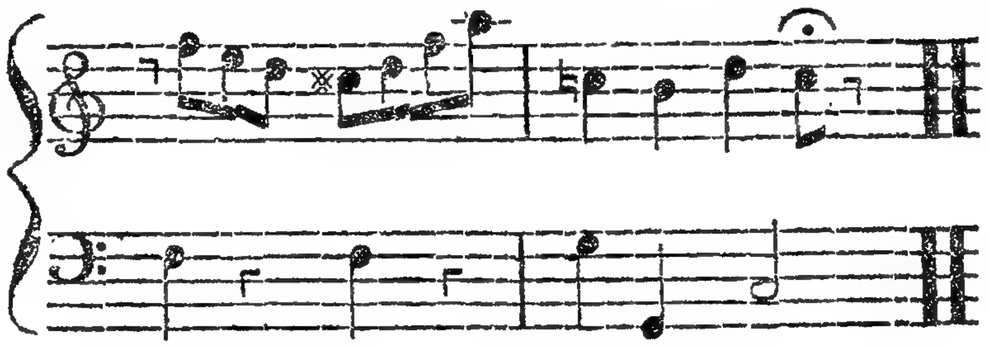
Diſcords ſeem to have originated from *appoggiaturas*, or embelliſhments of a treble part.

Sevenths reſolved into 6ths, are appoggiaturas; as are the baſes carrying 2ds.

As melody quitting Canto Fermo, and plain counterpoint, began to receive ornaments, appoggiaturas ſeem to have been the firſt that were received in harmony. The 4th made a diſcord by the 5th at a cloſe, is the firſt that appears in the moſt ancient counterpoint that has been preſerved.

Man has been defined by the French, *animal d'habitude*, and ſaid by the Engliſh to be "a bundle of prejudices." And melody in muſic may be ſaid to conſiſt of a bundle of appoggiaturas; firſt introduced by ſingers, and for which it afterwards became the buſineſs of compoſers to find harmony.

Great relaxation has taken place of late in the preparation of diſcords; it uſed to be an inviolate rule never to jump to any diſcord except the 7th; but Berthoven, op. 14. jumps to the 9th. We have formerly ſaid, that the preparation of diſcords in vocal muſic was probably eſtabliſhed as a rule in favour of bad ſingers, who were uncertain of hitting them right *per ſaltum*. But very pleaſing and pathetic effects are to be produced by unprepared diſcords. As all good taſte in muſic originates from good ſinging, ſo good ſingers were the firſt to hazard, at a cloſe, an unprepared 9th, as in the following example:



Old rules told us, that double diſcords muſt be doubly prepared and reſolved. See Muſic plates.

Rouſſeau has given, in *Pl.* K. of his Dict. de Muſ. *fig.* 1. two diatonic ſcales, one, the natural ſcale, in conſtant and univerſal uſe; the other he calls the ſcale of *Aliquots*, in which are introduced two new characters, for which we have no names or inſtruments by which they can be expreſſed: theſe are the falſe notes of the French horn and trumpet, which a few modern theoriſts want to perſuade us, in ſpite of our ſenſes, are the true harmonies of nature. But they have never yet been admitted in an orcheſtra, or written in a muſical compoſition. We give the Greek enharmonic ſcale, as a curioſity; but of which we can make no uſe in counterpoint; as we have no fundamental baſe for quarter tones. We have but two genera, one diatonic, and one chromatic, for the eye; when theſe are to be corrected, the key, and the ear of the performer, muſt determine.

The new equivocal character given by Rouſſeau and Kirnberger, for what are generally called the falſe notes, or 4th and 6th of the French horn and trumpet thus: 8 ſomething reſembling a double B b.

DISCORD, *apple of*, *pomum diſcordiæ*, a phraſe uſed to ſignify the ſubject, or occaſion of ſome miſunderſtanding in a ſociety.

DISCORD *goddeſs of*, in *Mythology*, called alſo *Até*, and *Eris*, is deſcribed by Ariſtides as having fiery eyes, a pale countenance, and livid lips, and as wearing a dagger in her boſom. This was the goddeſs, who is ſaid, at the marriage of Peleus and Thetis, to have thrown the golden apple, on which was written, "To the faireſt," which occaſioned a contention between the goddeſſes Juno, Minerva, and Venus; each pretending a title to the apple.

DISCORDANT, *out of tune*, falſe concords, or diſcords, *intonazioni perfidi*, in melody and harmony.

DISCOVERT, in *Law*, denotes an unmarried woman.

DISCOVERY, the act of revealing or diſcloſing any matter by the defendant, in his anſwer to a bill filed againſt him in a court of equity.

The courts of equity may in many caſes compel a diſcovery, with a view of ſubſerving the general adminiſtration of juſtice. But if a bill is brought to aid, by a diſcovery, the proſecution or defence of any proceeding "not merely civil," in any other court, as an indictment or information, a court of equity will not exerciſe its juriſdiction to compel a diſcovery, and the defendant may demur. (2 Vez. 398.) And in the caſe of ſuits merely civil, in a court of ordinary juriſdiction, if that court can itſelf compel the diſcovery required, a court of equity will not interpoſe. (1 Atk. 288. 1 Vez. 205. 2 Vez. 451.) The ſituation of a defendant may render it improper for a court of equity to compel a diſcovery, either, 1. becauſe the diſcovery may ſubject the defendant to pains and penalties, or to ſome forfeiture; or, 2. it may hazard

hazard his title in a caſe where in conſcience he has an equal right with the perſon requiring the diſcovery; though that right may not be inveſted with a perfect title. It is a general rule that no one is bound to anſwer ſo as to ſubject himſelf to puniſhment, in whatever manner that puniſhment may ariſe, ot whatever may be its nature. But if the plaintiff alone is entitled to the penalties, and expreſsly waves them by his bill, the defendant ſhall be compelled to make the diſcovery; for it can no longer ſubject him to a penalty. (1 Vern. 60.)

DISCOVERY *of accomplices* is provided in the caſes of coining, robbery, burglary, houſe-breaking, horſe-ſtealing, and larceny, to the value of five ſhillings, from ſhops, warehouſes, ſtables, and coach-houſes, by ſtatutes 4 and 5 W. & M. c. 8. 6 and 7 W. III. c. 17. and 11 W. III. c. 23. and 5 Anne, c. 31. which enact, that if any ſuch felon, being out of priſon, ſhall diſcover two or more perſons, who have committed the like felonies, ſo that they may be convicted, he ſhall in caſe of burglary or houſe-breaking, receive a reward of 40l. and in general be entitled to a pardon of all capital offences, excepting only murder and treaſon; and of them alſo, in caſe of coining. And if any ſuch perſon having feloniouſly ſtolen any lead, iron, or other metals, ſhall diſcover and convict two offenders of having illegally bought or received the ſame, he ſhall, by ſtat. 29 Geo. II. c. 30. be pardoned for all ſuch felonies committed before ſuch diſcovery.

It hath alſo been uſual for the juſtices of the peace, by whom any perſons charged with felony are committed to gaol, to admit ſome one of their accomplices to become a witneſs (or, as it is generally termed, king's evidence) againſt his fellows; upon an implied confidence which the juſtices of gaol-delivery have uſually countenanced and adopted, that if ſuch an accomplice make a full and complete diſcovery of that and all other felonies to which he is examined by the magiſtrate, and afterwards give his evidence without prevarication or fraud, he ſhall not himſelf be preſented for that or any other previous offence of the ſame degree.

DISCOVERY by *bankrupt*. See BANKRUPT.

DISCOVERY in *Dramatic Poetry*, a manner of unravelling a plot or fable, very frequent in tragedies, comedies, and romances; wherein, by ſome unforeſeen accident, a diſcovery is made of the name, fortuue, quality, and other circumſtances of a principal perſon, which were before unknown. See CATASTROPHE.

A diſcovery ſhould never be in vain, by leaving thoſe who thus diſcovered one another in the ſame ſituation and ſentiments they were in before: in effect thoſe diſcoveries, which are immediately followed by a peripetia, or change of fortune of ſome principal character, whereon the unravelling depends, are always the moſt beautiful.

One of the fineſt diſcoveries ever brought upon the ſtage, is that of Oedipus in Sophocles; for the minute he finds himſelf the ſon of that Jocaſta who was then his wife, he becomes, of the moſt happy, the moſt miſerable of all men.

There are three ſorts of diſcoveries: the firſt by certain marks of the body, either natural or accidental: ſuch is that of Ulyſſes, who having received a wound in the thigh by a boar before the Trojan war, is diſcovered by the old nurſe, upon waſhing his legs after his return home incognito.

The ſecond by tokens: as the caſket of things, which the prieſts found with Ion when he was expoſed, diſcovers Creuſa, whom he was going to kill, to be his mother.

The third is made by remembrance: that is, when the ſight or hearing of any thing occaſions us to recollect our misfortunes. Thus, when Ulyſſes heard Demodocus ſing his actions at Troy, the memory of them ſtruck him, and drew tears from his eyes, which diſcovered him to Alcinous.

But the fineſt ſort is, that which ariſes from the ſubject, or incidents of the fable; as that of Oedipus from his exceſſive curioſity, and the letter that Iphigenia ſent by Pylades. See TRAGEDY.

DISCOUNT, in *Commerce*, an allowance made for the immediate advance of money which is not due till the end of a certain period, as on a promiſſory note, or bill of exchange, which has two or three months to run from the time when it is diſcounted.

The true diſcount of any ſum is, ſo much as being deducted, will leave a ſum which, in the time diſcounted for, will, at intereſt, amount to the original principal. Thus, one pound, diſcounted for one year, is equal to that ſum which, at the given rate, will, in one year, amount to one pound, and the diſcount is the difference between this ſum and one pound: now, as $1 + r : 1 :: 1 : \frac{1}{1+r}$, the ſum which, in one year will amount to one pound, and, conſequently, $1 - \frac{1}{1+r} = \frac{r}{1+r}$ is the diſcount of one pound for one year. On this principle, the diſcount of one pound, for one year, at the ſeveral rates following, is found to be,

At 2 *per cent.* - -	.019607843137
3 - - -	.029126213592
4 - - -	.038461538462
5 - - -	.047619047619
6 - - -	.056603773585
7 - - -	.065420560748
8 - - -	.074074074074
9 - - -	.082568807339
10 - - -	.090909090909

The diſcount of one pound, for one year, multiplied by any ſum, gives the diſcount of that ſum for one year: thus, to find the diſcount of 160*l.* for one year, at 5 *per cent.* .047619 × 160 = 7*l.* 12*s.* 4½*d.*

The diſcount for any number of days is found in the ſame way as the diſcount for one year; for, as one pound, increaſed by its intereſt for any number of days, is to 1*l.*, ſo is 1*l.* to a fourth number, which will be one pound diſcounted for the given days; and this, ſubtracted from one pound, gives the diſcount required: therefore, "divide one pound by one pound, increaſed by its intereſt, and the complement of the quotient is the diſcount required." By this rule, the following diſcounts of 1*l.* are found:

Days.	3 per. Cent.	4 per Cent.	5 per Cent.
1	.00008218	.00010958	.00013697
2	.00016436	.00021913	.00027390
3	.00024651	.00032866	.00041079
4	.00032866	.00043816	.00054765
5	.00041079	.00054765	.00068446
6	.00049291	.00065710	.00082124
7	.00057501	.00070653	.00095798
8	.00065710	.00087594	.00109469
9	.00073918	.00098533	.00123136
10	.00082124	.00109469	.00136799
50	.00409277	.00544959	.00680272
100	.00815217	.01084011	.01351351
200	.01617251	.02144772	.02666667
300	.02406417	.03183024	.03947368

The

The diſcount for any number of days not contained in this table, cannot be found by the addition, or multiplication, of thoſe which are contained in it; for if, from 1*l.*, we ſubtract the diſcount for any number of days, the remainder will be that ſum which, in the ſame number of days, would gain the diſcount ſubtracted; but if, in order to diſcount 1*l.* for double the number of days, we ſubtract twice the former diſcount, the remainder being leſs than before, cannot gain ſo much intereſt, and, therefore, in twice the time cannot gain twice the intereſt which the former ſum gained; and which, being the ſum now ſubtracted, is what ought to be gained to amount again to one pound. A complete table, on the plan of the above, is given in Smart's Tables of Intereſt, but few perſons will find occaſion to refer to it.

The diſcount of any ſum, for any time, is ſo much as will, in the given time, amount to the intereſt of the ſum to be diſcounted; thus, if by retaining 100*l.* for one year, 5*l.* is gained at the end of the year, the proper equivalent to be received for the immediate advance of the ſame is 4*l.* 15*s.* 2½*d*, becauſe this ſum will, at the end of the year, amount to 5*l.*, which is what the 100*l.* would have gained.

Theſe are the true principles of diſcount; but the common mode of diſcounting bills of exchange is, by finding the ſimple intereſt for the time the bill has to run, (including the days of grace,) and deducting ſuch intereſt from the amount of the bill, which gives the ſum to be advanced. This is the method followed by the bank of England, the London bankers, and commercial perſons in general. It enables thoſe who employ their money in diſcounting, to make ſomewhat more than 5 *per cent.* intereſt of it; for a perſon diſcounting 100*l.* for a twelve-month, advances only 95*l.*, by which, at the end of the year, he gains 5*l.*, conſequently, he improves his money, at the rate of 5*l.* 5*s.* 3*d.* *per cent. per ann.*; and this circumſtance frequently cauſes the bankers and monied perſons to employ their money in diſcounting for merchants and manufacturers, in preference to inveſting it in the public funds, particularly when the latter are at a high price. The cuſtomary diſcount, according to this method, for the time a bill has to run, is found by any table of ſimple intereſt. See INTEREST.

DISCOUNT, is alſo commonly uſed for a certain allowance which manufacturers and wholeſale dealers make on the price of their goods, either in all caſes when ſold for money or credit, or more generally, only when ſold for ready money, in lieu of a cuſtomary credit. This diſcount varies greatly in different branches of trade; thus on ſome articles it is leſs than one *per cent.*; on others, ſuch as aqua-fortis, and oil of vitriol, chariots, and coaches, cutlery, fire-arms, hoſiery, needles, plants, and ſeeds, ſadlery, &c. it is uſually five *per cent.* On black lace, fans, black lead, earthen ware, and ſome other articles, the diſcount is 10 *per cent.*, and on a few deſcriptions of goods, as ribbons, perfumery, and hardware, the uſual diſcount is ſtill greater; on ſome articles of Birmingham and Sheffield manufacture, a diſcount of 50 or 60 *per cent.* is frequently allowed.

DISCOURSE, in *Logic*, from *diſcurro*, I run over, an operation of the human mind, whereby it paſſes, or proceeds from one thing to another, that is, from a known thing to an unknown.

The ſchoolmen define it an act of cognition, whereby the mind deduces one thing from another: this it does, when, in conſequence of an aſſent given to one propoſition, it yields aſſent to another: ſo that diſcourſe conſiſts in a dependency of aſſents; and ſuppoſes ſuch an order between the acts, that that belonging to the conſequent ariſes from that belonging to the antecedent. So that the intellect is then ſaid, *diſcurrere*, to diſcourſe; when, from an aſſent to one or more propoſitions, it infers or draws an aſſent to another.

The object of diſcourſe, therefore, or that about which the intellect is employed in diſcourſing, is the connexion of extremes conſidered with regard to ſome third, or medium: thus, when it judges, that every reaſonable animal is riſible, affirming, that there is a connexion between riſibility and rationality; and then finds, there is likewiſe a connexion betwixt man and reaſonable animal; and afterwards gathering from the connexion found between riſible and man, with rational, that man and riſible have likewiſe a connexion, as both are connected with rational; it is ſaid to diſcourſe.

Hence it appears, that diſcourſe, whereon men uſe to value themſelves, does really betray the infirmity of the human underſtanding; as it denotes a chain or ſcale of ſeveral ſucceſſive acts of cognition neceſſary to arrive at a truth. So that there is no diſcourſe in God, who underſtands all things originally and truly. See REASONING.

DISCOURSE, in *Rhetoric*, is uſed in the ſame ſenſe with oration.

DISCOUS FLOWER. Botaniſts reckon two claſſes of plants with a diſcous flower. 1. Such as have the flower compounded, and the ſeed pappous, but the leaves and ſtalks not milky when broken. 2. The corymbiferous plants, whoſe flowers are compounded into a diſcous figure, but their ſeeds not pappous. Of the former kind are the fleabanes, ragweeds, groundſels, &c. and of the latter are daiſies, chamomile, tanſy, wormwood, &c. Theſe are diſtinctions founded by Mr. Ray, but not regarded by the later botaniſts.

DISCRETE, or DISJUNCT, *Proportion*, is, when the ratio between two or more pairs of numbers, or quantities, is the ſame, and yet there is not the ſame proportion between all the four numbers.

Thus, if the numbers 6 : 8 : : 3 : 4 be conſidered; the ratio between the firſt pair, 6 and 8, is the ſame as that between 3 and 4, and therefore theſe numbers are proportional: but it is only diſcretely, or disjunctly; for 6 is not to 8, as 8 to 3; that is, the proportion is broken off between 8 and 3, and is not continued all along, as it is in theſe following, which are called continual proportionals, *viz.* 3 : 6 : : 12 : 24.

DISCRETE *Quantity*, is ſuch as is not continued and joined together. Such is a number, whoſe parts, being diſtinct units, cannot be united into one continuum; for in a continuum there are no actual determinate parts before diviſion, but they are potentially infinite; wherefore it is uſually and truly ſaid, that continued quantity is diviſible *in infinitum*. See CONTINUITY.

DISCREETS, DISCRETÆ, Low Latin, certain nuns who, from their offices or their qualifications, form the council of the abbeſs, prioreſs, or vicareſs, as is ſeen in the rules and conſtitutions of the Clareſſes, Benedictines, &c.

DISCRETION, in *Law*, the faculty of diſcerning between right and wrong; and therefore whoever hath power to act at diſcretion, is bound by the rule of reaſon and law. (2 Inſt. 56. 298.) Infants, &c. under the age of diſcretion, are not puniſhable for crimes; and want of diſcretion is a good exception againſt a witneſs. (2 Hawk. 434.) See AGE, and INFANCY.

The aſſeſſment of fines on offenders committing affrays, &c. the binding of perſons to their good behaviour, and the duration of impriſonment in particular caſes, are ſubmitted to the diſcretion of all judges and juſtices of peace; and, in many caſes, for crimes not capital, the judges have a diſcretionary power to inflict corporal puniſhment on the offenders.

DISCRETIONE, in the *Italian Muſic*, is uſed to direct the ſinger or player to execute his part with care diligently.

DISCRETIVE PROPOSITIONS, are thoſe where various judgments are made, and denoted, by the particles *but*, *notwithſtanding*, or by words of the like nature, either expreſſed or underſtood. Thus, fortune may deprive me of my wealth, *but* not of my virtue; they, who croſs the ſeas, change their climate, *but* not their diſpoſition; are called diſcretive propoſitions,

DISCUS, among the *Ancients*, a name given to a round ſhield, conſecrated to the memory of ſome famous hero, and hung up in the temples of their gods, as a trophy of ſome great action.

From the figure of this diſcus, or rather of that which the Greeks and Romans uſed to divert themſelves with, eſpecially at their public games, and which was a round quoit of braſs, comes the word ſo much in uſe among aſtronomers, *viz.* the diſc of the ſun, or moon. See DISC.

DISCUS, DISCEUS, or DISCIFORMIS *Cometa*, a comet or fiery meteor reſembling a round diſh or platter. The chief of this kind is called a ſolar comet, from the likeneſs of its rays to thoſe of the ſun; it is called alſo roſa and chryſeus, from its bright ſilver colour mixed with a golden or amber one.

DISCUSSION, in matters of literature, ſignifies a clear treating or handling of any point, or problem. The word imports a ſhaking off, or diſpelling the difficulties and obſcurities with which a thing was embarraſſed. We ſay, ſuch a point was well diſcuſſed, when it was well treated of, and cleared up.

DISCUSSION is alſo uſed in a medicinal ſenſe, for a diſperſing the matter of any tumour, or ſwelling, through the pores of the body; or an evacuation of ſome thin matter gathered in any part, by inſenſible perſpiration.

DISCUSSORIA, *Diſcutientia*, διαφορητικα, *diſcutients*. See DISCUTIENTS.

DISCUTIENTS, in *Surgery*, are ſuch applications as tend to promote the abſorption of effuſed fluids or tumours, &c. All ſtimulating lotions, liniments, and even mere friction, will produce this effect; and to the ſame claſs belong Galvaniſm and Electricity. The moſt common embrocations now in uſe, as diſcutients, are ſolutions of ammonia and of ſoap, to which a proportion of alcohol is added. See TUMOUR, BRUISE, SPRAIN, and INFLAMMATION.

DISDAIN, in *Ethics*, is a high degree of contempt, or ſuch as precludes any intercourſe with the party deſpiſed.

DISDIAPASON, in *Muſic*, a compound concord, in the quadruple ratio of 4 to 1, or of 8 to 2.

The diſdiapaſon is produced when the voice goes from the firſt tone to the fifteenth, and may be called a *fifteenth*.

The voice ordinarily does not go farther than from its firſt tone to the diſdiapaſon; *i. e.* it does not go beyond the compaſs of a double octave; for the diſdiapaſon is an octave doubled. It may ſometimes riſe ſeveral tones above a diſdiapaſon, but the effort or ſtruggle diſfigures it, and makes it falſe. In reality, the ancient ſcale, or diagramma, only extended to a diſdiapaſon.

DISDIAPASON-*Diapente*, a concord in a ſextuple ratio of 1 to 6.

DISDIAPASON-*Diateſſaron*, a compound concord in the proportion of 16 to 3.

DISDIAPASON-*Ditone*, a compound conſonance in the proportion of 10 to 2.

DISDIAPASON-*Semiditone*, a compound concord in the proportion of 24 to 35.

DISEASE, in *Medicine*, that condition of the animal economy, in which one or more of the functions is altogether impeded, or is performed with difficulty or with pain.

Various definitions of diſeaſe have been given by different phyſicians Some have laconically defined it *the abſence of health*, forgetting that this involves another definition, that of *health*. Some have deſcribed it as exiſting in particular conditions of the fluids, or of the ſolids. But it is unneceſſary to enquire into the variety of definitions of diſeaſe, ſince the word is well underſtood by all, and is uſed under the ſame acceptation by the peaſant and the philoſopher.

Health and diſeaſe are relative rather than poſitive terms. Few perſons have every organ and function of the body in the moſt perfect ſtate, while yet they may be conſidered as in health; for a very conſiderable variety of condition, both in the mental and bodily functions, is compatible with health. Thus one perſon may be poſſeſſed of great muſcular ſtrength, another may be remarkable for the feebleneſs of his muſcles; yet the health in both may go on uninterrupted. One perſon may be capable of digeſting the moſt inſoluble food, and in large quantities; another may have little appetite for food, and be unable either to take or digeſt any, but the moſt moderate in quantity, or the moſt light and digeſtible in quality; yet neither ſhall be in a ſtate of diſeaſe. Thus, alſo, one ſet of individuals, reſiding in a crowded city, and another in the country, may be both healthy, *i.e.* all their functions may go on regularly, without impediment or uneaſineſs; yet the florid countenance, the ſtrong powers of muſcle, the great digeſtive faculties of the ploughman, mark a conſiderably higher health, a more perfect performance of the functions, than takes place in the inhabitant of the crowded city, whoſe complexion, ſtrength, and appetite, are obviouſly characteriſtic of leſſer powers. The terms health and diſeaſe, therefore, are in ſome degree relative, and muſt be conſidered in regard to an individual, as compared with the generality of men, and with himſelf at different times.

Diſeaſe may occur in all parts of the body, in the fluids and the ſolids, and in each particular organ and function; it may occur ſingly, in one part, or in ſeveral parts at the ſame time: hence diſeaſes may be ſimple or complicated. But the moſt ſimple diſeaſes with which we are acquainted, produce ſeveral morbid appearances, or *ſymptoms*, by which alone they are diſtinguiſhed from each other. Some of theſe are occaſional and accidental; others are conſtant, and ſerve to define and characterize the diſeaſe: and ſome again are the effects of thoſe which ariſe from the original cauſe of the diſeaſe, and are called *ſymptomata ſymptomatum*, the ſymptoms of ſymptoms.

The ſymptoms or ſigns of diſeaſes which are obſerved in the ſick, are extremely various and numerous; yet a knowledge of them is requiſite, both with a view to learn the nature of, and to alleviate or remove the diſeaſes. The ſymptoms are the external characters of diſeaſes, and by obſerving them in certain congeries or groups, like the natural hiſtorian, we acquire a knowledge of thoſe which are commonly connected, thoſe which only accidentally meet together, and thoſe which appear to be incompatible. Experience has pointed out to us the means by which certain congeries may be alleviated; and where our remedies fail, an examination of the organs, after death, enables us to obſerve the connection between certain groups of external ſigns, and the diſordered condition of certain organs. We have a ſtill more uſeful and direct guide, in aſcertaining the ſeat and nature of a diſeaſe, from its external ſigns; namely, that which ariſes out of our knowledge of the nature of the functions of each reſpective

reſpective organ in health, or from the ſcience of phyſiology; which latter is, of courſe, founded upon the knowledge of anatomy. For it muſt be obvious, that, if the function of digeſtion is impeded or ſuſpended, the ſtomach, by which that function is performed, is the organ diſeaſed; if the voluntary power, or the intellectual faculties, are impaired, the brain, which is the common centre of ſenſe and motion, is neceſſarily to be conſidered as the immediate ſeat of the diſorder. But theſe concluſions, again, frequently require the correction of obſervation and experience. For ſo great and numerous are the *ſympathies* between different and diſtant parts of the animal frame, that the functions of a particular organ are frequently diſordered when no eſſential diſeaſe exiſts in it; but when the original diſeaſe is in a diſtant organ. Thus, the ſtomach is violently diſordered, ſickneſs and vomiting being excited, when injury is done to the brain; and, *vice verſâ*, the brain is often affected with pain, giddineſs, &c. when the ſtomach is deranged. In eſtimating the ſymptoms of diſeaſe, therefore, all theſe conſiderations muſt be taken into the account.

The ſymptoms of diſeaſe in the human economy, may be uſefully referred to three heads; to impeded functions, uneaſy ſenſations, and manifeſt changes in the appearance, or other qualities of the body. For every diſeaſe conſiſts principally in the derangement of ſome function: but no function can be much impeded or deranged, without occaſioning ſome pain or uneaſineſs, by which the patient is informed of his indiſpoſition; nor can any one labour under a diſeaſe for any length of time, without ſuffering ſome change from that appearance and form of the perſon, or that complexion of the countenance, which is wont to be connected with good health, as one of its agreeable characteriſtics.

Among the ſigns of diſeaſe, thoſe of the leſions of the animal functions are particularly to be obſerved; the ſigns of derangement, for example, of the ſenſes, and the voluntary motions. Each of the external ſenſes, of hearing, ſeeing, &c. may be diſordered in various ways; they are ſometimes found dull and defective, at other times preternaturally acute, or not exerted without pain; ſometimes they are altogether deranged; the eye repreſenting objects incorrectly, or the ear confounding ſounds. The internal ſenſes, or intellectual functions, are alſo variouſly affected by diſeaſes, as in delirium, mania, melancholia, &c.; theſe demand the moſt rigid attention from the phyſician, not only becauſe theſe derangements conſtitute of themſelves diſeaſes of the utmoſt importance, but becauſe they afford ſtriking indications of the nature, increaſe, and remiſſion of other important diſeaſes, eſpecially in the various kinds of fever, inflammation, &c. Upon the ſame grounds the faculty of motion muſt be obſerved in all its leſions; whether it be ſimply defective, as occurs in diſeaſes in general, which is termed debility; or loſt, as in palſy; or preternaturally increaſed, as ſometimes happens under particular morbid ſtates of the brain; or laſtly, irregular, as in convulſions, cramp, and other ſimilar diſorders.

The ſtate of the ſick in regard to ſleep ought alſo to be attended to; for, whether we conſider it as a function of the body, or as the ſuſpenſion of other functions, it follows its natural laws, in a ſtate of health, and theſe are uſually interrupted in the generality of diſeaſes; ſo that ſleep either altogether forſakes the patient, or it is too intenſe, as in a ſtate of coma, or interrupted at ſhort intervals, or accompanied with inceſſant and frightful dreams; and it is often altogether unrefreſhing.

The conſideration of the ſigns of diſeaſe in the vital functions is of ſtill more importance, not only becauſe we hence learn more fully the nature of the diſeaſe, and the condition of the patient; but becauſe they are in themſelves dangerous, when they are ſevere. Of this ſort are all the varieties of the pulſe; the feeble, ſmall, ſtrong, hard, irregular, or intermitting pulſe, demand particular attention, as they imply a defect of the powers of the circulation and the motion of the blood, or a morbid increaſe of ſtrength and motion, or an irregular and imperfect action of the heart; theſe are eſpecially obſervable in fevers, inflammations, and faintings.

The affections of the function of reſpiration are the next in importance. The unuſual quickneſs or tardineſs of the breathing; or a difficulty, or noiſe in inſpiration, as in aſthma, the ſtertor of apoplexy, or in croup; coughing, ſneezing, ſighing, or other modifications of breathing, are all indications of diſeaſe, which muſt not be overlooked. And to theſe the various affections of the voice muſt be added.

Farther, the ſymptoms of leſion in the natural functions muſt be ſeduloufly obſerved. The hunger or thirſt, the defect, exceſs, depravation, and every unuſual condition of the appetite; the various changes in the act of eating, ſwallowing, and the errors of digeſtion, ſuch as eructations, acidity, ſickneſs, &c.; the ſtate of the bowels, whether too much bound, or too much relaxed, whether flatulent, or in pain; the condition of the ſtools, and of the other ſecretions and excretions, which come more particularly under the cognizance of our ſenſes, as the perſpiration and urine; the exceſs, defect, difficulty, or depravation of theſe reſpectively;—in a word, all the circumſtances of this nature muſt be inveſtigated. Nor are the functions peculiar to each ſex, more particularly thoſe of the female, to be overlooked.

As to the ſecond head of morbid ſymptoms, uneaſy or painful ſenſations, they are the moſt frequent concomitants and ſigns of all diſeaſes; few diſeaſes are free at leaſt from uneaſineſs. For as there is a degree of pleaſurable feeling belonging to the healthful action of all the organs of the body; ſo, when theſe are interrupted and diſturbed, the ſick man ſuffers pain, anxiety, and various diſagreeable ſenſations. Beſides the various modifications of pain which we deſcribe by comparing them with the ſenſations produced by different cauſes, ſuch as a burning, ſtinging, ſtabbing, gnawing pain, a ſhooting, throbbing, binding pain, and ſo forth; itching, tingling, a ſenſe of laſſitude, of torpor, or numbneſs, of ſtupor, of heat, of cold, of weight, naufea, giddineſs, faintneſs, ringing in the ears, and a multitude of uneaſy feelings, indicate the varieties of diſeaſe. Sometimes the ſeverity of theſe feelings conſtitutes the principal part of the diſeaſe; and they agitate and diſtreſs or terrify the patient ſo much, that they become more terrible than even the apprehenſion of death; indeed, in many caſes, theſe painful ſenſations are by no means deſtitute of danger, from whatever cauſe they originate, as they may wear out the powers of life by their inceſſant irritation.

The third head of ſigns of diſeaſe compriſes all thoſe manifeſt morbid changes, which do not come under the preceding, and which we learn from our own obſervation, and not from the words or complainings of the ſick. Theſe are the morbid colour of the body, eſpecially of the countenance, whether it be unuſually pale, red, yellow, duſky, livid, or variable; the peculiar aſpect or expreſſion of countenance, dependent on the actions of the muſcles of the face, or on the circulation of the blood, and often on the ſtate of the mind; an aſpect or expreſſion not eaſy to be deſcribed, but which affords a better index of the condition of the *vires vitæ*, and of the increaſe or diminution of diſeaſe, than any language can expreſs. In particular, the ſtate of the eyes ſhould be examined; the languor or heavineſs, unuſual redneſs, brilliancy, wildneſs, or diſtortion, and other morbid appearances of the eyes, as the hollowneſs, inequality

of

of motion, or of apparent ſize, &c. are indications of various ſtates of diſeaſe. The condition of the mouth, and particularly of the tongue, as redneſs, whiteneſs, foulneſs, blackneſs, dryneſs, afford important indications of the degree, increaſe, and decreaſe of the diſeaſe, as they remain ſtationary, or become more or leſs obvious. The peculiar odours, which ariſe from the patient, or from his excretions, ſometimes contribute to point out the nature of the diſeaſe; as the unuſual fætor of the pulmonary and cutaneous halitus; or of the whole body, as in ſmall-pox; of a part, as in cancer; the ſmell and taſte of the urine in diabetes, &c. And many of the morbid qualities of the body may be aſcertained by the touch; as the heat, cold, dryneſs or moiſture of the ſkin, which are particularly important in the febrile ſtate; and the hardneſs, rigidity, ſoftneſs, thickneſs, ſwelling, or emaciation of different parts of the body, or of the whole, in various other diſeaſes. Theſe manifeſt qualities of diſeaſe ought to be the more carefully inveſtigated; becauſe they are eaſily obſerved, and by no means fallacious, nor can they be concealed by the patients; and beſides, an obſervation of them often ſuperſedes the neceſſity of aſking many diſagreeable queſtions.

Theſe various impediments of the functions, diſtreſſing ſenſations, and obvious external changes of the body, compriſing all the morbid phenomena which are obſerved, occur under various combinations, as to number and degree, conſtituting the characters of the different diſeaſes of the human frame. Each of theſe combinations, or groups of ſymptoms, has a few permanent ones, which mark its eſſential nature. Theſe are called its diagnoſtic, or diſtinguiſhing ſymptoms, and phyſicians have long ago pointed theſe out in moſt of the forms of diſeaſe. Within a century back, theſe have been claſſed and arranged, after the manner of the natural hiſtorians, into a regular ſyſtem, each form being diſtinguiſhed by its generic and ſpecific characters. See Nosology. At preſent we treat of diſeaſe in general.

The *cauſes* of diſeaſe are conſidered by phyſicians, as three-fold; firſt, the *proximate* cauſes, which ſignify the morbid condition itſelf; ſecondly, the *remote* cauſes, which are either *prediſpoſing*, or *occaſional* cauſes, as already explained. See Cause in *Medicine*.

A pre-diſpoſing cauſe, or pre-diſpoſition to diſeaſe, is inherent in the body, although it may often originate from external circumſtances; but the occaſional, or exciting cauſe, may be either internal or external. When they concur in their influence, diſeaſe is produced, which neither could occaſion alone. For every perſon, to whom an exciting cauſe of diſeaſe is applied, does not ſuffer diſeaſe; nor do thoſe in general, who are already pre-diſpoſed to diſeaſe, fall into it, unleſs an exciting cauſe acts upon them. Some pre-diſpoſitions are obvious to our obſervation; ſuch as general or partial debility of the ſolids, a morbid irritability of the ſame parts, a fulneſs of habit, with great ſtrength, &c.; in the latter of which ſtates inflammatory diſeaſes are readily excited; in the others, nervous and chronic diſorders of various ſpecies.—There are ſome exciting cauſes of diſeaſe, nevertheleſs, ſo powerful in their agency, that however ſteady the health and ſtrength of individuals, they will produce their effects. Thus the poiſon of ſmall-pox, and of ſyphilis, will infect the ſtrongeſt; other poiſons will produce death under any circumſtances of health; and cold and heat will injure the body in various ways. And exciting cauſes, which do not immediately occaſion diſeaſe, by continuing their influence, gradually corrupt the moſt healthy conſtitution, and induce a pre-diſpoſition to various diſorders. For the ſame agent may be at one time an exciting, and at another an occaſional cauſe; as may be illuſtrated in the inclemency and viciſſitudes of the weather, in intemperance and luxury, and ſo forth. It is of conſiderable importance in the practice of medicine to aſcertain theſe remote cauſes of diſeaſes, both with a view to prevent their ill effects, and to anticipate their agency; and experience has done much in the inveſtigation, as will be ſeen under the articles of Diſeaſe reſpectively.

The remote cauſes of diſeaſes in the human body operate variouſly. Many are purely *mechanical*, and injure the mechanical ſtructure; ſuch as blows, wounds, bruiſes, ligatures, extraneous ſubſtances introduced, &c. whence originate various inflammations, impoſthumes, fractures, diſlocations, and diſeaſes in the functions of particular organs, thus injured. Others operate *chemically*, that is, decompoſe the parts to which they are applied, or interrupt new combinations of matter, neceſſary to be carried on: of the former ſpecies are ſome chemical poiſons; ſuch as cauſtic potaſs, muriate of mercury or corroſive ſublimate, nitrate of mercury, arſenic, &c.; of the latter ſpecies, is the reſpiration of gaſes or airs, not containing oxygen, or containing carbonic acid, or other deleterious ſubſtance, which interrupts the change of the blood in its paſſage through the lungs.

But the great majority of cauſes of diſeaſe act upon the living ſolid, the irritable fibre, or the nervous energy, or by what other name the animal power of being excited by ſtimulus may be denominated. This power or property is peculiar to living bodies; and various phenomena ariſe from its operation, from its exceſs or defect of exertion, from the exceſs or defect of the ſtimulation applied to it, &c. See Excitement. Perhaps the moſt common exciting cauſes of diſeaſe, through the medium of the nervous power, are *heat* and *cold*, their viciſſitudes and modifications, as with dryneſs, moiſture, &c. After Sanctorius had drawn the attention of phyſicians to the inſenſible perſpiration, and while the humoral pathology prevailed, the morbid operation of cold was ſuppoſed to conſiſt ſolely in the ſuppreſſion of the perſpiration, which was ſaid to be thrown back into the ſyſtem, and to fall upon particular organs, there producing diſeaſe. But we have no evidence of this mechanical transference of fluids; and the modern theory which attributes the operation of cold and heat to the irregularity of vaſcular action, conſequent on the great variations in the ſtimuli applied to the body, appears to be more conſiſtent with the general laws of animal economy. See Cold; Catarrh; &c. From the operation of heat and cold, which, ſtrictly ſpeaking, are but degrees of the ſtimulus of heat, inflammation is occaſionally produced in every organ of the body: hence Catarrh, Pleuriſy, Rheumatiſm, Phrenſy, &c.; hence alſo many diſeaſes of the ſtomach, the bowels, and the ſkin; and hence various idiopathic fevers in all climates.

Next to heat and cold, the influence of *food* and *drink*, as exciting cauſes of diſeaſe, acting on the nervous fibre, may be conſidered as moſt general. Theſe circumſtances, indeed, influence the body in a double manner: they tend, in many inſtances, firſt to induce a pre-diſpoſition to diſeaſes, ſo that other exciting cauſes readily act upon the conſtitution, giving riſe to various maladies: this pre-diſpoſition may conſiſt in a plethoric ſtate of the body, which is liable to inflammatory diſorders; in a debilitated ſtate, from the exceſſive abuſe of ſtrong liquors, which expoſed to various chronic complaints, &c. Or they may act both as pre-diſpoſing and exciting cauſes; thus they produce a gouty conſtitution, and this being eſtabliſhed, an occaſional debauch will bring on a paroxyſm: and the ſame may be ſaid with reſpect

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to apoplexy and hemiplegia. In ſhort, errors in food and drink daily excite diſeaſes. Not to mention drunkenneſs and its immediate conſequences, the head, the ſtomach, the bowels, the kidnies, the conſtitution at large, are variouſly affected by this cauſe; and head-ache in all its forms; ſickneſs, acidity, flatulence, and various forms of dyſpepſia, and of thoſe diſeaſes termed bilious; colic, diarrhœa, dyſentery, and other inteſtinal affections, as well as general fever, in different ſhapes, are all the common reſult of exceſs and miſmanagement in regard to food and drink. (See DIET.) Imperfect nouriſhment, on the other hand, leads to a hoſt of chronic diſorders.

Contagions, or effluvia ariſing from the body under particular ſtates of diſeaſe, as well as the miaſmata from marſhes, &c. excite numerous diſeaſes. The mode in which they operate upon the irritable fibre is not clearly underſtood; but the laws, according to which they are propagated, have been ſatisfactorily inveſtigated. (See CONTAGION.) Their deleterious influence on the nervous ſyſtem, when in a concentrated ſtate, has in ſome inſtances been ſo great, that an almoſt immediate extinction of life has enſued. In the caſe of the plague, almoſt every nation in the world has ſuffered from the morbid effects of contagion. The ſmall-pox, ſcarlet fever, meaſles, and other ſpecific contagions, as they have been called, as well as the contagion of typhus fever, which may be produced under many circumſtances, all afford examples of this ſort of exciting cauſes of diſeaſe. Nor are the non-volatile contagions to be overlooked; the virus of ſyphilis, gonorrhœa, ſcaldhead, itch, &c. operates in a ſimilar way on the living ſyſtem, and induces a ſtate of diſeaſe reſembling that under which it was generated reſpectively.

The animal poiſons, and the vegetable narcotic drugs, have a powerful operation on the nervous power; the former chiefly when infuſed through a wound, and conveyed by the blood to the ſenſorium; the latter alſo through the medium of the ſtomach. Of the former are the poiſon of the viper, rattle-ſnake, &c.; of the latter ſpecies are opium, henbane, cicuta, belladonna, and a numerous tribe beſides; and to theſe we may add alcohol, or diſtilled ſpirits, in the various ſhapes of gin, rum, whiſky, &c. all of which have produced a multiplicity of diſeaſes, and often, when taken in ſufficient quantity, have ſpeedily annihilated the living power.

Among the cauſes of diſeaſe, acting through the medium of the nervous energy, the mental affections muſt be enumerated. All ſtrong or long continued emotions of the mind tend to produce diſeaſes; they derange all the bodily functions, eſpecially the digeſtion and the reſpiration; they interrupt the refreſhment of ſleep, and often, indeed, when ſudden and violent, at once induce diſeaſe, ſometimes death.

Errors in reſpect to ſleep and excerciſe, likewiſe often derange the nervous ſyſtem, and occaſion diſeaſes; eſpecially long watching, over-fatigue, &c.

Many diſeaſes, when once induced, become the pre-diſpoſing, and even exciting cauſes of others. The debility occaſioned by acute diſeaſes, becomes a pre-diſpoſing cauſe to the attacks of other acute and chronic diſeaſes, and eſpecially to a repetition of the ſame acute diſeaſe. Thus, a perſon who had been free from inflammatory ſore throat during the greater part of his life, being expoſed to a powerful exciting cauſe, ſuffers an attack of that diſeaſe, and henceforth the ſlighteſt expoſure to cold will bring it on again. One ſpecies of diſeaſe often excites another: thus, a tuberculated ſtate of the liver induces dropſy of the belly, by impeding the circulation through the hepatic veins, and therefore through the meſenteric and inteſtinal veſſels: ſcarlet fever often brings on anaſarca; common catarrhal inflammation of the bronchial membranes will give riſe to ulceration in the lungs, and induce a fatal conſumption, &c.

Many of the pre-diſpoſing cauſes to diſeaſes, of a particular ſort, conſiſt in obvious qualities: 1. The *age*: many diſeaſes are peculiar to infancy, others to manhood, others again to old age. Hydrocephalus, croup, the irritations of dentition, ſtrophulus, and ſome other cutaneous eruptions, occur almoſt excluſively in the early years of life: the more acute and inflammatory diſorders, as well as diabetes, conſumption, and ſome chronic complaints, are moſt frequent in the middle ages; and in the decline of life, chronic diſeaſes of the lungs, kidneys, bladder; the failure of the external ſenſes, and of the faculties of the underſtanding; palſy, chronic rheumatiſms, &c. are the prevailing diſeaſes. 2. The *ſex*. Each ſex has its peculiar prediſpoſitions in many reſpects; the male, being the more robuſt, is more liable to acute inflammatory diſeaſes; the female, poſſeſſing the more irritable fibre, ſuffers more frequently under hyſterical and nervous complaints, not to mention thoſe connected with the ſexual organs, with the ſtate of pregnancy, &c. 3. *Hereditary conſtitution*. That a liability to particular diſeaſe is tranſmitted from parent to off-ſpring, as well as a reſemblance in external form, and in manner, voice, &c. is too well known to require any evidence to be adduced here in proof of it. The ſins of the fathers are often viſited upon the children, in a phyſical ſenſe, for many generations. The gout, mania, ſcrofula, epilepſy, and many other forms of diſeaſe, are thus obſerved to deſcend through a long ſeries of deſcendants.

The exiſting cauſes of particular claſſes of diſeaſe, are likewiſe obſerved under particular circumſtances of life. Many *trades* give occaſion to certain maladies; thus the painter, the glaſs-cutter, the white-lead manufacturer, and every artiſan in the habit of uſing lead, is liable to attacks of *colica pictonum*, or painter's colic, and to a peculiar and diſtreſſing palſy of the hands, which enſues: millers, hair-dreſſers, chaff cutters, and all thoſe who are expoſed to breathe an atmoſphere, in which various ſubſtances are ſuſpended in the form of an impalpable powder, are liable to aſthma, dyſpnæa, pulmonary conſumption, and other diſeaſes of the lungs: thoſe employed in very ſedentary occupations, frequently ſuffer much from ſtomach complaints, head-ache, hypochondriaſis, and other diſeaſes of debility. Sailors, on long voyages, when confined ſtrictly to the uſe of ſalted animal food, are ſubject to the ſcurvy, a diſeaſe which is comparatively rarely ſeen, except under ſuch circumſtances. In the ſame way, armies in the field are expoſed to particular diſeaſes, dyſentery, infectious fevers, &c. (See CAMP-*diſeaſes*.) Climate, ſeaſon, and peculiar epidemic conſtitutions of the atmoſphere, are alſo ranked among the circumſtances modifying diſeaſes.

Diſeaſes have a conſiderable influence in modifying each other. We have already obſerved, that they ſometimes give riſe to one another; but they likewiſe are converted into each other; *i. e.* the original diſeaſe will excite a ſecond, and will itſelf diſappear. When a ſimilar diſeaſe is transferred from one part to another, or when a diſeaſe, of one kind, ceaſes in a part, and another diſeaſe ariſes in another part, this is termed a *metaſtaſis*. See CONVERSION *of diſeaſes*, where this point is diſcuſſed at length.

But diſeaſes alſo cure each other, or ſuſpend each other's action. It is a fact, in the animal economy, which was particularly pointed out by the late Mr. John Hunter, that certain operations of the ſyſtem are incompatible with certain others: thus, that febrile proceſs of the animal body, which produces the eruption of ſmall-pox, cannot go on at

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the ſame time with that which brings forth the eruption of meaſles; ſo that, if the contagion of theſe two diſeaſes be received nearly at the ſame time, the one will lie dormant during the whole progreſs of the other; and that having been completed, it will then commence, and complete its own courſe independently; or if one has already begun to appear, it will ſometimes diſappear during the operation of the other contagion, and re-appear, and go through its ſtages, on the ceſſation of the latter. This is generally true with reſpect to all the febrile contagious diſeaſes, chicken-pox, ſcarlet-fever, as well as thoſe juſt mentioned. The cow-pox and the ſmall-pox continue their action together, which implies, that their operation on the ſyſtem is the ſame. The general rule, however, that no two morbid actions can take place at the ſame time, is not altogether without its exceptions. Beſides theſe contagious fevers, various other diſeaſes are occaſionally interrupted and ſuſpended by the occurrence of others; mania is ſometimes ſuſpended by fever; we have mentioned two inſtances of diabetes ſuſpended by acute diſeaſes; phthiſis pulmonalis is occaſionally ſuſpended by a ſtate of pregnancy, &c.

The *proximate* cauſes of diſeaſe are, in fact, the eſſential morbid conditions of the whole body or its parts, according as the diſeaſe is general or local; or, in other words, they imply the diſeaſe itſelf: "præſens morbum facit, ſublata tollit, mutata mutat." The ſpeculations of phyſicians, reſpecting the proximate cauſes of diſeaſe, have been very various in different ages, according to the prevalent philoſophy; a circumſtance in which their futility is implied; for the operations of nature are immutable, and theories that are founded on the obſervation of nature alone, cannot change with the caprice of ſpeculative minds. It has been the misfortune of medicine, that the ſpeculative and mechanical ſciences had received a previous cultivation; and hence, that transferring their hypotheſes upon theſe topics to the animal ſyſtem, phyſicians have diſtorted all their views of the natural operations of that ſyſtem, and therefore have deceived themſelves in what they conceive to be an inveſtigation of facts. They ſet out, in the early ages, with the doctrine of Ariſtotle, Plato, and Pythagoras, reſpecting the elements, the temperaments, the harmony of numbers, the power of uneven numbers, &c., hypotheſes, which in fact, after the lapſe of more than two thouſand years, have not loſt all their influence with mankind. As the ſciences of chemiſtry, mathematics, and mechanics, ſucceſſively claimed the attention of the philoſophers, before they had learned the neceſſity of diſcriminating between facts aſcertained by experiment and obſervation, and their own conjectures and opinions, medicine was darkened and obſtructed by the language and hypotheſes borrowed from thoſe ſciences. To the elements, qualities, concoctions, and criſes of the Greeks, commented upon at large by Galen, and adopted by the Arabians, as ſatisfactory explanations of the eſſence of all morbid conditions; the ſalt, ſulphur, and mercury, the acids and alkalies, the effervеſcences, fermentations, and ebullitions, of the chemiſts ſucceeded: next the mathematicians waged war againſt theſe doctrines, as inapplicable to the explanation of diſeaſes, and undertook to explain them by axioms, and lemmas, problems, theorems, and ſo on; with which they flouriſhed plauſibly enough on paper, but which, it ſhould ſeem, would avail them little at the ſide of the ſick. Then the doctrines of mechanical relaxation and diſtention of obſtruction, and error loci, of lentor or tenuity of the humours, &c. ſuperſeded the opinions of the mathematicians. The phyſicians of the laſt century have gradually approached to a more accurate knowledge of the cauſes of diſeaſe, by the cultivation of anatomy, and phyſiology, by a more cloſe and experimental inveſtigation of the phenomena of health and diſeaſe: and that principle in the animal body, the nervous power, or irritability, which was firſt attended to in the ſchools of Hoffman and Stahl, has gradually been appreciated, and acknowledged, as the peculiar characteriſtic of the living body, in the ſyſtems of Cullen, Brown, and Darwin, and in the writings of practical phyſicians. Thoſe phyſicians, it is true, more eſpecially the two latter, have too haſtily generalized the facts, which have been aſcertained on this ſubject, and therefore their hypotheſes are ſharing the fate of thoſe of their predeceſſors. See MEDICINE. This is the age of experiment in medicine, rather than of ſyſtem and hypotheſis; but much remains yet to be done, before we can attempt to give a ſatisfactory account of the proximate cauſes of diſeaſes in general. Many morbid changes take place, which are not accompanied by any palpable or viſible alterations in the ſtructure of parts, but are cognizable by the derangements of the functions only; ſuch are the extreme depreſſion of muſcular ſtrength in the onſet of fever; the morbid increaſe of it in ſome forms of mania; &c. which depend upon ſome condition of the nervous power, which can only be appreciated by the obvious phenomena that are connected with it.

It is with theſe phenomena or ſymptoms alone, therefore, that the phyſician is required to occupy his attention; and, by means of theſe external ſigns, he will be able to diſcover thoſe varieties of the internal condition of the body, which will guide him ſafely and uſefully in the application of his remedies; although he may be unable to ſtate the eſſence of diſeaſes, as the natural philoſopher is unable to explain the eſſential nature of gravitation, electricity, or magnetiſm, but nevertheleſs ſatisfactorily traces their laws. An obſervation of the different morbid phenomena, as they are combined in different forms of diſeaſe, conſtitutes what is technically termed, the DIAGNOSIS, and is neceſſarily implied in every rational attempt to cure diſeaſes.

One of the moſt obvious and general diſtinctions which occurs to the obſerver of diſeaſes, is that of the two great claſſes of *acute* and *chronic* diſeaſe. *Acute* diſeaſes are thoſe, in which there is a great and ſudden perturbation of the vital and natural functions; as frequent pulſe, thirſt, quick reſpiration, heat of ſkin, and the other phenomena of fever; the animal functions alſo frequently ſuffering as in delirium, phrenſy, &c. They neceſſarily run through their courſe, and terminate in death, in recovery, or in ſome chronic diſeaſe, within a ſhort ſpace of time. The various continued, remittent, and exanthematous fevers, as well as the organic inflammations, cynanche, pleuriſy, enteritis, &c. are examples of acute diſeaſes. *Chronic* diſeaſes, from χρόνος, *time*, are ſuch as, on the contrary, produce ſlow and gradual changes in the health; they are not attended with any violent and continued perturbations of the functions, and may go on for months, and even years. They are not connected with fever, properly ſo called, but are often accompanied by the daily paroxyſms of *hectic* fever; which, without violently diſturbing the functions, contributes, by the daily repetition of its irritations, to wear out the vital powers. Phthiſis pulmonalis, tabes meſenterica, and other forms of decline, dropſies, ſcurvy, diabetes, &c. are examples of chronic diſeaſes.

Another diſtinction of diſeaſes, is of thoſe which are *general*, or affect the functions of the body in general, and thoſe which are *local*, or are confined in their effects to ſome particular part. Perhaps it is not ſtrictly correct to ſpeak of a general diſeaſe; if there is a diſeaſe in which the whole ſyſtem is affected at once, it is idiopathic fever; but even in this complaint, it is diſputed whether there be not, as in all other

other inſtances, ſome local diſorder, which excites the morbid action in the ſyſtem at large, by a general ſympathy. See Clutterbuck's Eſſay on Fevers, 1807. For practical purpoſes, however, it is proper to diſtinguiſh thoſe morbid appearances, which are connected with ſome conſtitutional diſorder, from thoſe which are merely local; becauſe the remedies of the firſt muſt be applied through the medium of the conſtitution at large, by the ſtomach, the cutaneous abſorbents, &c. to the diſeaſed parts; while thoſe of the laſt muſt be applied immediately to the parts themſelves. Thus the local cutaneous eruptions, in ſyphilis, require the ſtate of conſtitution to be thoroughly changed by medicine, before they can be cured; thoſe of itch, ring-worm, &c. can be removed only by external topical applications; and conſtitutional remedies are of no avail.

For the other diſtinctions of diſeaſe, ſuch as corporeal and mental, inflammatory, ſpaſmodic, &c. ſee NOSOLOGY, INFLAMMATION, &c.: and for the diagnoſtics of the particular denominations of diſeaſe, ſee the generic titles reſpectively.

There is another diſtinction, which it may, perhaps, appear to be unneceſſary to notice, namely, that of *feigned* diſeaſes, from thoſe which are *real*. But deceptions of this kind are conſtantly practiſed, from various motives, both upon medical practitioners and upon the world at large; in public hoſpitals, and other charitable inſtitutions, impoſitions of this ſort are but too commonly attempted. The only means of diſcrimination are to be found in the incongruity of the deſcriptions, or of the ſymptoms which the patient exhibits, with the appearances obſerved by the practitioner. Thus, if the functions of the ſtomach go on well, if the ſleep is good, if the pulſe is calm, and the tongue without fur, it would be obvious in general that no very acute ſymptoms could exiſt, whatever might be the pretended account of the patient's feelings. Under ſuſpicious circumſtances of this nature; in the Royal Infirmary at Edinburgh, Dr. Cullen uſed to inflict the puniſhment of a bliſter, intimating to the ſtudents that his object was to detect a deception. "Applicetur emplaſtrum veſicatorium," he would ſay, "ad eliciendam veritatem;" to draw out *the truth*. Nervous diſeaſes, particularly hyſterical and convulſive fits, are doubtleſs often feigned, for ſiniſter purpoſes: catalepſy, as authors have deſcribed it, was believed by Dr. Cullen to be always a feigned diſeaſe. A curious volume might be formed of the hiſtories of deceptions of this kind; and of the diſeaſes actually inflicted by individuals upon themſelves, for which they have applied for medical aid, in hoſpitals, &c. and continued to keep up the diſorders, to the great perplexity of their phyſicians, till their deceptions were detected by accident. One woman was actually expoſed on the table before the ſtudents of a large hoſpital in London, preparatory to the operation of lithotomy; but by the caution of the ſurgeon the extraordinary deception was detected; a hard ſubſtance being diſcovered to have been artificially introduced into the vagina.

Numerous and various, however, as are the real diſorders, to which the human conſtitution is expoſed, it is not deſtitute of hope, or of the means of a reſtoration of health, when diſeaſe has once invaded it. For it is happily poſſeſſed of an internal power, which preſerves it from the ill effects of many diſeaſes, and which ſpeedily diſſolves ſome, already begun, and carries others through their courſe more ſlowly to convaleſcence. This power of the animal economy has been denominated the *vis medicatrix naturæ*, and in the theories of ſome phyſicians has been conſidered too much in the light of a rational agent. The term, in fact, merely implies a diſpoſition in the conſtitution to recover from its diſeaſes: and it muſt be obvious, that, if ſuch a diſpoſition did not exiſt, it would be vain to attempt to cure them by medicine. For all that medicine, of the moſt active powers, can effect, is to excite, to direct, and to regulate that diſpoſition. Medicine has no influence on the dead body; and, uſed contrary to the natural efforts of the conſtitution, is of no avail. By the force of this diſpoſition wounds heal, hæmorrhages are ſuppreſſed, fractured bones re-unite; and many noxious matters are ejected from the body, by the very morbid actions which themſelves excite; and thus many evils, which were otherwiſe beyond the reach of art, diſappear ſpontaneouſly, without any external aſſiſtance. It is, therefore, of the higheſt importance to obſerve minutely the powers of the conſtitution, and the tendency of their operation; that, in the cure of diſeaſes, we may ſtimulate them, when too languid, or, when obviouſly deficient, we may imitate their actions by art. Much of the recent improvements in the medical art conſiſts in having exploded many of the abſurd interferences with the proceſſes of nature in the conſtitution; and in many diſeaſes, eſpecially of the febrile kind, when no organ of the body is particularly ſuffering, the principal buſineſs of the phyſician is to watch the progreſs of the natural efforts, to prevent all unneceſſary interference, and to be active only when the vital organs are likely to ſuffer.

The actions of the conſtitution, however, are not always to be confided in as ſalutary; ſometimes they are too weak to be uſeful; at other times they are vehement, and exceſſive, inſomuch that more miſchief is to be apprehended from their continuance, than from the diſeaſe itſelf. In ſlight diſorders the conſtitutional efforts are ſufficient to reſtore the health: but no phyſician could ſafely truſt the lues venerea, or inflammations of the viſcera, to the *vires medicatrices naturæ*; for in the former, no ſalutary effort whatever is made by the conſtitution; in the latter, the vehemence of its efforts is pregnant with danger, as they tend the more certainly to gangrene, or to ſuppuration, which, in the internal organs, is ſcarcely leſs fatal.

It is neceſſary, therefore, to be on our guard againſt a double error; and neither to neglect the efforts of nature too much, on the one hand, nor to bend to them too religiouſly on the other. For it is, obviouſly, ſo far from being always expedient to follow her footſteps cloſely, that it is often requiſite to purſue a contrary march, and to oppoſe the exertions of the conſtitution by all poſſible meaſures. Indeed in the profuſion of ſubſtances in exiſtence, which have extenſive powers over the human economy, and produce various and moſt ſtriking changes in its condition, nature appears to ſuggeſt to man this occaſional interference with his conſtitution. Thus many cauſes of diſeaſe may be converted, by the ſagacity of the phyſician, into the moſt uſeful auxiliaries in his art; ſince whatever violently ſtimulates the animal frame, may be, under one mode of adminiſtration, the cauſe of death, and, under another, the beſt remedy. Such are, in fact, the powers of the moſt valuable medicines, as opium, mercury, the mineral acids, &c.

Experience, then, guided by a knowledge of the cauſes and tendencies of diſeaſe, muſt teach us when to look on as quiet ſpectators, when to aid, and when to reſtrain the morbid efforts of the conſtitution. The phyſician, therefore, who with this knowledge and experience combines an acquaintance with the properties and effects of medicines, will ſeldom be perplexed in determining upon effectual meaſures of relief, againſt the various diſeaſes that may occur. The mode of fulfilling his views, in the uſe and choice of remedies, conſtitutes the art of THERAPEUTICS; which ſee.

Many writers of underſtanding have affected to deſpiſe the art of curing diſeaſes, conſidering it as built entirely upon

upon conjecture, unſupported by thoſe inductions from well aſcertained facts, on which the phyſical ſciences reſt; and conſequently as guided by no better rules than thoſe which the caprice or ſhrewd gueſſes of individuals may have ſuggeſted. And ſome phyſicians, it muſt be acknowledged, have given cauſe for ſuch opinions, in all ages, by the abſurdity of their hypotheſes; while others, by the ſolemn myſtery with which they have attempted to cloak their ignorance, or to give an air of importance to the profeſſion, have excited a ſuſpicion that concealment was neceſſary for the ſucceſs of a craft, which would be contemned for its imbecility, if expoſed. But this myſtery is deprecated by all rational phyſicians. The truth is, that the phenomena of the animal economy are as regular and immutable as the other phenomena of nature; and conſequently are as open to obſervation, and as capable of generalization and arrangement; that is, of being reduced to a ſcience, as the other departments of natural knowledge. The facts, indeed, have not as yet been ſufficiently noted, to enable us to form a perfect theory; as is likewiſe the caſe with the chemical, electrical, and magnetical ſciences. Much yet remains to be done, but much alſo has been done, in all thoſe ſciences, and in medicine, among the reſt, in the courſe of the paſt century. The ſyſtem of abſorbent veſſels, of ſo much importance in the animal economy, has been diſcovered; a nearer approximation to the knowledge of the proceſs of reſpiration, and the changes of the blood in its courſe, has been made by the aid of chemiſtry; the phenomena of irritability have been the ſubject of ſucceſsful examination, to a great extent, and many of its laws aſcertained, both in health and diſeaſe; the effects of many powerful agents on the animal body have been diſcovered experimentally, and many general concluſions reſpecting them obtained, ſuch as thoſe of cold, of heat, of contagion, and ſome active remedies, arſenic, mercury, &c. have been more amply appreciated, within the period juſt mentioned. The ſcience of medicine, therefore, like other branches of natural knowledge, is in a courſe of advancement, and that upon the ſame ſure grounds of obſervation and experience. The hiſtory of diſeaſes will alſo afford ample evidence of the progreſs of this improvement. The contagious diſeaſes of the old world are greatly diminiſhed in their extent and fatality. Of the plague we know little more than hiſtory teaches us: the ſcarlet fever, which, under a hundred denominations, was the ſcourge of Europe for ſeveral centuries, is now comparatively rendered harmleſs. (See Willan on Cutan. Diſeaſes, part iii.) The ſmall-pox has been ameliorated by inoculation and cool treatment, and now appears likely to be exterminated by the diſcovery of the cow-pox. And many other individual diſeaſes may be enumerated, of which the fatality has been greatly diminiſhed.

In ſhort, as facts accumulate, the ſcience advances towards certainty and perfection. The circumſtances which influence diſeaſe in the animal economy are numerous; their combinations, perhaps, innumerable; ſo that the ſcience of life is neceſſarily more complicated than that of dead matter; but the principles on which they both are founded are the ſame, *viz.* fact aſcertained by experiment. The variety and complication of the phenomena of health and diſeaſe point out, in the moſt irrefragable manner, the neceſſity of various applications, in the way of remedy, and the conſequent abſurdity of the expectation that any one remedy can be effectual in the cure of all, or of many diſeaſes. Nothing, therefore, except the effrontery of empirics, can equal their error and falſehood, in the aſſurances of the general virtues of the remedies which they promulgate.

The power of the mind over the diſeaſes of the body is very conſiderable; inſomuch that very ſtrong impreſſions, excited in the former, will often remove the diſorders of the latter; eſpecially impreſſions of hope and confidence. This power was ſtrongly illuſtrated in the influence of the profeſſors of animal magnetiſm, and more lately in the uſe of the tractors of Perkins in the cure of many ſlight diſeaſes. There can be little doubt that this principle influences the effect of remedies, under the beſt adminiſtration, and aids their curative operation. (See Dr. Haygarth's pamphlet on the influence of imagination in the cure of Diſeaſes. See alſo Dr. Franklin's report of the French commiſſioners, appointed to inveſtigate animal magnetiſm.) Hence, there can be little doubt, that many remedies have obtained the reputation of efficacy in the cure of diſeaſes, which, in conſequence of the confidence of the patient in their virtues, or ſome other impreſſion on the mind, have been followed by a recovery of health, in the procuring of which they had phyſically no influence.

The reader will find the indications of cure, and the remedies, which experience has ſuggeſted for the fulfilment of thoſe indications in the various forms of diſeaſe, under the titles of thoſe diſeaſes reſpectively. See Gregory Conſpect. Med. Theoret. tom. i.

Diseases *of Plants*, in *Vegetation*, are ſuch affections as take place in vegetables from ſome derangement in the actions or functions either of the whole, or ſome particular part of them. They proceed from a great variety of different cauſes, and have very different appearances as they affect the wood, the bark, or the leaves of the plants. Theſe diſeaſes may, perhaps, be conſidered, in moſt caſes, as proceeding from internal decay, a morbid ſtate of the circulating fluids, blights, lightning, and the attacks of animals of the inſect kind.

But as particular trees and plants are liable to be affected by particular diſeaſes, their cauſes, nature, and means of removal, will be more properly treated of under the names by which they are uſually denominated, and after deſcribing the plants. See Plants, *diſeaſes of*.

DISEL, in *Geography*, a town of Perſia, in the province of Khoraſan; 18 miles S. E. of Herat.

DISEMBARK, ſignifies to land goods from on ſhipboard.

DISEMBODY. See Embody.

DISEMBOGUE. When a ſhip paſſes out of the mouth of ſome great gulf or bay, they call it diſemboguing. They ſay, alſo, of a river, that at ſuch a place, or after it has run ſo many leagues, it diſembogues itſelf into the ſea.

DISENTIS, or Dissentis, in *Geography*, a ſmall town of Switzerland, in the canton of the Griſons, ſituated in a mountainous but fertile diſtrict, irrigated by two ſources of the Rhine, and remarkable for a rich abbey, which is ſaid to have been founded in the ſeventh century, and of which St. Sigiſbertus is reported to have been the firſt abbot from the year 1614 to 1636. It is ſituated between Tavetſch and Trons. The abbot of Diſentis, Peter of Pictlingen, was one of the three patriots who firſt ſwore allegiance to the Helvetic confederacy under the lime tree at Trons.

DISERGOT, in the *Manege*. See Ergot.

DISFIGURING, in *Law*. See Mayhem.

DISFRANCHISING, the taking away one's freedom, or privilege. See Franchise.

DISGORGE, in the *Manege*, is uſed for diſcuſſing or diſperſing an inflammation or ſwelling: thus, if a horſe's legs are gorged or ſwelled, we ſay he muſt be walked out to diſgorge them.

DISGRACE, in a *Military Senſe*, has various modifications; from abſolute infamy to ſimple reprimand; it is alſo variable in its extent according to the rank of the perſon to whom

whom reprehenſion may be given; thus, what would be but a ſlight reprimand to a young officer, would, if uſed towards a veteran, who ſhould be ſuppoſed to underſtand the whole of his duty, and to act on all occaſions with the ſtricteſt propriety, be a ſevere cenſure, and tend to degrade him in the minds of his equals. The term diſgrace is, however, generally applied to the puniſhment inflicted by a court martial; eſpecially when the ſentence is to be carried into effect upon an officer in a public manner; ſuch as reading the deciſion of the court on a parade in front of a body of troops; though it is more uſual to diſpenſe with the attendance of the party, unleſs in caſes of cowardice, and ſuch ignoble conduct as demands the moſt exemplary puniſhment. The policy of debaſing the ſubordinates from witneſſing the expulſion of an officer is certainly proper; hence we conſider the ordinary mode of deputing a perſon to deliver the ſentence to the offender, to be highly politic and commendable.

But where the court have reſolved to break an officer in the moſt ſevere manner, which is always implied under the terms of "breaking with infamy," the foregoing diſpenſation cannot with propriety be indulged in. The party, on ſuch occaſions, muſt be brought to the parade; when the ſentence having been publicly announced, and his majeſty's approval declared, the officer, who is immediately inſtrumental in carrying the ſentence into execution, breaks the culprit's ſword over his head, and after cutting his ſaſh into pieces, tramples them under foot, and conducts the party beyond the limits of the camp or garriſon. In ſome ſervices the ceremony is performed under a gibbet, but more eſpecially when the court have ſentenced the offender to death, and that the ſovereign commutes the puniſhment to breaking with infamy.

It, however, is to be obſerved, that no officer, or ſoldier, can be broke *with infamy* except by the deciſion of a competent court; and the impoſing ſuch a puniſhment upon any man, in lieu of any other, even of death, is obviouſly againſt the ſtatute, becauſe a perſon broke with infamy is incompetent to become a witneſs in any cauſe; whereas one convicted of any crime whatever, provided he obtain the king's pardon, is reſtored to his credit, and may be adduced as a teſtimony in any court, civil or military; at leaſt ſuch are the opinions of our beſt law authorities, ſuch as Hawkins, Holt, and Hale, who all admitted a pardoned felon to give evidence, while they invariably rejected ſuch as had ſtood in the pillory, or had been publicly whipped, or who had been branded by the ſentence of any court having juriſdiction competent to inflict ſuch puniſhments.

It therefore behoves every perſon in authority, eſpecially military men, who are not always ſufficient judges of the law, to be very careful how they commute puniſhments; at leaſt without conſent of the party; but even that might not ſave them from damages in a civil court, ſince the fear of death, &c. might be urged in plea for an aſſent, and be found a ſufficient ground for proſecution.

Diſgracing a regiment is, eraſing its number from the military calendar: this has on various occaſions been done, the corps being firſt broken and its colours burnt.

A ſoldier is held to be *in diſgrace*, who is obliged, for any ſpecified number of days, to wear his coat the wrong ſide outwards, ſo as to diſtinguiſh him from the deſerving part of the regiment. We regret much that ſuch means are not more generally reſorted to, for the puniſhment of ſlight offences: from what we can collect, many very important reformations have been effected by attacking the pride, rather *than the backs of the ſoldiery*.

DISGUISE. Perſons doing unlawful acts in diſguiſe, are, by our ſtatutes, ſometimes ſubjected to great penalties, and even declared felons. Thus, perſons convicted of hunting in diſguiſe, in foreſts, parks, or warrens, or of unlawful hunting in the night, are to ſuffer as felons. But the principal act of parliament, in this reſpect, is that commonly called the *Black Act*, which ſee.

DISH, in *Mining*, is a trough made of wood, about twenty-eight inches long, four inches deep, and ſix inches wide; by which all miners meaſure their ore. If any be taken ſelling their ore, not firſt meaſuring it by the barmaſter's diſh, and paying the king's duties, the ſeller forfeits his ore, and the buyer forfeits, for every ſuch offence, forty ſhillings to the lord of the field, or farmer. See MINING.

DISHERISON, an old word of the ſame import as diſinheriting. Our lord the king, conſidering his own damage, and diſheriſon of the crown, &c. Stat. 20 Ed. I. 8 Richard II.

DISHERITOR, a perſon who diſherits, or puts another out of his inheritance. The ſheriff ſhall, forthwith, be puniſhed as a diſheritor of our lord the king, and his crown. Stat. 3 Edw. 1. c. 39.

DISHNE, in *Geography*, a town of Egypt; 16 miles N.E. of Menuf.

DISIMIEU, a ſmall town of France, in the department of the Iſerè; 3 miles S.E. of Cremieu.

DISINTEGRATION, in *Geology*, implies the ſeparation of the integrant parts of mountains and ſtrata, by the viciſſitudes of the atmoſphere, the abſorption and congelation of water in conſequence of the ſudden dilatations and contractions thereby produced, &c.; by means of diſintegration, the primitive mountains are ſuppoſed by ſome to have been ſo far lowered, degraded, and decompoſed, as to have furniſhed matter for the ſubſequent formation of what they call the ſecondary ſtrata: this opinion ſeems, however, to be faſt giving way, and the DEPOSITION *of Strata*, (ſee that article) to be accounted for, on principles ſimilar to thoſe which operated in the formation of the ſubſtances called primitive.

DISJUNCT PROPORTION. See DISCRETE *Proportion*.

DISJUNCTIVE denotes ſomething that ſeparates or disjoins. Thus, disjunctive conjunctions ſignify a ſpecies of words which bear this contradictory name, becauſe, while they disjoin the ſenſe, they conjoin the ſentences; or, whilſt they connect a diſcourſe, they ſeparate its parts; or, they are ſuch as denote the relations of diverſity, or oppoſition. Of theſe disjunctives, ſome are ſimple, and ſome adverſative; for an account of which, ſee ADVERSATIVE and CONJUNCTION.

DISJUNCTIVE *Propoſitions*, in *Logic*, are compound propoſitions, conſiſting of two members, or parts, connected by a disjunctive conjunction.

The firſt propoſition of a dilemma is uſually a disjunctive propoſition.

> "You muſt either obey the king, or be a rebel.
> But you muſt not be a rebel.
> Therefore you muſt obey the king."

DISK. See DISC and DISCUS.

DISK, in *Botany*, the central part of a compound, or ſyngeneſious flower, oppoſed to the marginal, or radiant part. The diſk is either flat, as in the Ox-eye, or *Chryſanthemum*, or conical, as in the Daiſy. Its colour is almoſt univerſally yellow; ſometimes white, as in *Achillea*, in which caſe, the radius alſo is white, or reddiſh. "No inſtance is known of yellow rays with a white, red, or blue diſk." Sm. Introd. to Botany, 308.

Diſk is alſo uſed for the middle part of the upper ſurface of a leaf, excluſive of all lobes, ſegments, or indentations.

DISKO Bay, in *Geography*, a large bay of Greenland, ſeparating the main land from the iſland of Diſko; in which bay there is a multitude of ſmall iſlands, the principal being the Weſt, Whale, Green, Dog, and Dunk iſlands. Some of theſe are extended eaſtwards as far as Spiring bay, and ſome northwards to Diſko iſland. N. lat. 68°—70°. W. long. about 45° 46′. The whole bay is about 160 leagues in circumference. The land is high, flat above, and covered with ice. Beneath, near the ſhips' road, the country is flat and level. The Dutch maps intimate, that on a place they call Schaus, good coals have been found, but they were never uſed. On this iſland are many rein-deer, which are found on no other iſland. The water between this and the firm land is called Waigat, and is ſix leagues broad. The fiſhery in the bay is the beſt in the whole country; in the winter, when the water of the bay is frozen, the Greenlanders take a multitude of ſeals on the ice, and in the ſpring they catch ſmall whales, and ſometimes large ones. Many Dutch whale fiſhers have formerly been accuſtomed to viſit this place every year. Diſko bay is the moſt populous place on the coaſt, except thoſe parts fartheſt to the ſouth, where no colonies have been eſtabliſhed. Diſko is alſo the beſt place for trade. Several colonies were eſtabliſhed by the Moravian miſſionaries, in the vicinity of this bay, from the year 1734, to the year 1758. The Greenlanders of Diſko ſay, that the country is inhabited for 209 leagues upward, that is, as far as the 78th degree, but very thinly; for though there is plenty of eider-fowls, white bears, ſeals, and whales, yet no perſon wiſhed to live there for a long time, on account of the tedious melancholy winter nights. They alſo were in want of food and iron, which they procured in barter from the Southlanders for unicorn-horn. The land was nothing but dreary rock and ice, and did not produce ſo much graſs as they uſed in their ſhoes, and, therefore, they were under a neceſſity of bartering alſo for graſs. Inſtead of making their houſes with wood-work and turf, they make them with the horn of unicorn-fiſh, clay, and ſeal-ſkins. The land is ſaid to ſtretch N.W., towards America, and is fenced with many iſlands. Here and there, it is ſaid, there are ſtones ſtanding erect, with arms extended, like the guide-poſts in our country. Fear has ſuggeſted to the inhabitants, that there ſtands a great "Kablunak," or European, on a certain hill, to whom they offer a piece of whale-bone when they paſs by. A miſſionary reports, that in Diſko bay, on a point which the whale-fiſhers ſay is 300 fathom deep, ſeveral ice mountains have ſtood faſt for many years; one of which they call the city of Harlem, and another, Amſterdam. Sometimes they faſten their ſhips to them, and unload their train-barrels on the flat ice. Crantz's Hiſt. of Greenland, vol. i.

DISLOCATION, in *Geology*, ſignifies the diſplacements of the parts of mountains, and the pieces of the ſtrata of the earth, from the ſituation which the ſame once occupied, when in contact with each other. The fiſſures, faults, flips, dykes, troubles, hitches, traps, rifts, breaks, loads, veins, knots, &c. which occaſion theſe diſlocations, are evident fractures of the matters compoſing the cruſt of the earth, after the ſame had aſſumed a ſolid form, and their edges, in moſt inſtances, preſent evidence of the moſt violent mechanical action, and rubbing againſt each other (Philoſophical Magazine, xxviii. p. 120.) indicating their having frequently ſlid, or ground againſt each other, even where no alteration in the level of the diſlocated parts of the ſtrata are now obſervable. See Continent, Denudation, &c.

DISLOCATION, in *Surgery*. See Luxation.

DISMAL, in *Geography*, a ſwamp of N. America, in the townſhip of Milton, Lincoln county, Maine.

Dismal *Swamp*, called the "Great Diſmal," in order to diſtinguiſh it from another ſwamp called Diſmal in Currituck county, is a very large bog, extending from N. to S. near 30 miles, and from E. to W. at a medium, about 10 miles; partly in Virginia, and partly in N. Carolina. Five navigable rivers, beſides creeks, riſe from it; two run into Virginia, *viz.* the S. branch of Elizabeth, and S. branch of Nanſemond river; and three into N. Carolina, *viz.* North river, North-weſt river, and Perquimons. The heads of theſe rivers lie concealed in the Diſmal, as no ſigns of them appear above ground, and therefore the ſwamp from which they originate muſt be amply ſupplied either from ſubterraneous ſtores, or by the water that drains into it from the high lands. The ſkirts of the ſwamp towards the N.E. are overgrown with reeds, 10 or 12 feet high, interſperſed every where with bamboo briars. Among theſe grows here and there a cypreſs, or a white cedar. Towards the S. end is a large tract of reeds, which being conſtantly green and waving in the wind, is called the green ſea. In many parts, eſpecially on the borders, is found, in abundance, an ever-green ſhrub, called the gall-buſh, from its bearing a berry, which dyes a black colour like the gall of an oak. No beaſt, bird, reptile, or inſect, approaches this horrible deſert. The noxious vapours that aſcend from it infect the air about it, and occaſion agues and other diſtempers to the neighbouring inhabitants. This dreadful ſwamp was judged impaſſable, till the line, dividing Virginia from N. Carolina, was carried through it, in N. lat. 36° 28′, in the year 1728, by order of king George II.; the men employed were not without apprehenſions of being ſtarved, as they were ten days in accompliſhing the work. This ſwamp is chiefly owned by two companies, *viz.* the Virginia company, of which Gen. Waſhington was one, owning 100,000 acres, and the N. Carolina company, which owns 40,000 acres. In the midſt of the ſwamp is a lake, about ſeven miles long, called "Drummond's pond," whoſe waters diſcharge themſelves into Paſquotank river, that empties into Albemarle ſound, and on the north into Elizabeth and Nanſemond rivers, which fall into James river. A navigable canal is forming in order to connect the navigable water of Paſquotank and Elizabeth river, through a diſtance of about 14 miles. This canal will open an inland navigation from the head of Cheſapeak bay, including all the rivers in Virginia, to George-town in S. Carolina; and when the ſhort canal from Elk river to Chriſtiana creek is opened, the communication will extend to Philadelphia and the other parts connected with Delaware river. Morſe.

DISMASTED, in *Sea Language*, denotes the ſtate of a ſhip, when ſhe has loſt her maſts by engagement or bad weather.

DISMEMBERED, in *Heraldry*, is applied to birds that have neither feet nor legs; as alſo to lions and other animals, whoſe members are ſeparated. See Membered.

DISMES, *Decimæ*, in our *Law Books*, tithes. See Tithe.

DISMISS, in a *Military Senſe*, relates to the diſcharge of an officer from the king's ſervice. This is occaſionally rendered highly diſgraceful, as well as injurious in a pecuniary ſenſe, by a prohibition againſt the party being re-admitted to any military ſituation; in ſuch caſe the ſentence ordinarily runs, "to be diſmiſſed and rendered incapable of ſerving his majeſty in any *military* capacity." This diſtinction has been rendered highly neceſſary, on account of the circumſtances which attended the late lord George Sackville, whoſe admiſſion into the houſe of peers, and eſpecially into his majeſty's privy council, was ſtrongly oppoſed, be-

cauſe

cauſe he had been diſmiſſed by a court martial, which adjudged him to be diſqualified from being again employed by his majeſty. It requires but little conſideration to decide the foregoing queſtion; the ſenſe of the court was obviouſly founded on his lordſhip's conduct as a ſoldier; and could neither diſqualify him as a counſellor, nor as a peer. Beſides, his reſtoration to the king's favour, was, in itſelf, tantamount to a pardon.

DISMISS, is alſo a word of command occaſionally given to troops on a parade, when it is intended they ſhould retire to their barracks, &c.

DISMISSION *of a bill*, in *Chancery*. If the plaintiff does not attend on the day fixed for the hearing, his bill is diſmiſſed with coſts. It may alſo be diſmiſſed for want of proſecution, which is in the nature of a NON-SUIT at law, if he ſuffers three terms to elapſe without moving forward in the cauſe.

DISMOUNTING, in the *Military Art*, the act of unhorſing. Thus, to diſmount the cavalry, the dragoons, or the like, is to make them alight.

To DISMOUNT *the cannon*, is to break their carriages, wheels, and axle-trees, ſo as to render them unfit for ſervice.

Horſes are alſo diſmounted when they are rendered unfit for ſervice.

DISNEY, JOHN, in *Biography*, was born at Lincoln in the year 1677. At the grammar ſchool in that city he received the early part of his education, and afterwards ſtudied at a private academy among the Diſſenters, to whom his father was attached. He was next entered at the Middle Temple with a view of making himſelf ſo far acquainted with the law as to enable him to become reſpectable as a magiſtrate and an author. The former character he ſuſtained with dignity and much reputation: he was diligent, diſintereſted, and impartial in his deciſions: he took an active part with thoſe who formed themſelves into a ſociety for the ſuppreſſion of vice and immorality. His regard to duty gained him the reſpect of the wiſe and good, and on ſome occaſions he was ſingled out as meriting the thanks of the judges of the circuit for ſervices that he had rendered his country. As he advanced in life, and after he had acted as a magiſtrate more than 20 years, he conceived the deſign of becoming a miniſter in the church of England, with which he had communicated from the time that he had attained to manhood. He was firſt ordained a deacon, and afterwards in 1719 a prieſt. In the ſame year he was preſented with the vicarage of Croft, and to the rectory of Kirby-ſuper-Baine, both in his native county. In the year 1722, he was inſtituted to the vicarage of St. Mary in Nottingham, to which town he removed; and here he remained till his death in the year 1729-30. As a clergyman he was remarkably attentive to the duties of his profeſſion, and his own conduct was in complete uniſon with the precepts which he delivered as the rule of life: he was admired as a preacher; reſpected and beloved as a man. He publiſhed many works; and left behind him ſtill more in MS.; of theſe we have a full account in the Biographia Britannica, to which our readers muſt be referred for more particulars relating to this excellent man. Biog. Brit.

DISŃIA, or DISSIMA, in *Geography*, an iſland or peninſula of Japan, on a rock of which the Dutch had formerly their factory, and from which they carried on a conſiderable trade.

It is ſeparated from the city of Nanguazak only by a river and a wall, which divides the traders from all communication with the town. The iſland is about two miles in compaſs; and no Dutchman was allowed to ſtir out of it, during the whole time of his ſtay, or about nine months in the year, without danger of being cut to pieces by the guards, which were ſet over them, and guarded the bridge over the river that parted them from the city. They were not permitted to converſe either with the guards, or with any natives, except ſuch as were appointed by the governor as factors, brokers, or to ſome other ſuch office. They were not ſuffered to have a lighted candle in their houſes, any more than on ſhip board; and if the centinels heard any uncommon noiſe, or perceived any diſturbance among them, they gave immediate notice of it by blowing a horn; upon which a party was diſpatched by the governor, with an officer at their head, to inquire into the occaſion of it, and either puniſh, or, at leaſt, ſeverely threaten the offenders. During the ſix weeks of open trade, great numbers of Japaneſe came into the iſland, and put up their rich booths, furniſhed with all manner of merchandize. They amuſed themſelves with gaming, drinking, and converſing with handſome young women procured from the Bayos, or Japaneſe lords, who thought it no diſgrace to their dignity to trade with ſtrangers in that ſort of commodity.

DISORDERLY HOUSES. See NUSANCE.

DISORDERLY *Perſons*. See VAGABONDS.

DISORIENTATED, from *dis*, and *oriens*, eaſt, a term applied to a thing that is turned, or removed from the eaſt, to which it was originally directed.

But the word is moſt frequently uſed in a figurative ſenſe, for the diſconcerting, or putting a man out of his way or element.

Andrew Marvel uſes the word diſoccidentated inſtead of diſorientated: Geneva had diſoccidentated our geographer.

DISPARAGEMENT, in *Law*, was uſed, in the old tenures, for the matching an heir, &c. in marriage, below his or her degree or condition; or againſt the rules of decency.

The word is a compound of the privative particle *dis*, and *par*, *equal*.

DISPART, in *Gunnery*, is uſed for ſetting a mark on the muzzle-ring of a piece of ordnance; ſo that a ſight-line, taken upon the top of the baſe ring againſt the touch-hole, by the mark ſet on or near the muzzle, may be parallel to the axis of the concave cylinder. The common way of doing which, is, to take the two diameters of the baſe ring, and of the place where the diſpart is to ſtand, and divide the difference between them into two equal parts, one of which will be the length of the diſpart, which is ſet on the gun with wax or pitch, or faſtened there with a piece of twine or marlin: but an inſtrument may be made to do it to all poſſible nicety. See *Line of* DIRECTION.

DISPART *Frontlet*. See FRONTLET.

DISPATCH, (from the French *dépêche*, which induced Johnſon to write it deſpatch,) is a letter on important ſtate affairs, ſent with particular care and expedition by a truſtworthy perſon, appointed for that ſpecial purpoſe. The perſons generally appointed to be the bearers of diſpatches in England are called king's meſſengers; in France and Germany, couriers. But when a letter of particular importance is confided in Germany to a poſtillion of the poſt-office, or to any ſpecial meſſenger ſent expreſs on horſeback, ſuch a perſon is called an eſtafette, corruptly eine ſtafette, in Engliſh an expreſs.

DISPAUPER. When any perſon by reaſon of his poverty, is admitted to ſue in *forma pauperis*; if afterwards, before the ſuit be ended, the ſame party have any land or perſonal eſtate fall to him, or that the court, wherein his ſuit is depending, think fit for that, or ſome other reaſon, to

to take away the privilege from him, he is then ſaid to be diſpaupered. See COSTS.

DISPENSARY, an inſtitution for the relief of the ſick poor with medical advice and neceſſary drugs, &c.; about twenty of which are eſtabliſhed in London, and ſupported by voluntary contributions. One or more phyſicians and ſurgeons attend daily at each diſpenſary, and preſcribe for the medicines, which are diſtributed gratuitouſly; and afterwards, thoſe patients who cannot meet the medical attendants at the inſtitution are *viſited* by them at their own habitations. In the latter reſpect, it is obvious, that a well conducted diſpenſary has the advantage over an hoſpital of adminiſtering comfort and relief to poor families, without mingling them with diſeaſed and dying ſtrangers, or ſeparating them from their neareſt relatives. But, as there are numerous caſes of individuals too poor to maintain themſelves during ſickneſs, or who are in a ſtate to need ſome chirurgical operation which cannot well be done at home, the practice of a diſpenſary muſt, in ſuch inſtances, give place to the accommodations of an hoſpital. (See HOSPITAL.) In ſome diſpenſaries three thouſand patients are relieved annually; ſo that, probably, not fewer than 40 000 poor perſons receive the benefit of thoſe humane eſtabliſhments every year in London alone!

Three diſpenſaries have been inſtituted by the college of phyſicians, the firſt of them in 1696, for the purpoſe of *vending* at prime coſt the medicines which were preſcribed for the ſick-poor; but they have been long ſince aboliſhed, and, indeed, are not now wanted, as medicines are furniſhed *gratis* at other diſpenſaries more recently eſtabliſhed. When we recollect, that, beſides theſe charitable inſtitutions, there are not leſs than twelve large hoſpitals in this metropolis, for the reception of the ſick and maimed, moſt of which are ſupported by voluntary ſubſcriptions; we cannot contemplate ſo much beneficence and fellow-feeling, without admiring the noble effects produced by the *Proteſtant* religion, and which are not found to the ſame extent in any other country.

DISPENSATION, in *Law, &c.* a permiſſion to do ſomething contrary to the ſtanding laws; or a relaxation, or ſuſpenſion of a law, on ſome juſt occaſion.

Some confound diſpenſation with equity; but they are very different things; for equity is only the correction, or modification, of a law which is too general; but a diſpenſation ſuſpends the obligation of the law itſelf, and can, therefore, be only given by the legiſlative power.

The king of France uſed to grant diſpenſations of age to ſome officers, to be admitted before the legal age: but the greateſt dealer in diſpenſations is the pope, who claims the office, *jure divino*, and extends it to every thing: indeed, the more ſober of the Romaniſts themſelves deny that he can give a diſpenſation for a thing contrary either to the divine law, or the law of nature, and confine him to what is contrary to poſitive laws, as to things relating to faſts, marriages, holding ſeveral benefices, &c. And even in theſe things they ſet bounds: thus, ſay they, a diſpenſation in the firſt degree of affinity, as that of father and daughter, brother and ſiſter, would be abuſive and null. But it is certain the papal ſee does not apprehend itſelf under any ſuch ſevere reſtrictions.

The right of giving diſpenſations they thus prove. It is certain the church has power to make laws: a power which the apoſtles themſelves exerciſed, and which their ſucceſſors have continued to exerciſe after them. Whoever can make a law, can annul it; and much more, can he diſpenſe with it in certain caſes: the church, then, may diſpenſe with the laws itſelf has made, and we find it to have done accordingly in all ages. See PRÆMUNIRE.

The archbiſhop of Canterbury has a power, by ſtat. 25 Hen. VIII. c. 21. of diſpenſing in any caſe, within the realm, wherein diſpenſations, not contrary to the law of God, were formerly granted by the ſee of Rome, as well to the king as to his ſubjects: but in extraordinary matters, or in a caſe that is new, the king and council are to be conſulted; and the diſpenſation muſt be confirmed under the broad ſeal: and during the vacancy of the archbiſhop's ſee, the guardian of the ſpiritualities may grant diſpenſations. Every biſhop, of common right, has the power of diſpenſing in common caſes.

DISPENSATIONS *for pluralities*. See CHAPLAIN and PLURALITY.

DISPENSATION *of the king*, makes a thing prohibited lawful to be done by the perſon that has it, though a thing evil in itſelf will not admit of a diſpenſation. When an offence wrongs none but the king, or if the ſuit is only the king's for the breach of a penal law, that is, not to the damage of a third perſon, the king may diſpenſe: but in caſe the ſuit is the king's, for the benefit of another, he cannot. It was formerly held, that the king might in many caſes diſpenſe with penal ſtatutes, and the exerciſe of this diſpenſing power was one of the moſt ignominious badges of ſlavery and engines of tyranny, which ever diſgraced and haraſſed this country. The claim and exerciſe of it are very ancient in England; and though it ſeems firſt to have been copied from papal uſurpations, it may be traced up as high as the reign of Henry III. The practice of diſpenſing with penal ſtatutes had ſo much prevailed, that parliament itſelf had more than once acknowledged this prerogative of the crown; particularly during the reign of Henry V., when they enacted the law againſt aliens, and alſo when they paſſed the ſtatute of proviſors. (Rot. Parl. 1 Hen. V.) However, in the reign of Richard II., the parliament granted the king only a temporary power of diſpenſing with the ſtatute of proviſors (Rot. Parl. 15 Rich. II.); a plain implication, ſays Mr. Hume, that he had not of himſelf ſuch a prerogative. In the 23d of Henry VI. a clauſe was inſerted in a ſtatute, by which the king was diſabled from granting a diſpenſation for a ſheriff's ſerving more than a year. Nevertheleſs the diſpenſing power prevailed in other caſes; and it was ſoon able, aided by the ſervility of the courts of judicature, even to overpower this ſtatute, which the legiſlature had evidently intended to ſecure againſt violation. In the reign of Henry VII. the caſe was brought to a trial before all the judges in the exchequer-chamber; and it was decreed that, notwithſtanding the ſtrict clauſe above-mentioned, the king might diſpenſe with the ſtatute. Many other diſpenſations of a like nature may be produced; not only ſuch as took place by intervals, but ſuch as were uniformly continued. In the 2d of James I., a new conſultation of all the judges was held upon a like queſtion; and this prerogative of the crown was again unanimouſly affirmed. (Coke's Rep. 7.) And it became an eſtabliſhed principle in Engliſh juriſprudence, that though the king could not allow of what was morally unlawful, he could permit what was only prohibited by poſitive ſtatute. Even the jealous houſe of commons, ſays Hume, which extorted the petition of right from Charles I., made no ſcruple, by the mouth of Glanville, their manager, to allow of the diſpenſing power in its full extent; and in the famous trial of ſhip-money, Holborne, the popular lawyer, had freely, and in the moſt explicit terms, made the ſame conceſſion. Sir Edward Coke, the great oracle of Engliſh law, had not only concurred with

with all other lawyers in favour of this prerogative, but ſeems even to believe it ſo inherent in the crown, that an act of parliament itſelf could not aboliſh it. (Rep. 12.) And he particularly obſerved, that no law can impoſe ſuch a diſability of enjoying offices as the king may not diſpenſe with, becauſe the king, from the law of nature, has a right to the ſervice of all his ſubjects. This diſpenſing power was exerciſed by Charles II. in his declaration of indulgence to diſſenters in 1672, but in the following year it was diſapproved and condemned by the houſe of commons. The diſſenters joined with other members of the houſe in diſavowing it, though it had been exerciſed in their favour. Alderman Love, member for the city of London, declared, "that he had rather go without his own deſired liberty, than have it in a way ſo deſtructive of the liberties of his country, and the proteſtant intereſt; and that this was the ſenſe of the main body of diſſenters:" at length the king recalled his declaration. King James II. diſpoſed to ſhew favour to the papiſts, and finding it impracticable to obtain a legal toleration in the circumſtances of the nation, in the year 1686, determined to attempt it by the diſpenſing power. On this occaſion many pamphlets were diſperſed in favour of liberty of conſcience; and ſir Roger l'Eſtrange, with many other mercenary writers, were employed to maintain, that a power in the king, to diſpenſe with the laws, is law. Moreover, it was reſolved, to have the determination of the judges on this queſtion: and they all (except one) gave it as their opinion, 1. "That the laws of England were the king's laws 2. That it is an inſeparable branch of the prerogative of the kings of England, as of all other ſovereign princes, to diſpenſe with all penal laws in particular caſes, and on particular occaſions. 3. That of theſe reaſons and neceſſity the king is ſole judge. 4. That this is not a truſt now inveſted in, and granted to the preſent king, but the ancient remains of the ſovereign power of the kings of England, which was never yet taken from them, nor can be." Accordingly, a diſpenſation, or licence office, was ſet up, where all who applied might have an indulgence, paying only fifty ſhillings, for themſelves and their families. Many non-conformiſts, now careſſed by the court for very obvious reaſons, who had been proſecuted for conventicles, took out theſe licences, which not only ſtopped all proceſſes that had been commenced, but gave them liberty to go publicly to meetings for the future. Whatever topics lawyers might find to defend James's diſpenſing power, the nation thought it dangerous, if not fatal, to liberty; and his reſolution of exerciſing it may, on that account, be eſteemed no leſs alarming, than if the power had been founded on the moſt recent and flagrant uſurpation. However, he was determined to perſevere; nor was he deterred by the reflection, that this ſcheme of indulgence had already failed in the preceding reign, and that in ſuch a government, as that of England, it was not ſufficient that a prerogative be approved of by ſome lawyers and antiquaries: if it was condemned by the general voice of the nation, and yet was ſtill exerted, the victory over national liberty was no leſs ſignal than if obtained by the moſt flagrant injuſtice and uſurpation. Nevertheleſs in the following year, *viz.* 1687, he iſſued his declaration for liberty of conſcience; and announced it to be his intention, from time to time, to grant his royal diſpenſation to all his ſubjects to be employed in any office, or place of truſt, either civil or military, under his government. A ſimilar declaration was ſent to Scotland. Some diſſenters of the ſeveral denominations, who were now admitted to ſerve in all offices of profit and truſt, were thankful for their liberty, and concurred with others in addreſſing his majeſty in higher ſtrains than ſome of their elder and more cautious miniſters approved. Many of the moſt reſpectable refuſed to join in them; and biſhop Burnet admits, that few concurred in theſe addreſſes: and that the perſons who preſented them were mean and inconſiderable. The diſſenters, in general, both dreaded and deteſted the diſpenſing power, whatever preſent benefit might redound from it to themſelves. Means were uſed for electing a parliament which would ſanction the king's declaration of indulgence, and cauſe it to paſs into a law; but amongſt many others, who were indiſpoſed to concur in the court meaſures, the diſſenters, though they had been peculiarly favoured, manifeſted either total indifference or averſion. Concerned for the proteſtant religion, and dreading the effects of the king's bigotted attachment to popery, they choſe to truſt their liberty to the mercy of their proteſtant brethren, rather than receive a legal ſecurity of it under a popiſh government. Their conduct diſobliged the king to a very high degree, and he ſaid, that "the diſſenters were an ill-natured ſort of people that could not be gained."

The king, finding little hopes of ſucceſs, delayed the ſummoning of a parliament, and proceeded ſtill in the exerciſe of his *illegal* and arbitrary authority. In 1688, he publiſhed a ſecond declaration of indulgence, almoſt in the ſame terms with the former; and he ſubjoined an order that, immediately after divine ſervice, it ſhould be read by the clergy in all the churches. The clergy determined not to comply with the royal mandate; and in order to encourage them in this reſolution, ſix prelates concerted the form of a petition to the king, in which, amongſt other things, they repreſented, that, as the declaration of indulgence was founded on a prerogative, formerly declared illegal by parliament, they could not, in prudence, honour, or conſcience, ſo far make themſelves parties, as the diſtribution of it all over the kingdom would be interpreted to amount to. They therefore beſought the king, that he would not inſiſt upon their reading the declaration. The conſequence is well known. The biſhops were ſummoned before the council and committed to the Tower. It is beſides our purpoſe in this place to give in detail thoſe farther violent proceedings of king James, which accelerated the revolution. But adverting to the immediate ſubject of this article we ſhall only obſerve, that by ſtatute 1 W. & M. c. 2. it is declared, that the ſuſpending or diſpenſing with laws by regal authority, without the conſent of parliament, is illegal: it is alſo a maxim in law, that it requires the ſame ſtrength to diſſolve as to create an obligation. See Blackſt. Com. vol. i. and vol iv. Neal's Hiſt. of the Puritans, vol. i. See PREROGATIVE.

DISPENSATION *by non obſtante*. See NON-OBSTANTE.

DISPENSATION, in *Pharmacy*, the diſpoſition and arrangement of ſeveral medicines, either ſimple or compound, all weighed in their proper doſes, or quantities, in order to be employed in the making of a compoſition.

DISPENSATIONS, *Divine*, in *Theology*, otherwiſe called the *works* and *ways of God*, denote thoſe ſchemes or methods which are deviſed and purſued by the wiſdom and goodneſs of God, in order to manifeſt his perfections and will to mankind, for the purpoſes of their inſtruction, diſcipline, reformation, and advancement in rectitude of temper and conduct, in order to promote their happineſs. Theſe are the grand ends of the divine diſpenſations; and in their aptitude to promote theſe ends conſiſts their peculiar excellence. The works or conſtitutions of nature are, in a general ſenſe, divine diſpenſations, by which God condeſcends to diſplay to us his being and attributes, and thus to lead us to the acknowledgment, adoration, love, and dutiful obedience of our creator, father, and benefactor. But beſides the general

conſtitution of nature, there is a variety of other diſpenſations, which more immediately pertain to mankind, and in which they are more eſpecially intereſted. Such are their being born of parents for ſupplying the ſeveral generations of the world, whence reſult ſundry relations and duties; their being ſuſtained by food, covered and ſheltered by clothes and habitations, healed by phyſicians, and taught by the learned and ſkilful; their forming of ſocieties for mutual convenience and comfort; and the inſtitution of government, or the ſubordination of ſome to the authority of others, for preſerving good order, for the protection of virtue, and the reſtraint and puniſhment of vice. Moreover, wars, peſtilence, famine, earthquakes, perſonal and natural calamities, and ſimilar events, may be reckoned among the divine appointments or diſpenſations; ſome of which are deſigned for the exerciſe of our rational and moral powers in a courſe of right conduct; ſome for diſcipline, correction, and reformation; but none merely for deſtruction, except where reformation cannot be effected. But the ſacred ſcriptures reveal and record other diſpenſations of divine providence, which have been directed to the promotion of the religious principles, moral conduct, and true happineſs of mankind. Theſe have varied in ſeveral ages of the world, and have been adapted by the wiſdom and goodneſs of God to the circumſtances of his intelligent and accountable creatures. In this ſenſe the various revelations which God has communicated to mankind at different periods, and the means he has uſed, as occaſion has required, for their diſcipline and improvement, have been juſtly denominated divine diſpenſations. Accordingly, we read in the works of theological writers of the various diſpenſations of religion, as they exiſted before and after the fall of man, that of the patriarchs, that of Moſes, that of Chriſt, called the diſpenſation of grace, the perfection and ultimate object of every other; all of which were adapted to the conditions of the human race at theſe ſeveral periods; all of theſe in regular ſucceſſion mutually connected and preparatory one to the other; and all ſubſervient to the deſign of meliorating the world, and of contributing to the perfection and happineſs of its rational and moral inhabitants. See COVENANT and REVELATION.

DISPENSATORY, in *Medicine*, is ſynonymous to the word *Pharmacopœia*, and ſignifies a collection of formularies or directions for the uſe of apothecaries. Many private practitioners have written and publiſhed diſpenſatories; but thoſe which are of greateſt authority, have been compoſed by colleges or authorized bodies of medical men. Thus, in the United Kingdom, we have the London, the Edinburgh, and the Dublin pharmacopœia or diſpenſatory; the former being of moſt authority in England and Wales, the next in Scotland, and the laſt in Ireland. Nevertheleſs, it is lawful for apothecaries to uſe either or all of them, as they may judge fit; only, it is required, when they deviate from the eſtabliſhed pharmacopœia, that they do ſo "by the ſpecial direction or preſcription of ſome learned phyſician." (See PHARMACOPOEIA.) The completeſt work of this kind now extant in this kingdom, is that of Dr. Duncan, Jun., entitled, "The Edinburgh New Diſpenſatory," which includes the lateſt editions of the three authorized pharmacopœias in one volume.

Although the apothecaries of London are enjoined, under his Majeſty's diſpleaſure, to keep all the ſimple and compound remedies preſcribed in the pharmacopœia of the royal college of phyſicians, and not to vary from them of their own accord, it is a fact that all the apothecaries do nevertheleſs preſcribe daily for their patients, without regarding the formulæ of the college! But a much more lamentable fact is this, that any perſon who chuſes, however ignorant and unſkilful he is in phyſic, may ſet up as a druggiſt or an apothecary, and then may practiſe as a phyſician, *i. e.* he may attend the ſick and adminiſter whatever medicines he will; which, indeed, is done continually by hundreds of illiterate men in the metropolis and elſewhere, without being puniſhable by law! The vaſt quantities of licenſed quack medicines ſold annually, are compounded by ignorant men or women (with very few exceptions), to the great profit of the revenue and the certain detriment of his majeſty's ſubjects; proving how little avail are the ſtatutes of the college for preventing pharmaceutical abuſes, &c.! The firſt diſpenſatory, ſays Beckmann, (Hiſt. Invent. vol. ii.) was drawn up by Valerius Cordus, or at leaſt his was the firſt made known by the approbation of public magiſtrates. Haller has remarked one older; but it is now known only from the title mentioned by Maittaire. (Biblioth. Bot. i. p. 244.) Cordus, however, appears to have firſt uſed the word *diſpenſatorium* for a collection of receipts, containing directions how to prepare the medicines moſt in uſe. Some have ſaid that the book of Cordus was improved and enlarged by Matthiolus. But Beckmann ſays, that this is a miſtake, and that the error ſeems to have ariſen from the Chriſtian name of Matthias Lobelius, which ſtands in the title of ſome editions, becauſe his annotations are added to them.

DISPERIS, in *Botany*, (from δις, *double*, and πηρα, *a pouch*, becauſe the two lateral leaves of the calyx are each furniſhed with a little ſpur-like bag or cavity, which makes a part of the generic character,) Swartz. Orchid. 38. t. 1. f. F. Willd. Sp. Pl. v. 4. 59. Claſs and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

Gen. Ch. *Cal.* Perianth of three leaves; the upper one erect and vaulted, forming a ſort of helmet with the two petals; the two lateral ones ſpreading horizontally, each furniſhed with a central pouch or ſpur pointing downwards. *Cor.* Petals two, ſhorter than the calyx, dilated upwards, abrupt, ſheltered by the upper calyx-leaf. Nectary or lip proceeding from the baſe of the ſtyle, erect, tapering at the lower part, attached to the organs of impregnation, reflexed at the top under the helmet. *Stam.* and *Piſt.* Germen inferior, oblong, ſomewhat obovate; ſtyle very ſhort; ſtigma in front near the anther. Anther attached to the top of the ſtyle, erect or reclining, oblong, of two cells, covered with a veil which bears at its margin on each ſide in front, a little cartilaginous ſpiral appendage; pollen oblong, glutinous, its ſtalks glued to the tips of the appendages of the veil. *Peric.* Capſule of one cell, with three angles and three valves, burſting at the angles. *Seeds* numerous, minute, roundiſh, each with a membranous integument.

Eſſ. Ch. Calyx ſpreading; its two lateral leaves horizontal, ſomewhat ſpurred. Lip from the baſe of the ſtyle, erect, connected with the organs of impregnation. Anther covered with a veil bearing two ſpiral appendages in front.

Five ſpecies of this genus are enumerated by Swartz copied by Willdenow. 1. D. *capenſis* (Arethuſa capenſis; Linn. Supp. 405. Thunb. Prod. 3.), a native of the Table mountain at the Cape of Good Hope. "Stalk bearing two lanceolate leaves, and one flower." This is a pretty plant, about a foot high, with a purple flower remarkable for its long-pointed ſpreading calyx. 2. D. *villoſa*. (Arethuſa villoſa; Linn. Suppl. 405. Thunb. Prod. 3.) "Stem with two leaves and one flower. Bractea and germen hairy. Leaves ovate inclining to heart-ſhaped, ſmooth beneath, fringed at the margin." This grows alſo at the Cape, and is ſaid by the younger Linnæus to look like a *Commelina*. 3. D. *cucullata*. Swartz. Orchid. 40. Willd. Sp.

Sp. Pl. v. 4. 59. "Stem with two leaves and one flower. Germen ſmooth. Leaves oblong, downy beneath, as well as the bractea." Native of the Cape. 4. D. *ſecunda*. (Arethuſa ſecunda; Thunb. Prod. 3. Ophrys circumflexa; Linn. Sp. Pl. 1344.) "Stem with two linear leaves, and many flowers leaning one way." This grows alſo at the Cape, and bears ſeveral yellowiſh green flowers, whoſe white veils and their twiſted appendages are very conſpicuous. 5. D. *cordata*. Swartz. Orchid. 41. Willd. 60. "Stem with two heart-ſhaped ſmooth leaves, and many ſeparate flowers." Native of the iſland of Mauritius. *Flowers* yellowiſh, four or five in a ſort of corymbus, with an ovate bractea to each. To theſe we are enabled to add a non-deſcript ſpecies. 6. D. *oppoſitifolia*. "Stem with two oppoſite ovate ſmooth leaves, and ſeveral bracteated flowers." Native of the iſle de Bourbon, communicated by Dr. Smith from the Linnæan herbarium. *Root* tuberous. *Stem* a ſpan high. *Leaves* above an inch long, oppoſite, about the middle of the ſtem, ſpreading, obſcurely five-ribbed. *Flowers* three or four in a bracteated ſpike, yellowiſh. *Bracteas* elliptical.

DISPERSE, in *Military Language*. To diſperſe a body of men, in the heat of an engagement, and to rally them, ſo as to take advantage of an enemy ſcattering in purſuit, or leaving a ſtrong poſt for that purpoſe, is a ſtratagem which has been reſorted to at times with peculiar ſucceſs. Being, however, extremely hazardous, it ſhould only be practiſed with well diſciplined troops, and by previous notice; when the ſignal to rally ſhould likewiſe be communicated to every individual. In order to deceive the enemy more effectually, it is common to attack him in his entrenchments with great ſhew of vigor, and in the height of the conflict to beat the *retreat*; on this the aſſailants ſhould retire in ſeeming diſorder, but with ſtudied attention to the object in view. If it be practicable to lead the enemy beyond ſome old building, or coppice, or hedge-row, behind which ſome men could be placed in ambuſh, the effect will be conſiderably encreaſed; both by encreaſing the ſurprize, and panic, and by placing the enemy between two fires. It ought, however, to be always carried in mind, that when once ſoldiers turn their backs, they loſe ſomething of their confidence; and that it is extremely difficult to get them to face about at the proper moment. This device is beſt calculated for rangers, rifle-men, and other light corps.

DISPERSION *of Light*, in *Optics*, denotes the enlargement of a pencil or beam of light, which is produced by its paſſage from one medium into another, and this enlargement ariſes from the nature of the medium; but there is an enlargement of light, which ariſes from the form of the medium, and which is not comprehended under the denomination of the preſent article. We ſhall briefly endeavour to point out the diſtinction.

When a beam of light, (ſuch, for inſtance, as proceeds from the ſun, and comes into a room through a hole in a window ſhutter) is received upon a concave lens, and a ſheet of paper is placed to receive it on the other ſide of, and at a little diſtance from, the lens; the luminous ſpot, which is thereby formed upon the paper, will be found much larger in diameter than the diameter of the hole in the ſhutter through which the light enters; the reaſon of which is, that on account of the concavity of the ſurface of the lens, every part of the beam of light, excepting the very axis of it, falls obliquely upon the ſurface of the lens, and is bent from the axis of it, in conſequence of which it, the beam of light, proceeds in a diverging direction from the lens to the paper, and neceſſarily forms an enlarged ſpot upon the latter. Now this enlargement, being the effect of the peculiar figure of the lens, is not conſidered under the preſent article.

When a beam of light paſſes not in a perpendicular, but in an oblique direction from one medium into another medium of a different nature, ſuch as from air into water, or into glaſs, &c. its ſtraight direction is deſtroyed, *viz.* it is bent to a certain degree, and this bending is called the *refraction of light*; but beſides its being bent, the beam of light is ſpread in a ſectoral form, and is divided into coloured ſtripes (ſee the articles LIGHT and REFRACTION.) Now this ſpreading, which ſeems to ariſe from the nature of the medium, is called the *diſperſion*, or *diſſipation, of light*, and is the object of our preſent conſideration. The following illuſtration will render the nature of it more evident.

Let H (*Plate* IV. *Optics*, *fig.* 7.) repreſent a ſmall beam of the ſun's light, which paſſes through the tube I, and falls obliquely at C, upon the ſurface A D, of the refracting medium A B D G, be it water, or glaſs, or other tranſparent ſubſtance. Let a circle of any diameter be drawn round the centre C, cutting the beam of light at O. Draw the perpendicular H N through C. The beam of light, by its falling obliquely upon the ſurface of the water at C, will be refracted, *viz.* will be bent, from its ſtraight direction C P, into the more inclined direction C *s*, and will at the ſame time be ſpread into the ſectoral ſhape *r* C *t*. which is called the *diſperſion of the light*. This ſector *r* C *t* is itſelf divided into ſmaller ſectors of different colours; *viz.* next to the upper line C *r*, the colour is red, and thence the light gradually degenerates into orange, yellow, green, blue, indigo, and violet, which is neareſt to the lower boundary C *t*. All this may be perceived by placing a white ſurface at the bottom of, or within, the refractive medium A B D G.

From the points O, *r*, *s*, and *t*, let perpendiculars be dropped on the line H N; then C *s*, which is drawn through the middle of the angle *r* C *t*, is the mean direction of the refracted light, and *s e* is its ſine, or the *ſine of the mean angle of refraction*; O M being the ſine of the angle of incidence, *r w* and *t q* are the ſines of the extremes, of which *t q* is the *ſine of the moſt refrangible* colour, and *r w* the *ſine of the leaſt refrangible* colour.

It has been found, that through the ſame medium, the angle of diſperſion is always proportionate to the mean angle of refraction, and, of courſe, when the mean angle of refraction is very ſmall, then the angle of diſperſion *r* C *t*, muſt be much ſmaller, in which caſe the different colours cannot be diſtinguiſhed; but when the angle of incidence O C M, and conſequently the mean angle of refraction *s* C N, are conſiderably larger; then the angle *r* C *t* of diſperſion will alſo be large enough to exhibit the above-mentioned colours.

Different refractive media have different diſperſive powers; for inſtance, the angle of incidence O C H, remaining the ſame, not only the mean angle of refraction *s* C N will vary according as the refractive medium A B D G is water, or glaſs, or oil, or diamond, &c. but the angle of diſperſion *r* C *t* will alſo vary. And in ſome refracting media, the mean angle of refraction is larger, whilſt the angle of diſperſion is ſmaller; in other refracting media the mean angle of refraction is ſmaller, whilſt the angle of diſperſion is larger. In ſhort, the knowledge of the mean refractive power of a given ſubſtance will not enable us to determine its diſperſive power, and *vice verſâ*.

Sir I. Newton, who made the important diſcovery of the different refrangibility of the rays of light, which converted the white ſolar light into the colours of the rainbow, when that light was made to paſs obliquely from one tranſparent medium into another, had not the leaſt ſuſpicion of the

different diſperſion ariſing from the different natures of the media; and he imagined that the refrangibility of the extreme rays might be determined, if that of the mean was given. Or, in other words, that if the angles of refraction in different media were alike, the angles of diſperſion in thoſe media would likewiſe be alike; but it was reſerved for Mr. Dollond to ſhew the fallacy of this ſuppoſition, which was conſidered as true by all the philoſophers of his time. Mr. Dollond began to ſuſpect the truth of it, and in the year 1757 he commenced a courſe of laborious experiments which confirmed him in his ſuſpicion, gradually ſhewed him that different tranſparent ſubſtances were endowed with different diſperſive powers, ſhewed him the preciſe limits of thoſe powers, and finally led him to make the capital diſcovery of the achromatic teleſcope, which depends upon the different diſperſive powers of different ſorts of glaſs, and which will doubtleſs tranſmit his name to the lateſt poſterity. Mr. Dollond having thus ſhewn the important uſes to which the different diſperſive powers of tranſparent ſubſtances were applicable, ſeveral ingenious perſons readily took the ſubject in hand, and endeavoured to aſcertain the diſperſive properties of various bodies, to ſimplify the method of determining that property, and to apply it to optical uſes. The ſimpleſt, and, at the ſame time, the accurate method of aſcertaining the preciſe diſperſive power of a given ſubſtance, is to form a priſm of it, to expoſe it to a beam of ſolar light which enters a dark room through a hole, and then to meaſure, as exactly as poſſible, the angle of refraction, and the breadth of the ſpectrum upon a ſcreen placed at a given diſtance from the priſm; and from theſe particulars the angle of diſperſion in proportion to the angle of refraction may be eaſily deduced; thus, by making priſms of different ſubſtances, but exactly of the ſame refractive angle, and placing them ſucceſſively in the like circumſtances, the peculiar diſperſive powers of thoſe ſubſtances may be aſcertained. Mr. Euler, who gives particular inſtructions reſpecting the performance of this operation, adviſes to make uſe of priſms with very large refracting angles, not leſs than 70 degrees. The Philoſophical Tranſactions for the year 1802, art. xii. contains the account of a new method of examining the refractive and diſperſive powers by means of priſmatic reflection, by Dr. W. H. Wollaſton; but as the principal uſe of this method is for aſcertaining the refractive powers of ſubſtances, the reader will find it deſcribed under the article REFRACTION. With reſpect to the diſperſive powers, Dr. Wollaſton did not meaſure them with accuracy, nor indeed does his method, without ſome farther improvement, ſeem capable of determining theſe powers with great preciſion. We ſhall in the ſequel add his liſt of diſperſive powers, ſuch as it is; but we ſhall premiſe a liſt of thoſe ſubſtances, whoſe diſperſive powers have been aſcertained with greater preciſion.

TABLE of the diſperſive Powers of various tranſparent Subſtances, in compariſon of the diſperſive Power of Water, which is reckoned 100.

	Diſperſion.
White flint-glaſs, of the ſpecific gravity 3.29,	180
Glaſs made of minium; *viz.* red-lead, and flint, in the proportion of M. 3, F. 1,	709
M. 2, F. 1,	524
M. 1, F. 1,	482
M. ¾, F. 1,	325
M. ½, F. 1,	265
M. ¼, F. 1,	200
Common plate-glaſs, or coach-glaſs, ſp. gr. 2.76,	165
Crown-glaſs, ſp. gr. 2.52,	148
Brazil pebble, ſp. gr. 2.62,	159
Glaſs tinged red by means of gold, for enamel,	290
Glaſs of *Saint Gobin*, in France,	149
Diamond,	286
Rock-cryſtal,	121
Another ſpecimen of the ſame,	124
Iſland-cryſtal,	169
Another ſpecimen of the ſame,	233
Water,	100
Water ſaturated with common ſalt,	122
Solution of ſal ammoniac, or of muriated ammonia,	134
Nitric acid,	154

Dr. Wollaſton's Table of diſperſive Powers, reſpecting which he ſays,

"I have endeavoured to reduce the ſeveral ſubſtances, thus examined, to one table; but as the limits of colour are in few inſtances ſufficiently well defined for accurate menſuration, I have not attempted to add any numerical eſtimate of their powers, but have merely aſcertained the order in which they ſucceed each other."

In this order the ſubſtances now follow:

Sulphur,	Amber,
Glaſs of lead, (⅓ ſand,)	Diamond,
Balſam of Tolu,	Alum,
Oil of ſaſſafras,	Plate-glaſs, Dutch,
Muriate of antimony,	Plate-glaſs, Engliſh,
Guaiacum,	Crown-glaſs,
Oil of cloves,	Ruby, (ſpinelle,)
Flint-glaſs,	Water,
Colophony,	Sulphuric acid,
Canada balſam,	Alcohol,
Oil of amber,	Sulphate of barytes,
Jargon,	Selenite,
Oil of turpentine,	Rock-cryſtal,
Copal,	Sulphate of potaſh,
Balſam of Capivi,	White ſapphire,
Anime,	Fluor ſpar.
Iceland ſpar,	

Mr. Zeiher of Peterſburgh, who compoſed the ſix kinds of glaſs made with flint and minium, and examined their diſperſive powers, which are ſtated at the commencement of the firſt table, willing to give a ſuperior or more uſeful conſiſtence to thoſe glaſſes, tried to mix alkaline ſalts with them; but he was much ſurpriſed to find that this mixture greatly diminiſhed the mean refraction, almoſt without making any change in the diſperſion. After many trials, he, at length, obtained a kind of glaſs, greatly ſuperior to the flint-glaſs uſed by Dollond, with reſpect to the conſtruction of teleſcopes, ſince it occaſioned three times as great a diſperſion of the rays as common glaſs, at the ſame time that the mean refraction was only as 1.61 to 1. (Ac. Berl. 1766.) Having now ſtated all the moſt eſſential obſervations which have been made by various ingenious philoſophers reſpecting the powers of diſperſing the rays of light by a variety of ſubſtances, the reader may probably expect ſome information relative to the cauſe of that power, or rather to the cauſe which renders that power greater in one body than in another. Were the diſperſive power proportional to the refractive power, the phenomenon would occaſion no wonder; but ſince there ſeems to be no correſpondence whatever between the one and the other, the human mind is naturally led to make the above-mentioned enquiry. It is not, however, in our power to give our readers any ſatisfactory information about it. The inveſtigations of various philoſophers have not furniſhed any thing more than

conjectures. Some have attributed the diſperſion of rays of different colours to a ſort of elective attraction in the tranſparent body. "But," as Dr. Thomas Young juſtly obſerves, "an elective attraction of this kind is a property foreign to mechanical philoſophy, and when we uſe the term in chemiſtry, we only confeſs our incapacity to aſſign a mechanical cauſe for the effect, and refer to an analogy with other facts, of which the intimate nature is perfectly unknown to us."

The volume of the Philoſophical Tranſactions for the year 1802, contains a paper of the above-mentioned gentleman, Dr. Thomas Young, on a peculiar production of colours. In that paper, Dr. Young offers an hypotheſis, which is the neareſt that has been offered, reſpecting the diſperſive powers of bodies, and with which we ſhall conclude this article. "The colours," he ſays, "of mixed plates ſuggeſt to me an idea, which appears to lead to an explanation of the diſperſion of colours by refraction, perhaps more ſimple and ſatisfactory than that which I advanced in the laſt Bakerian lecture. We may ſuppoſe that every refractive medium tranſmits the undulations conſtituting light in two ſeparate portions, one paſſing through its ultimate particles, and the other through its pores; and that theſe portions reunite continually, after each ſucceſſive ſeparation, the one having preceded the other by a very minute but conſtant interval, depending on the regular arrangement of the particles of a homogeneous medium. Now, if theſe two portions were always equal, each point of the undulations, reſulting from their reunion, would always be found half-way between the places of the correſponding point in the ſeparate portions; but ſuppoſing the preceding portion to be the ſmaller, the newly combined undulation will be leſs advanced than if both had been equal, and the difference of its place will depend, not only on the difference of the lengths of the two routes, which will be conſtant for all the undulations, but alſo on the law and magnitude of thoſe undulations; ſo that the larger undulations will be ſomewhat further advanced after each reunion than the ſmaller ones, and the operation recurring at every particle of the medium, the whole progreſs of the larger undulations will be more rapid than that of the ſmaller; hence the deviation, in conſequence of the retardation of the motion of light in a denſer medium, will of courſe be greater for the ſmaller than for the larger undulations. Aſſuming the law of the harmonic curve for the motions of the particles, we might, without much difficulty, reduce this conjecture to a compariſon with experiment; but it would be neceſſary, in order to warrant our concluſions, to be provided with accurate meaſures of the refractive and diſperſive powers of various ſubſtances, for rays of all deſcriptions."

DISPERSION *of Mankind*, in the *Hiſtory of the World*, was occaſioned by the confuſion of tongues, and took place in conſequence of the overthrow of Babel at the birth of Peleg; whence he derived his name: and it appears by the account given of his anceſtors, Gen. chap. xi. 10—16. to have happened in the 101ſt year after the flood, B. C. 2247, according to the Hebrew chronology, and by the Samaritan computation in the 401ſt. However, various difficulties have been ſuggeſted by chronologers concerning the true era of this event. Sir John Marſham and others, in order to reconcile the Hebrew and Egyptian chronologies, maintain a diſperſion of mankind before the birth of Peleg: others, unable to find numbers ſufficient for the plantation of colonies in the ſpace of 101 years, according to the Hebrew computation, fix the diſperſion towards the end of Peleg's life, thus following the computation of the Jews, adopted by St. Jerom, and ſeveral of the Chriſtian chronologers: Petavius aſſigns the 153d year after the flood; Cumberland, the 180th; and Uſher, though he generally refers it to the time of Peleg's birth, in one place aſſigns the 131ſt after the flood for this event. Mr. Shuckford ſuppoſes the diſperſion to have been gradual, and to have commenced with the ſeparation of ſome companies at the birth of Peleg, and to have been completed thirty-one years after. According to the calculation of Petavius, the number of inhabitants on the earth at the birth of Peleg amounted to 32,768; Cumberland makes them 30,000; Mr. Mede ſtates them at 7000 men, beſides women and children; and Mr. Whiſton, who ſuppoſes that mankind now double themſelves in four hundred years, and that they doubled themſelves between the deluge and the time of David in ſixty years at a medium, when their lives were ſix or ſeven times as long as they have been ſince, by his computation, produces about 2389, a number much too inconſiderable for the purpoſes of ſeparating and forming diſtinct nations. This difficulty induced Mr. Whiſton to reject the Hebrew, and to adopt the Samaritan chronology, as many others have done; which, by allowing an interval of 401 years between the flood and the birth of Peleg, furniſhes, by the laſt mentioned mode of computation, more than 240,000 perſons. Uſher is of opinion, (Chron. Sacr. p. i. c. 5.) that in the 102d year after the flood, mankind might have increaſed to the number of 388,605 males, and as many females. This uncommon increaſe he aſcribes to an extraordinary fecundity implied in that repeated command or bleſſing, "Increaſe and multiply, and fill the earth." But a much ſmaller number than this would have been ſufficient. Marſh. Can. Chron. ſec. 1. Petav. Doctrin. Temp. lib. ix. c. 14. Cumb. Orig. Gent. Antiq. p. 142—154. Uſher ad A. M. 1757 & 1787. Whiſton's View Chron. O. T.

As to the manner of the diſperſion of the poſterity of Noah from the plain of Shinar, it was undoubtedly conducted with the utmoſt regularity and order. The ſacred hiſtorian informs us, that they were divided in their lands, every one according to his tongue, according to his family, and according to his nation; Gen. x. 5, 20, 31; and thus, as Mr. Mede obſerves, they were ranged according to their nations, and every nation was ranged by their families, ſo that each nation had a ſeparate lot, and each family in every nation. The following abſtract will ſerve to give a general idea of their reſpective ſettlements: Japhet, Noah's eldeſt ſon, had ſeven ſons, *viz.* Gomer, whoſe deſcendants inhabited thoſe parts of Aſia, which lie upon the Ægean ſea and Helleſpont northward, containing Phrygia, Pontus, Bithynia, and a great part of Galatia: the Galatians, according to Joſephus, were called Gomeræi; and the Cimmerii, according to Herodotus, occupied this tract of country: and from theſe Gomerians, Cimmerii or Celts, Mr. Camden derives our ancient Britons, who ſtill retain the name Cymro or Cymru: Magog, the ſecond ſon of Japhet, was probably the father of the Scythians on the eaſt and north-eaſt of the Euxine ſea: Madai planted Media, though Mr. Mede aſſigns Macedonia to his ſhare: Javan was the father of the Grecians about Ionia, whoſe country lies along upon the Mediterranean ſea; the radicals of Javan and Ionia, being the ſame יון: to Tubal and Meſhech belonged Cappadocia, and the country which lies on the borders of the Euxine ſea; and from them, migrating over the Caucaſus, it is ſuppoſed the Ruſſians and Muſcovites are deſcended: and Tiras occupied Thrace. The ſons of Shem were five: Elam, whoſe country lay between the Medes and Meſopotamians, and

was called by the Gentile writers Elymais; and Joſephus calls the Elamites the founders of the Perſians: Aſhur, who was driven out of Shinar by Nimrod, afterwards ſettled in Aſſyria, and there built Nineveh, and other cities: Arphaxad, who gave name to the country which Ptolemy calls Arraphacitis, a province of Aſſyria, though Joſephus makes him the father of the Chaldees: Lud, who inhabited, and, as ſome ſay, gave name to the country of Lydia, about the river Mæander, remarkable for its windings, in Aſia Minor: and Aram, the father of the Aſſyrians, who inhabited Meſopotamia and Syria, comprehending the countries weſtward of Aſſyria, as far as the Mediterranean ſea; within or bordering on this country of Aram, his four ſons probably ſettled. Ham, the youngeſt ſon of Noah, had four ſons, *viz.* Cuſh, whoſe poſterity ſpread into the ſeveral parts of Arabia, over the borders of the land of Edom, into Arabia Felix, up to Midian and Egypt: Mizraim, the father of them who inhabited Egypt, and other parts of Africa: Phut, to whom Bochart aſſigns the remaining part of Africa, from the lake Tritonides to the Atlantic ocean, called Libya: and Canaan, to whom belonged the land of Canaan, whence the Phœnicians derived their origin.

Upon this diſtribution of Noah's poſterity, we ſhall only obſerve, that the Deity preſided over all their counſels and deliberations, and that he guided and ſettled all mankind, according to the dictates of his all-comprehending wiſdom and benevolence. To this purpoſe, the ancients themſelves, according to Pindar, (Olymp. od. vii.) retained ſome idea, that the diſperſion of men was not the effect of chance, but that they had been ſettled in different countries by the appointment of Providence. (See Gen. xi. 8, 9. Deut. xxii. 8.)

This diſperſion, and that confuſion of languages with which it originated, was intended, by the counſel of an all-wiſe Providence, to counteract and defeat the ſcheme which had been projected by the deſcendants of Noah, for maintaining their union, and, of courſe, their ſuperiority and pre-eminence; implied in their propoſing to make themſelves a *name*, שם, which Schultens (in Job. i. 1.) derives from the Arabic verb שמה, or שבא, to be high, elevated, or eminent. Thus, they might think, by building a lofty tower, to keep off all that ſhould attempt to break in upon them, and to intimate to all future generations, that they were the true original governors, to whom all mankind ought to be in ſubjection. By this ſcheme, which ſeems to have been a project of ſtate policy, for keeping all men together under the preſent chiefs and their ſucceſſors, a great part of the earth muſt, for a long time, have been uninhabited, and over-run with wild beaſts. The bad effects which this project would have had upon the minds, the morals, and religion of mankind, was, probably, the chief reaſon why God interpoſed to fruſtrate it as ſoon as it was formed. It had manifeſtly a direct tendency to tyranny, oppreſſion, and ſlavery. Whereas in forming ſeveral independent governments by a ſmall body of men, the ends of government, and the ſecurity of liberty and property, would be much better attended to, and more firmly eſtabliſhed; which, in fact, was really the caſe; if we may judge of the reſt by the conſtitution of one of the moſt eminent, the kingdom of Egypt. (Gen. xlvii. 15—27.) The Egyptians were maſters of their perſons and property, till they ſold them to Pharoah for bread; and then their ſervitude amounted to no more than the fifth part of the produce of the country, as an annual tax payable to the king.

By this event, conſidered as a wiſe diſpenſation of Providence, bounds were ſet to the contagion of wickedneſs; evil example was confined, and could not extend its influence beyond the limits of one country; nor could wicked projects be carried on, with univerſal concurrence, by many ſmall colonies, ſeparated by the natural boundaries of mountains, rivers, deſerts, ſeas, and hindered from aſſociating together by a variety of languages, unintelligible to each other. Moreover, in this diſperſed ſtate, they could, whenever God pleaſed, be made reciprocal checks upon each other, by invaſions and wars; which would weaken the power, and humble the pride of corrupt and vicious communities. This diſpenſation was, therefore, properly calculated to prevent a ſecond univerſal degeneracy; God dealing in it with men as rational agents, and adapting his ſcheme to their ſtate and circumſtances. Mede's Works, vol. i. diſc. 50. p. 276, &c. Bochart, Phaleg. lib. iii. & iv. Patrick in loc. Shuckford's Conn. vol. i. book i. and Un. Hiſt. vol. i. part 3. book i. chap. 2. § 6.

Dr. Bryant has advanced a new hypotheſis on this ſubject, and ſupported it with his uſual acuteneſs and learning: he maintains, that the diſperſion, as well as the confuſion of tongues, was local, and limited to the inhabitants of the province of Babel; that the ſeparation and diſtribution, recorded to have taken place in the days of Peleg, Gen. x. 25, 31, 32. which was the reſult of divine appointment, occaſioned a general migration; and that all the families among the ſons of men were concerned in it: the houſe of Shem, from which the Meſſiah was to ſpring, was particularly regarded in this diſtribution; the portion of his children was near the place of ſeparation; they in general had Aſia to their lot; as Japhet had Europe, and Ham the large continent of Africa. But the ſons of Chus would not ſubmit to the divine diſpenſation; they went off under the conduct of Nimrod, and ſeem to have been for a long time in a roving ſtate: however, at laſt they arrived at the plains of Shinar, and having ejected Aſhur and his ſons, who were placed there by divine appointment, ſeized his dominions, and laid there the foundation of a great monarchy. But afterwards fearing leſt they ſhould be divided and ſcattered abroad, they built the tower of Babel, as a land mark, to which they might repair, and probably to anſwer the purpoſes of an idolatrous temple, or high altar, dedicated to the hoſt of heaven, from which they were never long to be abſent. They only, *viz.* the ſons of Chus or the Cuthites, and their aſſociates from other families, who had been guilty of rebellion againſt divine authority, and of wicked ambition and tyranny, were puniſhed with the judgment of confounded ſpeech through a failure in labial utterance, and of the diſperſion recorded in Gen. x. 8, 9: in conſequence of which they were ſcattered abroad from this city and tower, without any certain place of deſtination. The Cuthites invaded Egypt or the land of Mizraim, in its infant ſtate, ſeized the whole country, and held it for ſome ages in ſubjection; and they extended likewiſe to the Indies and Ganges, and ſtill farther into China and Japan. From them the province of Cuſhan or Goſhen in Egypt derived its name; here they obtained the appellation of royal ſhepherds; and when they were by force driven out of the country, after having been in poſſeſſion of it for two hundred and ſixty, or two hundred and eighty years, the land which they had been obliged to quit was given to the Iſraelites, who were alſo denominated ſhepherds, but ſhould not be confounded with the former or the antecedent inhabitants of Goſhen. Bryant's Analyſis of Ancient Mythol. vol. iii. p. 16, &c. See Cush.

Dispersion *of inflammations*, in *Medicine*. See Inflammations.

DISPLANT-

DISPLANTING, among *Gardeners*, is the plucking up of a tree or plant out of the ground.

DISPLANTING *ſcoop*, an inſtrument for taking up plants, with earth about their roots.

DISPLAYED, in *Heraldry*, is underſtood of the poſition of an eagle, or other bird, when it is erect, with its wings expanded, or ſpread forth.

DISPONDEE, in the *Greek* and *Latin Poetry*, a double ſpondee; or a foot conſiſting of four long ſyllables: as *jūrāmēntūm*, *dēlēctāntē*, θαυμαζονσῶν.

DISPONTIUM, in *Ancient Geography*, a deſerted town of Triphylia, N. of Heraclon, whoſe inhabitants, in the time of Strabo, had emigrated to Epidamnus and Apollinia, a town of Illyria.

DISPOSITION, from *dis*, and *pono*, I place, in *Architecture*, is the juſt placing of all the ſeveral parts of an edifice, according to their proper nature and office. See BUILDING.

DISPOSITION, in *Logic*, is that operation of the mind, whereby we put the ideas, propoſitions, and arguments which we have formed concerning one ſubject, into ſuch an order as is fitteſt to gain the cleareſt knowledge of it, to retain it longeſt, and to explain it to others in the beſt manner: the effect of this is called method. Watt's Logic.

DISPOSITION, in a *Military Senſe*, is the arrangement of an army or body of men upon the moſt advantageous ground, and in the beſt ſituation for a vigorous attack or defence.

DISPOSITION, in *Phyſiology*, denotes a ſtate of mind diſtinguiſhing one man from another and inherent in the conſtitution of nature, which, while it laſts, gives a tendency, or proneneſs, to be moved by certain animal principles, rather than by others; while, at another time, another ſtate of mind, in the ſame perſon, may give the aſcendant to other animal principles. As far as we can trace the cauſes of the different diſpoſitions of the mind, they ſeem to be in ſome caſes owing to thoſe aſſociating powers of the principles of action, which have a natural affinity, and are prone to accompany one another; ſometimes to accidents of good or bad fortune, and ſometimes the ſtate of the body may have an influence on the diſpoſition of the mind. At one time the ſtate of the mind, like a ſerene unclouded ſky, ſhews every thing in the moſt agreeable light; then a man is prone to benevolence, compaſſion, and every kind affection; unſuſpicious, not eaſily provoked. The poets have obſerved, that men have their "mollia tempora fandi," when they are averſe from ſaying or doing a harſh thing, and artful men watch theſe occaſions, and know how to improve them to promote their ends. This diſpoſition is commonly called "good humour," of which, in the fair ſex, Mr. Pope ſays,

> "Good humour only teaches charms to laſt,
> Still makes new conqueſts, and maintains the paſt."

There is no diſpoſition more comfortable to the perſon himſelf, or more agreeable to others than good humour. It is to the mind what good health is to the body; gives a man the capacity of enjoying every thing that is agreeable in life, and of uſing every faculty without impediment. It diſpoſes to contentment, benevolence, and ſympathy; and whilſt it preſents every object in the moſt favourable light, it inclines us to avoid giving or taking offence. This happy diſpoſition ſeems to be the natural fruit of a good conſcience, and of a firm belief that the world is under a wiſe and benevolent adminiſtration; and when it ſprings from this root, it is an habitual ſentiment of piety. The oppoſite diſpoſition, called "bad humour," has a contrary influence; an influence as malignant as the other is ſalutary. It tinges every object with its own diſmal colour, and like a part that is galled, it is hurt by every thing that touches it. It takes offence where none was intended, and diſpoſes to diſcontent, jealouſy, envy, and, in general, to malevolence.

There are other oppoſite diſpoſitions, which are "elation" of mind, on one hand, and "depreſſion" on the other. Theſe may be good or bad, as they are grounded on true or falſe opinion, and as they are regulated. The former, when it ariſes from a juſt ſenſe of the dignity of our nature, is true magnanimity, and diſpoſes a man to the nobleſt virtues, and the moſt heroic actions and enterpriſes. When it ariſes from a conſciouſneſs of our worth and integrity, it may be called the pride of virtue, which is noble and excellent, and conſtitutes the true ſenſe of honour; but when it ſprings from a vain opinion of our poſſeſſing talents or worth, which do not belong to us, or from an undue eſtimate of the value of thoſe we actually poſſeſs, it is pride, and produces arrogance, contempt of others, ſelf-partiality, and vicious ſelf-love. Depreſſion, on the other hand, proceeding from a juſt ſenſe of the weakneſs and imperfections of human nature, and of our own perſonal defects and faults, is true humility, which is not inconſiſtent with real magnanimity. But in, other caſes, it is oppoſite to magnanimity, and debilitates the ſprings of action, and chills every ſentiment that ſhould lead to any noble exertion, or enterpriſe. This depreſſion of mind may ſometimes be owing to melancholy, and may produce ſtrange opinions; and at other times our opinions may have a very conſiderable influence, either to elevate, or depreſs the mind, even where no melancholy attends them. (Reid's Eſſays on the Active Powers of Man, Eſſ. iii. ch. 7.) The diſpoſition, or original bent of the mind, which tends to form, or upon which is grafted, the habitual temper and diſcriminating character, is ſometimes called *propenſity*, which, uſed more generally, includes *principle*, as well as *diſpoſition*.

DISPOSITION, in *Rhetoric*, is defined, by Cicero, the act of diſtributing the things, or arguments, invented, or found out, into a proper order; or, a due placing, or ranging the ſeveral parts of ſpeech, or diſcourſe.

Diſpoſition in oratory differs from that operation of the mind which is ſo called by logicians. The logician ſo places the ſeveral propoſitions of a ſyllogiſm in a certain preſcribed method, that the relation between the terms may be evident, and the concluſion appear to be fairly drawn from the premiſes. And if either of the premiſes ſeems weak, or the truth of it not ſufficiently clear, he ſupports it by a freſh argument; and ſo proceeds in one ſuccinct and uniform chain of reaſoning, till he has made out the proof of what he had at firſt propoſed. But the orator is not thus tied down to mode and figure; or to perfect ſyllogiſms, which he ſeldom uſes: but reaſons in the manner that ſeems to him moſt convenient: he begins with either of the premiſes, and ſometimes with the concluſion itſelf; confirms one part with proper reaſons, and enlarges upon it for greater evidence and variety, before he proceeds to another; and drops any part, which he thinks ſufficiently clear of itſelf, and may be ſupplied by the attentive hearer. And thus, by a diverſity of method, and an agreeable variety, he conſults the pleaſure and entertainment of his hearers, as well as their inſtruction. Beſides, he conſiders the frame and ſtructure of his whole diſcourſe, and as his view is not every where the ſame, he divides it into certain parts, and ſo diſpoſes each of them, as may beſt anſwer his intention. From all which it appears, that diſpoſition, conſidered as a part of oratory, is widely different from that which logic teaches.

Diſpoſition

Diſpoſition makes one of the great branches, or diviſions, of rhetoric. Iſocrates was the firſt among the Greeks, that made them ſenſible of the beauty of diſpoſition; and Cicero among the Romans.

The diſpoſition is of the ſame neceſſity in oratory, as the marſhalling of an army in order to a battle; or a beautiful compoſition in architecture, painting, &c. Horace enjoins it expreſsly in poetry: "Singula quæque locum teneant ſortita decenter." Quintilian has well obſerved, (Inſt. Orat. lib. vii.); "A diſcourſe that wants diſpoſition muſt neceſſarily be confuſed, and without connection, liable to frequent tautologies and omiſſions; and like one wandering in the dark, be conducted by chance rather than deſign." Order and regularity are always pleaſant and agreeable; we admire them in nature; and they are no leſs beautiful in art, and particularly in diſcourſe. The diſpoſition, then, is the order, or arrangement, of the parts of an oration; which parts are uſually reckoned four, *viz.* the exordium, or introduction; the narration; the confirmation; and the peroration, or concluſion. Ariſtotle, (De Rhetor. l. iii. c. 13.) mentions the four following; *viz.* introduction, propoſition, proof, and concluſion. Quintilian, (Inſt. Orat. l. iii. c. 9.) makes five parts, introduction, narration, confirmation, refutation, and concluſion. Though ſome make them ſix, *viz.* the exordium, diviſion, narration, confirmation, confutation, and peroration; as indicated in that popular verſe:

"Exorſus, narro, ſeco, firmo, refuto, peroro."

But the diviſion is more naturally referred to the exordium; and the confutation to the confirmation. Cicero alſo, (De Invent. l. i. c. 14.) enlarges them to ſix, thus: introduction, narration, propoſition, confirmation, confutation, and concluſion.

The diſpoſition is either natural, or artificial. Natural, is the order the parts are above rehearſed in. Artificial, is when, for ſome particular reaſon, we recede from the order of nature. See each part under its proper article, Exordium, &c.

DISPOSSESSION, in *Law*. See Disseisin and Ouster.

DISPROPORTION, a term of relation implying a want of proportion, or ſymmetry.

DISPROVING, in *Rhetoric*. See Refutation.

DISPUTE, or Disputation, from *dis*, and *puto*, I think, in the *Schools*, *&c.* a conteſt, or combat, either by word, or writing, on ſome point of learning, or religion, for a degree, prize, exerciſe, or even for the mere ſake of truth, or advantage of a party, or the honour of a triumph. See Thesis.

The Port Royaliſts take occaſion to obſerve, that nothing gives ſo many different lights and openings, for diſcovering the truth, as diſputation. The movements of a mind, employed ſingly in the examination of any ſubject, are uſually too cool and languid; the mind needs a certain degree of heat to awake its ideas. Now, by the oppoſitions in a diſpute, we come to find wherein the difficulty lies, and the vigour the mind has acquired enables us to ſurmount it.

DISQUISITION, from *dis*, and *quæro*, I enquire, an enquiry into the nature, kinds, and circumſtances of any problem, queſtion, or topic; in order to gain a right notion of it, and to diſcourſe clearly about it.

DISS, in *Geography*, a market town and pariſh, in the hundred of Diſs. in the county of Norfolk, England, is 14 miles ſouth of Norwich, and 90 from London. It is built on the northern bank of the river Waveney, which divides the counties of Norfolk and Suffolk at this place, and contains 325 houſes, with 2246 inhabitants. The principal ſtreets are paved, and many of the houſes are well built, preſenting an aſpect of comfort and reſpectability. Here are ſome manufactories for hempen cloth and hoſe; and many of the inhabitants are employed in making ſtays. The markets, held on Fridays, are ſupplied with great quantities of yarn, linen cloth, and proviſions. The church is a large ancient building. John Skelton, king's orator and poet-laureat to Henry VIII., was rector of this town for many years. Blomefield's Hiſtory of Norfolk.

DISSAY, a ſmall town of France, in the department of the Vienne; nine miles S. E. of Château du Loir.

DISSDORF, a town of Germany, in the circle of Upper Saxony, and Old Mark of Brandenburg; 16 miles W. S. W. of Salzwedel.

DISSECTION, in *Anatomy*, from *dis* and *ſeco*, *I cut*, is the diviſion of any part of the body by means of knives, ſciſſars, &c. This, in general, is performed on the dead ſubject, for the purpoſe of expoſing the different organs in their natural ſituation, and learning their connections and ſtructure. In its moſt extenſive ſenſe, it may be conſidered to include, not merely the ſimple expoſure and diviſion of the parts in a recent body, but alſo every proceſs in practical anatomy which can contribute to elucidate the ſtructure of our frame; as all the methods of preparing the various organs, by means of injection, maceration, corroſion, &c.; of preſerving theſe by drying, varniſhing, immerſion in ſpirits, oil of turpentine, and other liquors, which conſtitute the art of making anatomical *preparations*. This branch of diſſection is exerciſed with a view to diſcover the natural ſtructure and relations of parts; but we employ it alſo, in order to obſerve the effects produced in the organization of the body by diſeaſe, and this conſtitutes *morbid* anatomy. Every proceſs then that can tend to illuſtrate the ſtructure of the body, whether in health or diſeaſe, and to expoſe its component parts in their natural or morbidly changed relations of figure, poſition, and connection, may be regarded as a branch of the art of diſſection. This is the way in which we propoſe to conſider the ſubject in the preſent work; but as, in this mode of regarding it, diſſection becomes moſt intimately connected with the art of making anatomical preparations, we ſhall refer the whole account to that article.

Dissection *of Murderers*. See Murder.

DISSEISIN, in *Law*, an unlawful diſpoſſeſſing a man of his land, tenement, or other immoveable and incorporeal right.

This is a ſpecies of injury by ouſter, or a privation of the freehold, conſiſting in a wrongful putting out of him that is ſeiſed of the freehold. It differs from *abatement* and *intruſion*, which denote a wrongful entry where the poſſeſſion was vacant, by its being an attack upon him who is in actual poſſeſſion, and turning him out of it. The former were an ouſter from a freehold in law, this is an ouſter from a freehold in deed. Diſſeiſin may be effected either in corporeal inheritances, or incorporeal. Diſſeiſin of things corporeal, as of honſes, lands, &c. muſt be by entry and actual diſpoſſeſſion of the freehold (Co. Litt. 181.); as if a man enters either by force or fraud into the houſe of another, and turns, or at leaſt keeps, him or his ſervants out of poſſeſſion. Diſſeiſin of incorporeal hereditaments cannot be an actual diſpoſſeſſion; for the ſubject itſelf is neither capable of actual bodily poſſeſſion, nor diſpoſſeſſion; but it depends on their reſpective natures and various kinds; being, in general, nothing more than a diſturbance of the owner in the means of coming at, or enjoying them. With regard to freehold rent in particular, our ancient law-books (Finch. L. 165, 166. Litt. § 237, &c.) mention five methods of working a diſſeiſin

diſſeiſin thereof: 1. By *encloſure;* where the tenant ſo encloſeth the houſe or land, that the lord cannot come to diſtrain thereon, or demand it: 2. By *foreſtaller*, or lying in wait; when the tenant beſetteth the way with force and arms, or by menaces of bodily hurt, affrights the leſſor from coming: 3. By *reſcous;* that is, either by violently retaking a diſtreſs taken, or by preventing the lord, with force and arms, from taking any at all: 4. By *replevin;* when the tenant replevies the diſtreſs at ſuch time when his rent is really due: 5. By *denial;* which is, when the rent being lawfully demanded is not paid. All, or any of theſe circumſtances, amount to a diſſeiſin of rent; that is, they wrongfully put the owner out of the only poſſeſſion, of which the ſubject matter is capable, namely, the receit of it. But all theſe diſſeiſins of hereditaments incorporeal, are only ſo at the election and choice of the party injured; if, for the ſake of more eaſily trying the right, he is pleaſed to ſuppoſe himſelf diſſeiſed (Litt. § 588, 589.) Otherwiſe, as there can be no actual diſpoſſeſſion, he cannot be compulſively diſſeiſed of any incorporeal hereditament. Thus alſo, even in corporeal hereditaments, a man may frequently ſuppoſe himſelf to be diſſeiſed, when he is not ſo in fact, for the ſake of entitling himſelf to the more eaſy and commodious remedy of an ASSISE *of novel diſſeiſin*, (which ſee,) inſtead of being driven to the more tedious proceſs of a writ of entry (4 Burr. 110.). The true injury of compulſive diſſeiſin, ſeems to be that of diſpoſſeſſing the tenant, and ſubſtituting oneſelf to be the tenant of the land in his ſtead; in order to which, in the times of pure feodal tenure, the conſent or connivance of the lord, who, upon every deſcent or alienation, perſonally gave, and who, therefore, alone could change the ſeiſin or inveſtiture, ſeems to have been conſidered as neceſſary. But when, in proceſs of time, the feodal form of alienations were off, and the lord was no longer the inſtrument of giving actual ſeiſin, it is probable that the lord's acceptance of rent or ſervice, from him who had diſpoſſeſſed another, might conſtitute a complete diſſeiſin. Afterwards, no regard was had to the lord's concurrence, but the diſpoſſeſſor himſelf was conſidered as the ſole diſſeiſor; and this wrong was then allowed to be remedied by entry only, without any form of law, or againſt the diſſeiſor himſelf; but required a legal proceſs againſt his heir or alienee. And when the remedy by aſſiſe was introduced, under Henry II., to redreſs ſuch diſſeiſins as had been committed within a few years next preceding, the facility of that remedy induced others, who were wrongfully kept out of the freehold, to feign, or allow themſelves to be diſſeiſed, merely for the ſake of the remedy. Blackſt. Comm. book iii. ch. 10.

By Magna Charta, 9 Henry III. c. 29, no man is to be diſſeiſed, or put out of his freehold, but by lawful judgment of his peers, or by the law of the land; and by ſtat. 32 Hen. VIII. c. 33. the dying ſeiſed of any diſſeiſor of, or in any lands, &c. having no right therein, ſhall not be a deſcent in law, to take away an entry of a perſon having lawful title of entry, except the diſſeiſor hath had peaceable poſſeſſion five years, without entry or claim by the perſon having lawful title. See DISSEISOR.

Diſſeiſin, according to ſome writers, is of three ſorts, *viz.* ſimple diſſeiſin, committed by day, without force and arms: and diſſeiſin by force, for which ſee DEFORCEOR, and FRESH *diſſeiſin*. See alſo RE-DISSEISIN and POST-DISSEISIN.

Aſſiſes are called writs of diſſeiſin, which lie againſt diſſeiſors in any caſe: whereof ſome are termed little writs of diſſeiſin, as being vicontial, that is, ſuable before the ſheriff in the county-court, becauſe determinable by him without aſſize.

DISSEISIN, *aſſiſe of novel*. See ASSISE.

DISSEISIN, *warranty by*. See WARRANTY.

DISSEISOR, he who diſſeiſeth, or puts another out of his land: as *diſſeiſee* is he who is put out.

If a diſſeiſor, after he has expelled the right owner, gains peaceable poſſeſſion of the lands five years without claim, and continues in poſſeſſion, ſo as to die ſeiſed, and the land deſcends to his heirs, they will have a right to the poſſeſſion till the owner recovers at law; and the owner ſhall loſe his eſtate for ever, if he doth not proſecute his ſuit within the time limited by the ſtatute of limitations.

And if a diſſeiſor levy a fine of the land whereof he is diſſeiſed unto a ſtranger, the diſſeiſor ſhall keep the land for ever; for the diſſeiſor againſt his own fine cannot claim, and the conuſee cannot enter, and the right which the diſſeiſor had, being extinct by the fine, the diſſeiſor ſhall take advantage of it. (2 Rep. 56.) But this is to be underſtood, where no uſe is declared of the fine by the diſſeiſee; when it ſhall enure to the uſe of the diſſeiſor, &c. (1 Lev. 128.) See CLAIM, *continual*. A diſſeiſor in aſſize, where damages are recovered againſt him, ſhall recover as much as he hath paid in rents chargeable on the lands before the diſſeiſin. (Jenk. Cent. 189.) But if the diſſeiſor or his feoffee ſows corn on the land, the diſſeiſee may take it before or after ſeverance. (Dyer 31. 173. 11 Rep. 46.) Where a man hath a houſe in fee, &c. and locks it, and then departs; if another perſon comes to his houſe, and takes the key of the door, and ſays that he claims the houſe to himſelf in fee, without any entry into the houſe, this is a diſſeiſin of the houſe. (2 Danv. Abr. 624.) If the feoffor enters on the land of the feoffee, and makes a leaſe for years, &c. it is a diſſeiſin; though the intent of the parties to the feoffment was, that the feoffee ſhould make a leaſe to the feoffor for life. (2 Rep. 59.) If leſſee for years is ouſted by his leſſor, this is ſaid to be no diſſeiſin. (Cro. Jac. 678.) A man who enters on another's land, claiming a leaſe for years, who hath not ſuch leaſe, is a diſſeiſor; though if a man enters into the houſe of another by his ſufferance, without claiming any thing, it will not be a diſſeiſin. (9 Hen. VI. 21, 31. 2 Danv. 625.) If a perſon enters on lands by virtue of a grant or leaſe, that is, void in law, he is a diſſeiſor. (2 Danv. 630.)

As the king in judgment of law can do no wrong, he cannot be a diſſeiſor. (1 Ed. V. 8.) A diſſeiſor is to be fined and impriſoned; and the diſſeiſee reſtored to the land, &c. by ſtat. 20. Hen. III. c. 3. Where a diſſeiſor is diſſeiſed, it is called diſſeiſin upon diſſeiſin.

DISSEMINATE VACUUM. See VACUUM *diſſeminatum*.

DISSEN, in *Geography*, a ſmall town of Germany, in the circle of Weſtphalia, which formerly belonged to the biſhopric of Oſnabruck, but is at preſent included in the poſſeſſions of the new king of Weſtphalia.

DISSENHOFEN. See DIESSENHOFEN.

DISSENTERS, a general denomination of equal import with non-conformiſts; and comprehending certain ſects, or parties, in England, who, in matters of religion, church diſcipline, and ceremonies, diſſent from, or diſagree with the church of England, and have a toleration by law for the ſame Such, particularly, are the preſbyterians, independents, anabaptiſts, and quakers. See PRESBYTERIANS, &c.

The diſſenters, with reſpect to their legal condition, have, in former periods, been ſubject to ſeveral diſabilities and reſtrictions, (which, ſays judge Blackſtone, I ſhall not undertake to juſtify,) laid upon them by abundance of ſtatutes (23 Eliz. c. 1. 29 Eliz. c. 6. 35 Eliz. c. 1. 22 Car. II. c. 1.); concerning which he obſerves, "that the legiſlature, with a ſpirit of true magnanimity, extended that indulgence to theſe ſectaries, which they themſelves, when in power, had held

held to be countenancing ſchiſm, and denied to the church of England;" (referring to the ordinance of 1645, which enforced the uſe of the DIRECTORY, and which inflicted impriſonment for a year on the third offence, and pecuniary penalties on the former two, in caſe of uſing the book of common prayer, not only in a place of public worſhip, but alſo in any private family.) The penalties are conditionally ſuſpended by the ſtatute 1 W. and M. ſt. 1. c. 18. "for exempting their majeſties' proteſtant ſubjects, diſſenting from the church of England, from the penalties of certain laws," commonly called the TOLERATION *act* (which ſee); which act is confirmed by ſtatute 10 Ann. c. 2. and declares, that neither the laws above-mentioned, nor the ſtatutes 1 Eliz. c. 2. § 14. 3 Jac. I. c. 4 and 5, nor any other penal laws made againſt popiſh recuſants (except the teſt acts) ſhall extend to any diſſenters, other than papiſts and ſuch as deny the Trinity: provided, 1. That they take the oaths of allegiance and ſupremacy (or make a ſimilar affirmation, being quakers, ſtat. 8 Geo. I. c. 6) and ſubſcribe the declaration againſt popery; 2 That they repair to ſome congregation certified to and regiſtered in the court of the biſhop or archdeacon, or at the county ſeſſions; 3. That the doors of ſuch meeting-houſe ſhall be unlocked, unbarred, and unbolted, in default of which the perſons meeting there are ſtill liable to all the penalties of the former acts. Diſſenting teachers, in order to be exempted from the penalties of the ſtatutes 13 and 14 Car. II. c. 4. 15 Car. II. c. 6. 17 Car II. c. 2. and 22 Car. II. c. 1. are alſo to ſubſcribe the articles of religion mentioned in the ſtatute 13 Eliz. c. 12. (which only concerns the confeſſion of the true Chriſtian faith and the doctrine of the ſacraments,) with an expreſs exception of thoſe relating to the government and powers of the church, and to infant baptiſm: or if they ſcruple ſubſcribing the ſame, ſhall make and ſubſcribe the declaration preſcribed by ſtatute 19 Geo. III. c. 44. profeſſing themſelves to be Chriſtians and proteſtants, and that they believe the ſcriptures to contain the revealed will of God, and to be the rule of doctrine and practice. Thus, though the *crime* of non-conformity, as Blackſtone expreſſes it, is by no means univerſally abrogated, it is ſuſpended and ceaſes to exiſt with regard to thoſe proteſtant diſſenters, during their compliance with the conditions impoſed by theſe acts; and, under theſe conditions, all perſons who will approve themſelves no papiſts or oppugners of the Trinity, are left at full liberty to act as their conſciences ſhall direct them, in the matter of religious worſhip. And if any perſon ſhall wilfully, maliciouſly, or contemptuouſly diſturb any congregation, aſſembled in any church or permitted meeting-houſe, or ſhall miſuſe any preacher or teacher there, he ſhall (by virtue of the ſame ſtatute 1 W. and M.) be bound over to the ſeſſions of the peace, and forfeit 20*l*. But by ſtatute 5 Geo. I. c. 4. no mayor or principal magiſtrate muſt appear at any diſſenting meeting with the enſigns of his office, on pain of diſability to hold that or any other office: the legiſlature judging it a matter of propriety, that a mode of worſhip ſet up in *oppoſition* to the national (ſays the learned judge) when allowed to be exerciſed in peace, ſhould be exerciſed alſo with decency, gratitude, and humility.

Diſſenters alſo, who ſubſcribe the declaration of the act 19 Geo. III. are exempted (unleſs in the caſe of endowed ſchools and colleges) from the penalties of the ſtatutes 13 and 14 Car. II. c. 4. and 17 Car. II. c. 2. which prohibit (upon pain of fine and impriſonment) all perſons from teaching ſchool unleſs they be licenſed by the ordinary, and ſubſcribe a declaration of conformity to the liturgy of the church, and reverently frequent divine ſervice *eſtabliſhed* by the laws of this kingdom.

Diſſenters choſen to any parochial or ward offices, and ſcrupling to take the oaths, may execute the office by deputy, who ſhall comply with the law in this behalf. (Stat. 1 W. & M. ſt. 1. c 18.) See CONSTABLE. Diſſenters are not ſubject to fine on refuſing to ſerve corporation offices. For where a freeman of London was elected one of the ſheriffs, but refuſed to take the office on account of his being a diſſenter, and as ſuch not having received the ſacrament according to the rites of the church of England, within a year before his election, an action was brought againſt him in the ſheriff's court for the penalty incurred by ſuch refuſal, and a judgment recovered, which judgment was affirmed in a writ of error brought in the court of Huſtings. But the defendant having obtained a ſpecial commiſſion of errors, the judges delegates reverſed both judgments; and on a writ of error in parliament, this judgment of reverſal was affirmed; the judges (except one) being of opinion that the defendant was at liberty to object to the *validity* of his election on the ground of his own non conformity. (3 Bro. P. C 8vo. ed. 465. Harriſon v. Evans.) The general principle and ſpirit of this deciſion, reſtricted in this caſe to the ſheriffs of corporations, have been thought to extend to thoſe of counties; and in ſeveral caſes that have ſince occurred the obligation of ſerving this office, under the plea of diſſent, has not been enforced.

The diſſenters have complained that judge Blackſtone has not truly repreſented their preſent legal condition. According to his ſtatement mere non-conformity is a crime, though, as he elſewhere ſays, not ſo great as ſome others, and is ſo conſidered in the eye of the law, notwithſtanding the toleration-act The *penalties*, indeed, by that act, are *ſuſpended*, but the *crime* ſtill ſubſiſts. Upon this ſtatement it has been obſerved by an able advocate of their cauſe (ſee letters to Blackſtone by P. Furneaux, D. D. 1770), that ſuſpenſion of penalty is not the language of the toleration-act. The act uſes a comprehenſive and forcible expreſſion, which excludes the *crime* as well as the *penalty*; it leaves theſe penal ſtatutes no operation at all, with reſpect to the diſſenters who are under the toleration act; it repeals and annihilates thoſe ſtatutes with regard to ſuch diſſenters. The words of the act are, that thoſe ſtatutes ſhall not be conſtrued to *extend* to ſuch perſons; and if they are not to be conſtrued to *extend* to them, nothing can be plainer, than that they are not to be conſtrued to *affect them at all*, either as to crime or penalty. If, therefore, the ſtatute-law doth not make non-conformity a crime, it is certain that it is no crime at all by the common law; becauſe the conſtitution of the church, and its peculiar doctrine, worſhip, diſcipline, and government are founded wholly upon the ſtatute-law, and not at all upon the common law. It would have been more juſt, as well as more candid, if the learned judge had ſaid, that all penal laws for non-conformity are *repealed*, with regard to thoſe diſſenters who are qualified as the act directs. It has been farther alleged, that both the crime and penalty of mere proteſtant non-conformity to the eſtabliſhed rites and modes of worſhip appear to be aboliſhed, by the act of toleration, from the protecting clauſes of that act; which, in the words of a great lawyer, (the late lord Mansfield.) have rendered the diſſenters' way of worſhip "not only innocent but lawful; have put it, not merely under the connivance, but under the protection of the law; have *eſtabliſhed* it. For nothing can be plainer than that the law protects nothing in that very reſpect, in which it is, at the ſame time, in the eye of the law a crime. Diſſenters, by the act of toleration, therefore, are reſtored to a legal conſideration and capacity." Beſides, the unanimous judgment of the commiſſioners-delegates, and of the houſe of lords affirming that judgment (Feb. 7, 1767), in the great cauſe between

between the city of London and the diſſenters, concerning the fine inflicted by a bye-law of the city on thoſe who refuſed the office of ſheriff, was grounded entirely on this opinion, *viz.* "that the toleration act removed the crime as well as the penalty of mere non-conformity." The arguments of the judges in this cauſe turned upon the ſingle point, "that the toleration act removed the *crime* as well as the *penalties* of non-conformity;" and in this they all, except one, agreed. The whole was ſummed up and the reaſoning on the oppoſite ſide examined and confuted, with great perſpicuity and force of argument, by lord Mansfield; and upon this ground the houſe of lords affirmed, *nemine contradicente*, the judgment of the commiſſioners delegates. Mr. Onſlow, formerly ſpeaker of the houſe of commons, whoſe excellent principles and character have been always held in high eſtimation, declared his decided approbation of the term *eſtabliſhed*, as applied by the noble lord already mentioned to the worſhip of diſſenters, and he moreover ſaid that this was the language which he himſelf always uſed; adding, that as far as the authority of the law could go in point of *protection*, the diſſenters were as *truly eſtabliſhed* as the church of England; and that an eſtabliſhed church, as diſtinguiſhed from their places of worſhip was, properly ſpeaking, an *endowed church*; a church which the law not only protected, but endowed with temporalities for its peculiar ſupport and encouragement. It deſerves to be conſidered, that the penalties inflicted by the act of toleration on thoſe who diſturb any diſſenting congregation for divine worſhip, or miſuſe the preacher, are preciſely the ſame as on thoſe who diſturb the congregation, or miſuſe the preacher in any cathedral, pariſh church, or chapel; and diſſenting miniſters, as well as the clergy of the church of England, are excuſed from all burdenſome offices.

Having ſtated the law, as it now exiſts with regard to diſſenters, we ſhall here introduce, for the ſatisfaction of our readers, a brief account of their principles and conduct. This ſeems to be the more neceſſary in a work that profeſſes to do juſtice to perſons of every party and profeſſion, both civil and religious, becauſe ſome for want of due information (as it is imagined) have conceived them to be a body of perverſe and obſtinate people, who ſeparate from the eſtabliſhed church without ſufficient reaſon; and others, for want of adverting to their diſcriminating character and general conduct, repreſent them as enemies to the conſtitution and government of their country. A juſt and candid ſtatement of their diſtinguiſhing tenets is ſuch as they have a right to expect: and it will ſerve, as the writer of this article apprehends, to conciliate different parties of Chriſtian profeſſors, to produce mutual forbearance and concord, and thus uniting the ſeveral members of the community by candour, charity, and good-will, to promote the permanence and proſperity of a country, to the honour and welfare of which they are zealouſly attached. The diſſenters have complained (how far they have had juſt grounds for complaint we leave others to judge) that their principles and character have been miſunderſtood and miſrepreſented: but at the tribunal of this enlightened age they can have nothing to fear, as their cauſe will be liberally tried and determined. Judge Blackſtone ſpeaks of them as "a ſpecies of non-conformiſts, who offend through a miſtaken or perverſe zeal. Such (he ſays) were eſteemed by our laws, enacted ſince the time of the reformation, to be papiſts and proteſtant diſſenters: both of which were ſuppoſed to be equally ſchiſmatics in not communicating with the national church; with this difference, that the papiſts divided from it upon material, though erroneous, reaſons: but many of the diſſenters upon matters of indifference, or, in other words, upon no reaſon at all." He allows, however, that our anceſtors were miſtaken in their plans of compulſion and intolerance; and that all perſecution for diverſity of opinions, however ridiculous or abſurd they may be, is contrary to every principle of ſound policy and civil freedom. The names and ſubordination of the clergy, the poſture of devotion, the materials and colour of the miniſter's garment, the joining in a known or unknown form of prayer, and other matters of the ſame kind, muſt be left to the option of every man's private judgment. Nevertheleſs, he reflects on the conduct of thoſe puritans, from whom they derive their pedigree, who concurred in the ordinance of 1645, which they alſo condemn (ſee DIRECTORY); without adverting to the period in which they lived, to the exaſperated feelings which they might poſſibly have unduly indulged, and without allowing for the imperfect and miſtaken ſentiments concerning toleration, which then too generally prevailed. He ſeems alſo to forget, as the diſſenters would argue, the ſevere ſufferings which the puritans experienced both before and after the period to which he refers, and which cannot be parallelled by any event that occurred during the interval of the interregnum. The diſſenter would contraſt (if recrimination were allowed) againſt the unwarrantable conduct of the parliament in 1645, the unrelenting rigours of archbiſhops Parker, Bancroft, Whitgift, and Laud. Under the firſt of theſe, he would ſay, more than 100, and under the ſecond, more than 300, pious and learned men, not only members, but miniſters of the eſtabliſhed church, were ſilenced, ſuſpended, admoniſhed, deprived; many of them loaded with grievous and heavy fines, and ſhut up in noiſome gaols, where they expired ſlowly through penury and diſeaſe: and he would ſay, the crimes for which they ſuffered theſe ſevere puniſhments were merely their ſcruples about the ſurplice and the cap, about bowing at the name of Jeſus, about Chriſt's deſcent into hell, and ſimilar momentous points. The diſſenter would call to mind the hundreds that were ſequeſtered, driven from their livings, proſecuted in the high commiſſion court, and forced to leave the kingdom for not punctually conforming to all the ceremonies and rites deviſed or enforced by Laud, and for not daring to tell their people, that they might lawfully profane the ſabbath-day by gambols and ſports. He would, moreover, allege, that many of the canons breathe a perſecuting ſpirit, and that the act of uniformity was an unrighteous and perſecuting act; by the operation of which more than 2000 excellent and pious miniſters were excluded from the church, and abandoned, with their ſtarving families, to great poverty and diſtreſs. This diſtreſs, it might be urged, was aggravated by another act, which baniſhed them five miles from any city, borough, or church in which they had before officiated, and which removed them to a diſtance from their acquaintance and friends, who might have miniſtered to their relief. The diſſenter, in pleading his own cauſe, would mention another act, which forbade their meeting to worſhip God any where but in the eſtabliſhed churches, under the penalties of heavy fines, impriſonment, and baniſhment to foreign lands. In conſequence of theſe cruel acts, it is ſaid, that great numbers of pious clergymen, with multitudes of their people, were laid in priſons amongſt thieves and common malefactors, where they ſuffered the greateſt hardſhips, indignities, and oppreſſions; their houſes were rudely rifled, their goods made a prey to hungry informers, and their families given up to beggary and want. An eſtimate is ſaid to have been publiſhed of near 8000 proteſtant diſſenters, who had periſhed in priſon in the reign only of Charles II. By ſevere penalties inflicted on them for aſſembling to worſhip God, they ſuffered in their trade and eſtates, in the compaſs of a few

years, at leaſt two millions; and a liſt of 60,000 perſons was taken, who had ſuffered on a religious account, betwixt the reſtoration and the revolution. (See Neal's Hiſt. Purit. vol. ii. p. 759.) The diſſenters have alſo complained of the diſabilities and diſgrace entailed upon them by the *Corporation* and *Teſt* acts; and alſo of the temporary injury which they ſuffered from the *Schiſm* and *Occaſional Conformity* acts.

Diſſenters, in the moſt general ſenſe of the term, as comprehending thoſe who diſapproved the doctrines and forms of worſhip ſanctioned by the authority of the eſtabliſhed church, have exiſted in this country for many ages. According to this latitude of the appellation, the famous John Wickliffe, who lived in the 14th century, was a diſſenter: for, independently of his objections to ſeveral doctrines of the church of Rome, then the eſtabliſhed church of England, he maintained moſt of thoſe points by which the puritans were afterwards diſtinguiſhed. But it was not till after the reformation, in the year 1548, and under the reign of king Edward VI., that the controverſy commenced, which afterwards occaſioned a ſeparation from the church. This controverſy aroſe from biſhop Hooper's refuſing to be conſecrated in the popiſh habits. This circumſtance produced a diviſion among the reformers, and gave riſe to the two parties of "Conformiſts" and "Non-conformiſts;" archbiſhop Cranmer and Ridley being at the head of the former, and biſhop Hooper, Rogers, and the foreign divines, eſpouſing and ſupporting the cauſe of the latter. Under the reign of queen Mary, when popery was re-eſtabliſhed, many of the more eminent reformers fled abroad for ſecurity; and at Franckfort, where the number of exiles was moſt conſiderable, that conteſt and diviſion began, which, in 1556, gave riſe to the puritans, and to that ſeparation from the church of England, which continues to this day. (See Puritans.) Soon after the acceſſion of queen Elizabeth, *viz.* in the year 1559, "An Act for the Uniformity of Common Prayer and Service in the Church, and Adminiſtration of the Sacraments" was paſſed; and upon this fatal rock of uniformity in things merely indifferent, in the opinion of the impoſers, was the peace of the church of England ſplit. The court reformers and the puritans were divided in opinion, with regard to a variety of ſubjects that engaged their attention. The principal queſtion, however, concerning which they diſagreed, related to the obligation and enforcement of things indifferent in their own nature, which, as the reformers maintained, might be ſettled, determined, and made neceſſary by the command of the civil magiſtrate, and authoritatively enjoined on the obſervance of all ſubjects; but, with regard to theſe the puritans inſiſted, that things which Chriſt had left indifferent, ought not to be made neceſſary by any human laws; and that ſuch rites and ceremonies as had been abuſed to idolatry, and manifeſtly tended to lead men back to popery and ſuperſtition, were no longer indifferent, but were to be rejected as unlawful. It is to be regretted, that both parties were too well agreed, in aſſerting the neceſſity of uniformity in public worſhip, and of uſing the ſword of the magiſtrate for the ſupport and defence of their reſpective principles; which they miſemployed in their turns, whenever they could graſp the power into their hands. The ſtandard of uniformity, according to the biſhops, was "the queen's ſupremacy and the laws of the land;" according to the puritans, "the decrees of provincial and national ſynods," allowed and enforced by the civil magiſtrate; but neither party was for admitting that liberty of conſcience, and freedom of profeſſion, which is every man's right, as far as is conſiſtent with the peace of the civil government under which he lives. The terms of miniſterial conformity at this time, *viz.* in 1560, were the oath of ſupremacy, compliance with the act of uniformity, and a declaration of faith, iſſued by order of both archbiſhops, metropolitans, and the reſt of the biſhops, for the unity of doctrine, &c. Many of the learned exiles, who were now returning home, and others, diſapproved of the ſecond article, and refuſed to accept of livings in the church, according to the act of uniformity, and the queen's injunctions. The queſtion about habits was ſoon after revived; and the diſcuſſion of it produced conſiderable agitation. Thoſe who refuſed them were puniſhed in a variety of ways. At length, *viz.* in 1566, the impoſition of the habits, and ſome other ceremonies, which the puritans were compelled by law to adopt, produced a ſeparation. In the following year, they urged a great number of other objections againſt the hierarchy, and various ceremonies, for the uſe of which there was no foundation in Scripture, or primitive antiquity; and which, therefore, as they argued, ought not to have been impoſed. In points of doctrine there was no difference between the puritans and conformiſts. The chief leaders of the ſeparation were beneficed perſons within the dioceſe of London; and theſe had their followers of the laity, who forſook their pariſh churches, and aſſembled with the deprived miniſters in woods and private houſes, to worſhip God, without the habits and ceremonies of the church. Many ſevere meaſures were adopted, in order to compel them to ſubmit; but they were ineffectual; nor did any efforts for parliamentary relief, on the part of the puritans, prove of any avail. See Puritans.

The reſtoration of Charles II. in 1660, was accompliſhed at a period when the preſbyterians, one claſs of proteſtant diſſenters, were in poſſeſſion of the whole power of England; and they were the principal inſtruments of effecting it. They have been juſtly blamed, however, for bringing in the king without a previous treaty, and for truſting a ſet of men, whom they knew to be their implacable enemies. Many of them lived long enough to ſee their error, and heartily to repent of it. The king was ungrateful; ſoon forgot his promiſes of kindneſs; and in the year 1661, the corporation act was paſſed. (See Corporation.) This was ſoon followed by the Savoy conference, which terminated without ſucceſs, as no alterations were made in the common-prayer book that were favourable to the preſbyterians, for it was reſolved to gratify them in nothing. Indeed, the common-prayer book was made more exceptionable, and the terms of conformity much harder than before the civil war. See Conference.

In the ſpring of 1662, "the act of uniformity" was brought into parliament (ſee Uniformity); and in conſequence of it the terms of conformity were higher than before the civil wars. The preſbyterian miniſters were allowed only three months to conſider what to do with themſelves and their families. Beſides other objections which occurred, that which the diſſenters, of all denominations, refuſed, was giving "their aſſent and conſent to all and every thing contained in the book of common prayer." This, they apprehended, to be more than was due to any human compoſition. Some of the non-conformiſts quitted their ſtations in the church before the 24th of Auguſt; and when the fatal St. Bartholomew came, about 2000 miniſters relinquiſhed their preferments in the church, or refuſed to accept of any on the terms of the act of uniformity. Among theſe were many men much valued and diſtinguiſhed by their abilities and zeal, caſt out of their poſſeſſions in an ignominious manner, deprived of their means of ſubſiſtence and opportunities of uſefulneſs, and reduced to a neceſſity, which both their principles and their circumſtances

ſtances juſtified, of forming ſeparate congregations. The perſecution they thus ſuffered tended to excite compaſſion, and to enſure eſteem.

Mr. Locke calls them worthy, learned, pious, orthodox divines, who did not throw themſelves out of ſervice, but were forciby ejected. So injurious was this event to the church itſelf, that many poor livings in the country had no incumbents for a conſiderable time. Many, who complied with the terms of conformity, did it, not becauſe they approved them, but for the ſake of their families, or becauſe they were unwilling to be buried in ſilence. Several young ſtudents, who were deſigned for the pulpit, applied themſelves to law or phyſic, or diverted their views to ſome ſecular employment. This act was paſſed after the king had engaged his faith and honour in his declaration from Breda, to preſerve liberty of conſcience inviolable; which promiſe opened the way for his reſtoration; and after the royaliſts had given public aſſurance, that all former animoſities ſhould be laid aſide as rubbiſh, under the foundation of univerſal concord.

The name of puritans was now changed into that of proteſtant non-conformiſts; who were ſub-divided into preſbyterians, independents, anabaptiſts, and quakers. The king was a concealed Roman catholic; and the court was diſpoſed to paſs the act of uniformity in the ſevereſt terms, in order to make the number of diſſenters more conſiderable; and when this was objected, it was replied, the more diſſenters the better, becauſe it will make a toleration more needful, in which the papiſts will be included. In December 1662, the king, with the advice of his privy council, publiſhed his declaration of indulgence. This was ſucceeded, on the pretence of a plot in the north, by an act for ſuppreſſing ſeditious conventicles (16 Car. II. c. 4.) (See CONVENTICLE.) In October 1665, the Oxford five-mile act, entitled "An act to reſtrain non-conformiſts from inhabiting corporations," (17 Car. II. c. 2.) received the royal aſſent. Some few took the oath required by this act; but the great body of non-conformiſt miniſters refuſed it; and preferred going to baniſhment. In the year 1668, a comprehenſion (which ſee) was projected; but the ſcheme was defeated by the court-biſhops and the friends of lord Clarendon; and the perſecution was renewed. And in April 1670, the conventicle act was revived, with ſome additional clauſes. (Stat. 22 Car. II. c. 1.) On this act great numbers were proſecuted, and many induſtrious families reduced to poverty. Many miniſters were confined in gaols and cloſe priſons; and warrants were iſſued againſt them and their hearers, by which great ſums of money were levied. In 1672, a new declaration of indulgence was iſſued, which was ſoon recalled. But this mode of obtaining relief, by the exerciſe of the diſpenſing power, was very far from being ſatisfactory to the non-conformiſts. (See DISPENSATION *of the king.*) The teſt-act was paſſed in 1673. (See TEST.) In 1680, although a bill for a comprehenſion, entitled "An act for uniting his Majeſty's proteſtant ſubjects," was committed, it did not paſs the houſe, being changed for another, entitled "An act to exempt his Majeſty's proteſtant ſubjects, diſſenting from the church of England, from the penalties impoſed upon the papiſts by the act of the 35th Eliz." by which act non-conformiſts were adjudged to perpetual impriſonment, or obliged to abjure (that is) depart the realm, never to return. This terrible law had lain dormant for almoſt 80 years, but was now revived, and threatened to be put in execution by the tories. The repeal paſſed the houſe of commons with a high hand, but went heavily through the houſe of lords; but when it ſhould have been offered to the king for the royal aſſent, at the cloſe of the ſeſſion, it was miſſing, and never heard of more, the clerk of the crown having withdrawn it from the table, by the king's particular order. However, the morning before the houſe was prorogued, (Jan. 10.) two votes were paſſed of an extraordinary nature. "1. Reſolved, *nemine contradicente*, that it is the opinion of this houſe, that the acts of parliament, made in the reigns of queen Elizabeth and king James, againſt popiſh recuſants, ought not to be extended againſt proteſtant diſſenters. 2. Reſolved, that it is the opinion of this houſe, that the proſecution of proteſtant diſſenters upon the penal laws, is, at this time, grievous to the ſubject, a weakening the proteſtant intereſt, an encouragement to popery, and dangerous to the peace of the kingdom." While the parliament was endeavouring to relieve the diſſenters, many of the biſhops and clergy of the church of England were pleaſed to ſee the court inclined to proſecute the non-conformiſts; and in the year 1681. a perſecution of the diſſenters was revived by order of the king and court. After the acceſſion of James II. they were treated with great ſeverity, and had few intervals of reſt, unleſs by the diſpenſing power of the king, which they diſapproved, and the benefit of which they knew was intended for the papiſts, and not for them. But though the diſſenters ſuffered much, their number was rather augmented than diminiſhed; which ſome of their advocates have attributed to their firmneſs and conſtancy in a long courſe of trial; to their doctrine and manner of preaching; to the ſeverity of their morals; to the careful and ſtrict education of their children; to a concern for a ſucceſſion of able and learned miniſters, for which purpoſe they encouraged private academies in ſeveral parts of the kingdom; to the perſecuting zeal of the high-church party; and to the ſpirit and principles of toryiſm, which began to appear ruinous to the nation. At length the act of toleration relieved them from oppreſſion. During a courſe of ſuffering, as unmerited as it was ſevere, they were led to examine the principles of their diſſent; and the more they examined them, the more they were led to approve them, and the more firm and zealous they were in maintaining them.

Diſſenters may be led, by the brief ſurvey which we have enabled them to take of the perſecuted and diſtreſſed condition of their anceſtors, to congratulate themſelves on account of the happier circumſtances in which their lot is caſt; to maintain their ſteady attachment to a government that protects them; and to wait with patience for the arrival of that period, in which all remaining diſabilities will be removed, and the legiſlature ſhall render them capable, in conſiſtency with their avowed principles, of occupying thoſe poſts of honourable ſervice and emolument, from which they are now excluded. Their advocates allege, that whilſt they ſeparate from the eſtabliſhed church with ſome degree of reluctance, and whilſt it muſt be their wiſh to unite with the enlightened and liberal members of this church in the profeſſion of their faith, and the exerciſe of their worſhip, they are conſtrained to diſſent, not from capriciouſneſs and perverſeneſs of temper, but from the conviction of their minds, and from a conſcientious regard to what they conceive to be truth and duty. Diſſenters are not men of ſo peculiar a turn of mind, as to love ſuffering and reproach, or to deſpiſe the dignities, preferments, and lucrative poſts, which are ſhared among their fellow-ſubjects; could they with a good conſcience partake of them, as they incline to think they have a natural right to do. It has been ſaid, indeed, by a learned judge already cited, "that many diſſenters divide from the church upon matters of indifference, or, in other words, upon no reaſon at all." Allowing them to be perfectly indifferent, it has been ſaid, that the autho-

rity by which they are enjoined and made neceſſary to the inſtitutions of Chriſt, and to a participation of Chriſtian ordinances, may be reaſonably called in queſtion. The 20th article of the church of England aſſerts, indeed, "that the church hath power to decree rites and ceremonies, and hath authority in matters of faith." If the church hath really this authority and power, then all objections urged by diſſenters againſt particular articles of faith, or modes of profeſſion and worſhip, muſt be vain and impertinent; becauſe the church, ſuppoſed to poſſeſs this authority, ought to be reverently obeyed. But this authority, claimed on behalf of the church, is controverted by the diſſenters. They aſſert, that Jeſus Chriſt alone hath this authority; that he hath expreſsly commanded that no power of this kind ſhall ever be claimed, or ever be yielded, by any of his followers; that no power can make that neceſſary which he hath not made neceſſary; and that what is indifferent in its own *nature*, ought to be left indifferent in *practice*, and ſhould not be bound upon Chriſt's ſubjects either by civil or eccleſiaſtical laws: neither of which can, in this caſe, be of any validity, as being both alike of human origin. That "all things ſhould be done decently and in order" (1 Cor. xiv. 20.) they admit; but they think there is a manifeſt difference between circumſtances of natural decency and order, which are neceſſary to be agreed upon and obſerved, in order to the performance of any divine worſhip at all: and ſuch rites and ceremonies, ſuch additions to divine inſtitutions, as are not at all neceſſary, in the reaſon of the thing, or by any law of Chriſt; but only enjoined by a human, that is, in this caſe, an incompetent authority. Beſides, "a power in the church to decree rites and ceremonies, and authority in matters of faith," is a principle ſo indefinite, and ſo extenſive in its influence, that under the ſhadow of it, have grown up all the enormous innovations and ſuperſtitions of the church of Rome. But it has been ſaid, that if the church of England claims and exerciſes this power, and obliges all its miniſters to ſubſcribe to articles of faith, which it hath authoritatively decreed, and to uſe in religious worſhip ceremonies and rites, which it hath authoritatively enjoined; hath not the church of France, the church of Spain, the church of Rome the ſame authority and power? This is not an excluſive privilege pertaining to one church. If it be allowed that the church of Rome hath this prerogative, ſuch a claim, it has been ſaid, will overthrow the reformation itſelf, and ſubvert the very foundation of the church which we wiſh to eſtabliſh. It may be ſaid, however, that our church hath expreſsly guarded againſt any ſuch abuſe of the power it claims, by adding in the 20th article: "Yet is it not lawful for the church to ordain any thing that is contrary to God's word written; neither may it ſo expound one place of Scripture that it be repugnant to another." But of this repugnance and contrariety, the church, and not every private perſon, is the only proper judge: for if every private perſon hath authority to judge of the church's deciſions, and to reject them if they appear to him repugnant to Scripture, then the church's authority, in points of faith, comes to juſt nothing at all. It is an authority to decree, where none are bound to ſubmit; that is, an authority over nobody, and authority to do nothing. But if this authority be conceded to the church, it will be ſaid by ſome, that it is inconſiſtent with the natural right which every man has to judge for himſelf, and make profeſſion of that religion which he apprehends to be moſt agreeable to truth, and the ſacred writings, which are the only authoritative rule of his faith or practice, as far as it does not affect the peace and ſafety of the government under which he lives; without being determined by the prejudices of education, the laws of the civil magiſtrate, or the decrees of councils, churches, or ſynods. It will be inquired, however, where does the church pretend to be the only proper judge, or where diſallow private Chriſtians to judge for themſelves in theſe matters? To which it will be replied, the authority it claims is of this kind; it has expreſsly decreed 39 articles of faith for the purpoſe "of taking away difference of opinion, and to eſtabliſh an agreement in true religion." (See Pref. to 39 articles.) Beſides, it is alleged, that in the 34th article private judgment is forbidden to oppoſe the common order of the church, and the authority of the magiſtrate; and when it preſumes to do ſo, it is to be cenſured and puniſhed. Moreover, ſome have inquired who are the perſons that are inveſted with this authority and power? In other words, who are the church? This power to order the manner of God's worſhip, and to ſettle articles of faith, it has been ſaid, is not at all lodged in the biſhops and clergy, who are uſually denominated our ſpiritual paſtors and guides, but entirely in the king and parliament of theſe realms, under whoſe direction and controul the clergy are to act. Accordingly the diſſenters allege, that the church of England is a parliamentary church: not properly an ally, but a mere creature of the ſtate; depending entirely upon the acts and authority of parliament for its very eſſence and frame. The qualifications of its miniſters, their power to officiate, the manner in which they are to adminiſter the ſacraments, are all limited and preſcribed by authority of parliament, and this authority, which at firſt made, can alone alter and new make it; can aboliſh, or add to its articles or rites according to its pleaſure, even though the whole body of biſhops and clergy ever ſo much diſlike or proteſt earneſtly againſt it. The diſſenters farther inquire, how the civil magiſtrate has acquired this authority in the Chriſtian church? Who gave him this power to decree rites in Chriſtian worſhip, which Chriſt never decreed, and to make articles of faith, which Chriſt never made? Neither Chriſt, nor the apoſtles, as they ſay, ever gave him this authority; and therefore they wiſh to know whence it is derived? The ſubjection to higher powers, and obedience to magiſtrates, which the Scriptures enjoin on Chriſtians, relates, as they conceive, only to civil, not at all to religious matters; becauſe the magiſtrate at that time was every where pagan. So far is Chriſtianity from enjoining, that it actually forbids obedience to civil governors in things of a religious nature. It commands us to "call no man upon earth father or maſter," (Matt. xxiii. 8, 9.) *i. e.* to acknowledge no authority or juriſdiction of any in matters of religion, but to remember that "one only is our maſter" and lawgiver, even Chriſt; and that all Chriſtians are brethren, having no dominion over one another. (Matt. xx. 25.) Chriſt, the only authorized and ſovereign legiſlator of the Chriſtian church, directs his followers "to render unto Cæſar the things that are Cæſar's, and unto God, the things which are God's."

The apoſtles, who certainly, if any perſons, might have pretended to authority in matters of faith, declared, that they "had no dominion over the faith" of Chriſtians (2 Cor. i. 4.) They appealed to reaſon and conſcience, and referred the final deciſion to every man's own private judgment; "we ſpeak as unto wiſe men; judge ye what we ſay." (3 Cor. x. 15.) The Bereans are commended for "ſearching the ſcriptures" of the O.T. "daily," to ſee, "whether the things" which the apoſtles declared to them "were ſo" as they reported. And it is the duty of every Chriſtian to endeavour, for himſelf, to underſtand the ſacred oracles, as well as he is able, in the uſe of all the means and helps which divine Providence puts into his power; and thus ſhould every man "be fully perſuaded in his own mind." We believe many things upon "human authority;" meaning by authority

rity "teſtimony;" but there is a manifeſt difference between human teſtimony as to matters of fact; and human authority, as to matters of opinion, and principles of truth. The former may be, and often is, a rational ground of belief; the latter is believing upon no evidence, and is a renunciation of reaſon. The authority or teſtimony of the apoſtles, and firſt teachers of Chriſtianity, was accompanied with divine credentials; and this rendered it a ſufficient foundation for the belief, both of the facts and doctrines they revealed. And, indeed, human teſtimony, under the influence of inſpiration, and ſupported by miraculous interpoſition, is *always* a juſt ground of our belief of religious truth, as well as facts; but the authoritative decrees and injunctions of fallible, uninſpired men, *never*. The former claim an abſolute regard, as being a proof and evidence of a divine miſſion; the latter are no evidences of religious truth, or ground of belief of it at all, and therefore deſerve no regard. Should it be alleged, that other men's underſtandings are more penetrating and judicious than ours; or, that great numbers, eſpecially of perſons venerable for their age as well as for their piety and learning, are more likely to be in the right than a few individuals; and that, therefore, it will be *ſafer* to be guided by their judgments than by our own. To this argument it is replied; that a man's own underſtanding, be it more or leſs judicious, is the only faculty which God hath given him to diſtinguiſh truth from error; and as every man is accountable for the uſe of his own underſtanding, not for that of other men's; conſequently, his ſafety conſiſts not in giving up his own to the direction and controul of others, but in uſing it himſelf to the beſt advantage. And ſhould he, in the careful and conſcientious uſe of it, err; that error will never be imputed to him as a crime; whereas, if he follow the judgment of other men, though ever ſo wiſe and learned, contrary to his own ſenſe of things, he may, perchance, *profeſs* what is *right*, but he *does* what is *wrong*; and is highly criminal in the ſight of God. For, the profeſſion of any doctrine ſhould always follow conviction of the truth of it; at leaſt, a man muſt never profeſs what is contrary to his conviction. To embrace or profeſs any point which he does not believe to be true, in compliment to human authority, is exalting *human* into the place of *divine* authority; and ſaying in one word, "that it is better to obey man than God." It has been further obſerved, that ſubmitting to the deciſions of human authority in matters of faith is ſometimes prejudicial to, and ſubverſive of, true religion, where it does not iſſue in downright hypocriſy. For as, on the one hand, by the exerciſe of our rational faculties in ſearching after truth, we are not only likely to arrive at it, but to improve in the love of it, in candour, docility, and openneſs to conviction; and are diſpoſed to ſubmit to its influence; ſo, on the contrary, in proportion as we reſign ourſelves to the conduct of human authority, truth loſes its charms, and its influence over us; and we become blind to its cleareſt evidences, and brighteſt characters, and are thus prepared to be led into the moſt abſurd ſuperſtitions, and vileſt corruptions of religion. (See HERESY.) Should it be ſaid that no man is at liberty to declare or profeſs any ſentiments different from thoſe by law eſtabliſhed; this maxim, it may be replied, will vindicate the exerciſe of human authority in ſupport of every eſtabliſhment that ever was or will be: Mohammediſm at Conſtantinople; popery at Rome; epiſcopacy in England; preſbyterianiſm at Geneva, or in Scotland. The ſame principle, purſued to its conſequences, would have precluded the reformation from popery, and would even have ſtifled in its birth our holy religion itſelf.

By ſuch reaſoning diſſenters have vindicated the right of private judgment in the province of religion, and their deviation, with regard to articles of faith and forms of worſhip, from the national eſtabliſhment. The church, they ſay, is the kingdom of Chriſt, "a kingdom not of this world;" and he is the *ſole* lawgiver, ſovereign, and judge, in all matters of religion; and whilſt "they ſtand faſt in the liberty with which he has made them free," they think themſelves exempt from the charge of *ſchiſm*, (which ſee.) in departing peaceably from the communion of the eſtabliſhed church. (See CHURCH.) If we inquire, they ſay, after the conſtitution of the church of Chriſt, we muſt look for it only in the *Bible*; according to the maxim of the excellent Chillingworth; "the bible only is the religion of proteſtants; but the conſtitution of the church of England is found in the ſtatute-book, in the canons, and common-prayer book, and in the codes of the Engliſh law."

Differing from one another, as well as from the articles of the eſtabliſhed church, in a variety of ſpeculative opinions, and alſo from eſtabliſhed forms and ceremonies, the diſſenters allege that theſe were drawn up when the kingdom was juſt emerging out of popiſh darkneſs; and that in drawing them up, eſpecial regard was had to the *then* weakneſs of the people, who could not all at once be entirely brought off from the old ceremonies and forms; and that there are ſeveral parts of our liturgy, and eccleſiaſtical conſtitution, which many, even of our biſhops and clergy, have wiſhed to ſee altered; but they chiefly object to the *impoſition* of rites and practices that are mutable and indifferent, and of doctrines, concerning which the wiſeſt and beſt men have diſagreed, and may continue to diſagree without injury or danger, as long as they preſerve the unity of the faith in the bond of peace and mutual forbearance. They object to *ſponſors* in baptiſm, *confirmation*, the *abſolution* of the ſick and dying, kneeling at the *ſacrament* and the adminiſtration of it as a teſt, the preſcribed and indiſpenſable uſe of certain *habits*, the office for burial of the dead, bowing at the name of Jeſus, ſubſcription to articles of faith, compoſed by fallible men, the damnatory clauſes of the Athanaſian creed, the nature and mode of epiſcopal ordination, the withholding from Chriſtian laity the right of chuſing their own miniſters, the various ranks and powers ſubſiſting among the clergy, &c. &c. &c. Diſſenters object, and more particularly, to the impoſition of articles of faith, and ceremonies of worſhip, which they conceive to be unauthoriſed by the ſcripture, and inconſiſtent with their notion of its ſufficiency, and with the right of private judgment.

As to the political principles and conduct of the diſſenters, it will be ſufficient, as they apprehend, to refer to the truth of hiſtory, impartially and candidly contemplated, and to the unequivocal teſtimony of their advocates and even of many of their adverſaries, ancient and modern. It has been ſaid, indeed, that the diſſenters hold principles unfriendly to ſociety, and to civil government; principles, which, in the extreme, have produced the moſt fatal effects, both at home and abroad; but this has been chiefly ſaid by perſons who have confounded their principles, in their nature and tendency, with thoſe, which, being carried to an extreme by the anabaptiſts in Germany, and the high-monarchy men in England, in the 17th century, produced very extravagant conſequences. Whilſt, in the opinion of proteſtant diſſenters, the magiſtrate ſhould not expect, much leſs exact, obedience or ſubmiſſion in matters purely religious, and that in things pertaining to conſcience, it is the duty of the ſubject to act upon the principle of the apoſtles and primitive Chriſtians; that is, to "obey God rather than man:" they are ſo far from ſetting up the ſuppoſed intereſts of religion againſt lawful magiſtracy, or the peace and good order

order of ſociety, that they allow of the exemption of none from the authority of the civil magiſtrate; holding all to be equally under his juriſdiction; and that no plea of ſacred character, or of religion and conſcience, is to be admitted in bar to his procedure, in matters of a criminal, or merely civil nature. And as, in their opinion, it is his duty to *protect* all *good ſubjects* in the profeſſion of their religious principles; ſo, without any regard to their religious principles or profeſſions, he is to *puniſh* all *offenders* againſt the *peace* of ſociety. No diſſenter on earth is now ſo abſurd as to hold, that "dominion is founded in grace," and that "the ſaints muſt rule the world;" or any principles which have the leaſt tendency and aſpect towards ſuch a concluſion. On the contrary, they all aſſert, that religion is ſo far from veſting in its profeſſors a title to *dominion*, that it is no exemption from *civil ſubjection*. It is in matters of conſcience only, they apprehend, they are alone accountable to God: and that not ſo as to excuſe thereby any criminal overt acts, inconſiſtent with the peace of ſociety: *theſe* the magiſtrate muſt puniſh, from whatever principle they proceed, from any or none, and whatever plea of that ſort is offered in their favour. The diſſenters zealouſly maintain, in conformity with reaſon and ſcripture, that "Chriſt's kingdom is not of this world," and doth not at all interfere with the office of the magiſtrate; who, in their opinion, is ſupreme over all perſons within his dominions, of whatever religion, of any or none. In a word, their principles, with reſpect both to church-authority and to civil government, are preciſely the ſame which biſhop Hoadly advanced, and ſupported by ſound argument; doing thereby ſuch ſervice to the cauſe of true proteſtantiſm, and of the royal ſucceſſion in the houſe of Hanover, as will always be remembered with gratitude by the true friends of that auguſt family and of the liberties of their country. It has been affirmed by thoſe who beſt knew their principles, that there are no better ſubjects, and no better friends to the conſtitution of their country as a limited monarchy, defined and improved by the glorious revolution, than the proteſtant diſſenters; they pray for the continuance of the proteſtant ſucceſſion in the preſent illuſtrious family, and for the *ſalus regis et populi*, in the words, and with the fervour, with which father Paul prayed for the republic of Venice in his dying moments; "ESTO PERPETUA!" How their anceſtors acted in the period preceding the revolution, appears in the abſtract of their hiſtory which we have already given. Of their firm and zealous attachment to the family on the throne, they have given unequivocal proofs. When the kingdom, about the middle of the laſt century, was aſſailed by the adherents of another claimant to the crown; when the loyalty of many of thoſe who were near the perſon of the king was ſuſpected, and when terror had palſied even more than corruption had ſeduced; there was not *one* man, not a *ſingle individual* of their ſociety, who joined the enemies of his majeſty's houſe: at that time, the diſſenters, regardleſs of the dreadful penalties of the law, and anxious for their country alone, eagerly took arms; and as ſoon as the danger was paſſed by, they were compelled to ſolicit the protection of that general *mercy* which was extended to the very rebels againſt whom they fought, and to ſhelter themſelves under that *act of grace*, which was granted to the very *traitors* from whoſe arms they had defended the crown and life of their ſovereign. Amongſt thoſe who have borne honourable teſtimony to the principles and character of the diſſenters as members of the civil community, we may mention Dr. Secker, archbiſhop of Canterbury, who, in his "Letter to Mr. Walpole concerning biſhops in America," ſays, "the diſſenters are ſincere well wiſhers to the civil part of our preſent happy eſtabliſhment; and they are to be eſteemed and loved for it." The teſtimony of this prelate is the more important, as he was not only born of diſſenting parents, but received his education, together with the late excellent biſhop Butler, in one of their academies, under a tutor, whoſe great learning and abilities would have been no little honour to either of our univerſities. Lord North, in the courſe of the debate on a motion for the repeal of the teſt laws, whilſt he was pronouncing a panegyric on the conſtitution of the church, liberally declared, that when he profeſſed an attachment to the principles on which thoſe laws reſted, he did not mean to throw any reflection on the opinions of thoſe who conſcientiouſly differed from his ſentiments. He deprecated the idea, that he ſhould be thought to treat the diſſenters as men, who deſerved diſlike or puniſhment. He knew their virtue, their morality, their learning. The right honourable Mr. Charles Fox, referring in the ſame debate to the teſtimony borne in favour of the diſſenters by lord North, ſaid, he had ſpoken liberally and handſomely of the diſſenters. Why? becauſe he felt the propriety and the juſtice of ſuch a teſtimony. He knew that they had been ſteady in their attachment to government; that their religious opinions were favourable to civil liberty; and that the true principles of the conſtitution had been remembered, and aſſerted by them, at times, when they were forgotten, perhaps betrayed, by the church. Such had been the character of the diſſenters; and he farther maintained, that their political opinions were not now different from what they had been formerly. Pierce's Vindiciæ, &c. Neal's Hiſt. Puritans. Furneaux's Letters to Blackſtone. Towgood's Letters. See CHURCH, NON-CONFORMISTS, PURITANS, TEST, and TOLERATION.

DISSENTIS. See DISENTIS.

DISSEPIMENTUM, a partition, in *Botany*, ſerves to divide the internal part of a fruit into two or more cells. The partitions of a capſule ſometimes originate from the centre of its valves, as in Juſſieu's natural order of *Ericæ*, or from the inflexed margins of thoſe valves as in his *Rhododendra*. Hence he has lately ſeparated from the former order the *Erica Dabeoci* Sm. Fl. Brit. 420. Engl. Bot. t. 35, and referred it to *Menzieſia*, a genus founded by Dr. Smith upon that very circumſtance. It appears however that ſome ſuppoſed *Ericæ* have the ſame ſtructure, though none of the *Rhododendra* have a partition from the centre of their valves. Some plants have partitions ſpringing from the central pillar or *columella*. Pods, *Siliquæ*, have moſtly a longitudinal membranous partition, dividing them into two cells, with a thick edge to which the valves are originally attached, as in the Sattin-flower, *Lunaria*, the various kinds of Stock, *Cheiranthus*, &c.

DISSIDENTS, in a general ſenſe, denote thoſe who differ from the eſtabliſhed religion of the country in which they live: but, in its more appropriate meaning, the denomination is applied in Poland to thoſe of the Lutheran, Calviniſtic, and Greek profeſſion. The hiſtory of this party, as it is ſketched by the Poliſh hiſtorians, is detailed by Mr. Coxe in his hiſtory of Poland. (Travels, vol. i.) The reformation was introduced in the reign of Sigiſmond I. who aſcended the throne in the year 1506, and who perſecuted its followers: but their number, however, increaſing, his ſon Sigiſmond Auguſtus, who ſucceeded his father in 1548, not only indulged them in the liberal exerciſe of their worſhip, but admitted them, together with the Greeks, and all other ſects then ſubſiſting in Poland, to a ſeat in the diet, and to all the honours and privileges hitherto confided to the catholics. Theſe maxims of unlimited toleration were generally adopted by the nation, and the members of the diet, which aſſembled upon the deceaſe of Sigiſmond Auguſtus, being of different perſuaſions,

perſuaſions, determined on a reciprocal indulgence of their reſpective tenets. To avoid invidious diſtinctions, they called themſelves indiſcriminately "diſſidents in religion," a phraſe intimating, not, according to our notions, ſeparatiſts from an eſtabliſhed church, but perſons holding different opinions in religious matters. It was at the ſame time enacted, that this difference of religious ſentiments ſhould create no difference in civil rights; and accordingly in the *Pacta conventa* formed by the diet, a clauſe was inſerted as part of the coronation oath: "I will keep peace among the diſſidents." Henry, who objected to this univerſal toleration, withheld his conſent, till one of the Poliſh envoys exclaimed, "Unleſs you confirm this article, you cannot be king of Poland:" he accordingly took an oath to obſerve this clauſe, before he was permitted to aſcend the throne. In proceſs of time, the Roman Catholics, having acquired a conſiderable aſcendency, ventured to apply the appellation of diſſidents to all thoſe who diſſented from the catholic religion. This reſtriction was at firſt attended with no encroachments on the privileges of the other ſects; and the term diſſidents was not regarded in an obnoxious light. The diſſidents indeed ſtill continued in ſuch unqueſtioned poſſeſſion of all rights, civil and religious, that, when it was agreed by both catholics and proteſtants to perſecute the Arians, it was thought previouſly neceſſary to expel them from the body of diſſidents. In conſequence of this excluſion, the Arians, in the reign of John Caſimir, were firſt rendered incapable of being elected nuntios, afterwards deprived of their places of worſhip, and finally baniſhed. This perſecution, inadvertently aſſented to by the Proteſtants and Greeks, was a prelude to their ſufferings: for, as the Catholic party predominated, the term diſſidents, at firſt confined to perſons profeſſing the Proteſtant religion, *viz.* the Lutherans and Calviniſts (other Proteſtant ſects, ſuch as the Mennonites, Anabaptiſts, Quakers, and Arians, not being included among the diſſidents,) and that of the Greek church, became of a leſs inoffenſive import, and conveyed an idea of non-conformity The ſectaries, accordingly, who were ſtill diſtinguiſhed by the appellation of diſſidents, perceiving the intention of the Catholics to undermine their privileges, obtained a declaration, that they ſhould not be blended with, and be obnoxious to the penal laws enacted againſt the Arians. But theſe promiſes were inſenſibly eluded; their privileges were gradually diminiſhed, in the courſe of a few years they were ſubjected to a variety of diſqualifications, and, at length, in 1733, formally incapacitated from ſitting in the diet. A law of Ladiſlaus II. againſt heretics, as well as the penalties againſt the Arians, were revived, and occaſionally extended to the diſſidents. Theſe continual perſecutions greatly diminiſhed their number, and rendered their remonſtrances ineffectual: the catholics, who took the lead in the diet, even declared it high treaſon to ſeek the reſtoration of their immunities by the interceſſion of foreign powers, in direct contradiction to the treaty of Oliva, in which it was ſtipulated, that the rights of the diſſidents ſhould be maintained in their full latitude.

Such was the ſituation of the diſſidents at the acceſſion of Staniſlaus Auguſtus, who, though ſtrongly inclined to toleration, was obliged to concur with the general ſenſe of the diet, and confirm the laws which had been promulgated againſt them. The diſſidents applied to the courts of London, Peterſburg, Berlin, and Copenhagen, as the mediating powers in the treaty of Oliva, who warmly ſupported their cauſe, and preſented memorials to the diet, demanding a reſtoration of their religious eſtabliſhments, and of all the privileges ſecured to them by that treaty. The diet of 1766, however, was not of a temper to accede to theſe propoſals. The enemies of toleration contended that the privileges were obſolete, having been repeatedly aboliſhed in various diets, and that the diſſidents had no well-founded claim either to the reſtitution of their civil immunities, or to the toleration of their worſhip: the biſhop of Cracow, the moſt bigotted of the catholics, even propoſed a law againſt their catholic abettors. Violent altercations aroſe in the aſſembly; and the members ſeparated in great diſorder. On a ſubſequent day, the violence of party was renewed, and the acts againſt the diſſidents confirmed. But to conciliate the mediating powers, the bench of biſhops, by command of the diet, drew up nine articles in favour of the diſſidents, relative to the free exerciſe of their worſhip. Theſe acceſſions not being deemed ſufficiently favourable, while the exceptionable laws were unrepealed, the empreſs of Ruſſia remonſtrated againſt the proceedings of the diet, and the diſſidents began to form confederacies in different parts of the kingdom. They were joined by many diſcontented catholics, and aſſiſted by a large body of Ruſſian troops, who entered Thorn, where the firſt and principal confederacy took its riſe. All the mediating powers, Great Britain, Denmark, Pruſſia, and Sweden, teſtified their approbation of theſe confederacies, which gradually comprehended political grievances, and which were ſtrengthened by other confederacies among the catholic nobles, who affected to be advocates for toleration, and declared their intentions of ſupporting the cauſe of the diſſidents. The coalition of this catholic confederacy with that of the diſſidents, ſoon afterwards took place in the palace of prince Radzivil at Warſaw. The king convoked a diet for the purpoſe of reconciling the oppoſite parties, but it failed in producing the intended effect. This diet, in a very intimidated and tumultuous ſtate, appointed a grand committee, to adjuſt, in conjunction with the mediating powers, the affairs of the diſſidents, and then broke up. This committee propoſed to repeal all the laws enacted againſt the diſſidents, and to reſtore their ancient privileges; and their pacific reſolutions were ratified at an extraordinary diet, convened in the beginning of the year 1768. In conſequence of theſe meaſures, Poland enjoyed for a moment an univerſal tranquillity; but it was that ſullen calm, which precedes a tempeſt, and announces the approach of violent commotions. The diet had not been long diſſolved, before the indulgences granted to the diſſidents excited general diſſatisfaction among the Roman catholics, who formed ſeveral confederacies in defence of the ſacred catholic faith. From this time, Poland became a ſcene of bloodſhed and devaſtation; and hoſtilities were protracted from the diſſolution of the diet in 1768 to the diviſion of Poland in 1772. At the laſt meeting of the delegates, who were appointed to adjuſt the terms of the diſmemberment in 1773, the pretenſions of the diſſidents were finally ſettled between the republic and the mediating powers. The catholic party violently oppoſing the reſtoration of their ancient privileges, by the conſent of the foreign courts, they continued excluded from the diet, the ſenate, and the permanent council. In return, the diſſidents enjoyed the free exerciſe of their religion, were permitted to have churches without bells, ſchools, and ſeminaries, were capable of ſitting in the inferior courts of juſtice, and in the tribunal appointed to try appeals in matters of religion, three of their communion were admitted as aſſeſſors. In conſequence of this toleration, the diſſidents conſtructed churches in different parts of the kingdom; and one built upon this occaſion by the Lutherans at Warſaw, has the following inſcription:

"Hæc

" Has ædes Deo J. O. ſacras
Cœtus Varſovienſis in Auguſt. Confeſs. ex
Conſenſu Staniſlai Auguſti Regis et Reipublicæ
Struere Cœpit, Aprilis 24, 1777."

See POLAND.

DISSIMILAR, in *Anatomy*. Authors divide the parts of the body into ſimilar, and diſſimilar.

Diſſimilar parts, by ſome called alſo compound, and organical parts, are ſuch as may be divided into various parts, of different ſtructure, &c. Thus the hand is diviſible into veins, muſcles, bones, &c. whoſe ſubdiviſions are neither of the ſame nature nor denomination.

DISSIMILAR *Leaves*, denote the two firſt leaves of any plant at its firſt ſhooting out of the ground.

They are thus called, becauſe they uſually are of a different form from the common leaves of a grown plant.

Theſe Dr. Grew obſerves to be nothing but the very lobes of the ſeed thus expanded, and thus advanced.

Their uſe is for the protection of the plume; which being young and tender, is thus guarded on each ſide, and has alſo ſome rain and dew gradually conveyed down to it by this means. See PLUME.

DISSIMILITUDE, in *Geometry*, &c. See SIMILITUDE.

DISSIMILITUDE, or *Diſſimili*, in *Rhetoric*, &c. is a diſagreement of things in quality, and furniſhes an argument, wherein, from diſſimilar, or unlike things, other diſſimilars are deduced.

Thus Cicero, " Si barbarorum eſt in diem vivere; noſtra conſilia ſempiternum tempus ſpectare debent." Thus alſo Cicero (in Piſon. c. 14, &c.) ſhews the preference of his own exile to Piſo's government of Macedonia, by the difference between their conduct, and the people's eſteem of them. Catullus furniſhes a very beautiful argument from diſſimilitude.

" Soles occidere & redire poſſunt,
Nobis cum ſemel occidit brevis lux,
Nox eſt perpetua una dormienda."

END OF VOL. XI.

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